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Authentic Decision and Self-Awareness Scale (ADSAS)

Validation study

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Table of Contents

Abstract.....	4
Authentic Decision & Self Awareness Scale (ADSAS).....	5
Literature Review.....	5
Operational Definitions of Autonomy Within SDT	6
Other Operational Definitions of Autonomy	7
Method	8
Participants.....	8
Materials	9
Authentic Decision and Self-Awareness Scale.	9
Perceived Choice and Awareness of Self Scale.	9
Alienation Scale.	10
Procedure	11
Face Validity.....	11
Content Validity.....	11
Criterion-Related Validity.	11
Construct Validity.....	12
Internal Consistency.....	13
Split-half Reliability.....	14
Test-retest Reliability.	14
Results.....	14
Validity Analyses	14
Face Validity.....	14
Content Validity.....	14
Criterion-related Validity.....	16

Construct Validity.....	18
Reliability Analyses	22
Internal Consistency.....	22
Split-half Reliability.....	23
Test-retest Reliability.	24
The Final Questionnaire.....	26
Discussion.....	27
Conclusion	29
References.....	30
Appendix A	32
Appendix B.....	34
Appendix C	35
Appendix D.....	37

Abstract

This is a validation study of a measure for the construct of autonomy, which is one of the essential cornerstones of self-determination theory. Based on previous research, autonomy was operationalized as composing of two subparts: authentic decision and self-awareness, which were then quantified on two subscales of the developing questionnaire. It was shown that the newly developed Authentic Decision and Self-Awareness Scale (ADSAS) correlated significantly and positively with the already established measure Perceived Choice and Awareness of Self Scale (PCASS), as well as significantly and negatively with the Alienation Scale (AS), providing the evidence for both convergent and discriminant validities. Also, the internal consistency of the final questionnaire was high with a Cronbach's alpha of .7 value. Construct validity examined by factor analysis showed that items loaded on expected subscales and provided confidence of the factor structure of the measure. Test-retest reliability yielded significant correlation for both total scores on ADSAS and Authentic Decision subscale, but no significance was found in Self-Awareness subscale, suggesting that self-awareness may be a more fluid construct amenable to change in time as compared to authentic decision. In conclusion, the newly developed measure of autonomy, along with the two subscales measuring authentic decision-making and self-awareness, was shown to be both reliable and valid and, therefore, may be used in further studies to assess this construct in the context of self-determination theory.

Keywords: autonomy, authentic decision, self-awareness, self-determination

Authentic Decision & Self Awareness Scale (ADSAS)

The Greek philosopher, Aristotle (d. 322 B.C.), postulated the idea of self-sufficiency (*autarkeia*) as one of the preconditions to happiness (*eudaimonia*) (Heinaman, 1988). According to Aristotle, self-sufficiency is defined as “that which on its own makes life desirable and lacking in nothing” (p. 41). Recent developments in psychology observe a parallel of this ancient philosophical idea in a theory called the Self-Determination Theory (SDT). Founded by two researchers from the University of Rochester, Richard M. Ryan and Edward L. Deci (2000), SDT is defined as a theory of human motivation, personality development, and well-being, that revolves primarily around the influence of an individual’s intrinsic desire for growth. Furthering the theory, DeRobertis and Bland (2018) align this innate self-actualizing factor to humanistic psychology’s model of becoming a *fully functioning person*, making SDT “explicitly indebted to Aristotle by way of a *eudaimonic* view of human health” (p. 111).

Literature Review

Researchers within the field of SDT posited that it is a multifaceted theory of motivation, which at its core lie three basic psychological needs: autonomy, competence and relatedness (e.g. Self-Determination Theory [SDT; Weblink], n.d.a; Vallerand, Pelletier & Koestner, 2008). Being driven by either one of these motivators as the driving force yields different outcomes. With regards to autonomy, particularly, DeRobertis and Bland (2018) considers it to be a fundamental concept of SDT in a way that likens it to the concept of *willing* within humanistic psychology. This is because, an “autonomous motivation is made possible when one is capable of endorsing one’s actions at the highest level of reflection” (p. 109), which is to say, an authentic motivation that happens intrinsically, as opposed to a controlled motivation that happens extrinsically (p. 109). As such, it corresponds to the humanistic psychological notion of the self-actualizing human being, and therefore is a

crucial element to self-development. This current validation study, hence, focuses on autonomy as a motivator, with the aim of developing a new scale to capture this construct.

Operational Definitions of Autonomy Within SDT

Autonomy may be operationalized in several ways. In this current research, autonomy has been defined as a person's ability to make authentic decisions and their level of awareness of their own emotional experience, which is operationally assessed by a total score on the newly-developed Authentic Decision and Self-Awareness Scale (ADSAS). The ADSAS is developed to measure the two aspects that characterize autonomy as it is known within SDT, specifically, as the name suggests, making decisions that are in accordance with one's true self (measured by the "*Authentic Decision*" subscale) and the awareness of the emotional experience of one's self (measured by the "*Self-Awareness*" subscale). These two areas are primary to autonomy, whereby they tap on the intrinsic locus of evaluation, which is central to the condition for growth in the human being, as theorized by Carl Rogers's organismic valuing process (DeRobertis & Bland, 2018). Therefore, to determine an individual's ability in authentic decision-making and his internal awareness may shed a light toward his competence in self-determination, which can, in turn, affect the quality of his life.

Additionally, autonomy as a psychological trait has been studied by researchers Sheldon, Ryan and Reis (1996) using the Self-Determination Scale (SDS). This scale measures two subdomains of *Self-Contact* and *Choicefulness*. They found a significant positive correlation at .01 level between autonomy and total well-being, which suggests that autonomy is important, not only as an optimal motivator as was mentioned above, but also as a trait to have to live a more satisfying life. The SDS has since been renamed to be called the Perceived Choice and Awareness of Self Scale (PCASS; SDT [Weblink], n.d.b); nevertheless, the items of the questionnaire remain the same.

Furthermore, researchers Chirkov, Ryan, Kim and Kaplan (2003) define autonomy as the “extent to which one fully accepts, endorses, or stands behind one’s actions” (p. 99). However, they also write that this definition is not a final one and mention that present-day SDT distinguishes between various action motives, which can be viewed as lying along the continuum from low to high internalization. Specifically, this continuum ranges from external regulation, when behavior is motivated solely based on contingent reinforcers such as rewards or punishments; through introjected regulation, when avoidance of guilt is the primary motivation of the actions; to integrated regulation, which refers to the state of having a congruent values and behaviors with which one has identified and synthesized those into his day-to-day life. This continuum of regulation overlaps with the continuum of levels of autonomy.

Other Operational Definitions of Autonomy

There have also been other scales that has been developed to measure autonomy as a construct separate from SDT. One such scale is the 30-item Autonomy-Connectedness Scale (ACS-30), which is a shorter version of the Autonomy Scale containing 50 items (Bekker & van Assen, 2006). According to the developers of the two scales, autonomy may be conceptualized in three ways, whereby only one of which is psychologically adaptable and leads to well-being, while the other two are not. The first, autonomy as “self-governance,” is characterized by “interpersonal connectedness” requiring psychologically healthy personality traits of agreeableness, conscientiousness, and openness, and low in neuroticism (p. 51). This type of autonomy is adaptive and leads to harmonious relationships characterized by interdependency between the individual and the people in his life. On the other hand, the two maladaptive types of autonomy are conceptualized as either “separation,” which is independence from others, and “depressogenic vulnerability,” which is a type of cognitive depression that leads one to self-reliance (p. 51). As such, the ACS-30 measures autonomy on

three subscales, namely “Self-Awareness,” “Sensitivity to Others,” and, “Capacity for Managing New Situations.” Even though Bekker and van Assen developed the ACS-30 independently from SDT, it can be noted that two of the subscales in the ACS-30 coincide with the two subscales present in ADSAS. The first are the “Self-Awareness” subscales, sharing the same nomenclature, which in the ACS-30 is characterized as “the capacity to be aware of one’s own opinions, wishes, and needs, and the capacity to express these in social interactions” (p. 52). The second are the “Capacity for Managing New Situations” (ACS-30) and the “Authentic Decision” (ADSAS) subscales, in the sense that a capability of a person to make decisions that are true to oneself would directly correlate with one’s aptitude in handling novel situations that “reflects (un-)easy feelings, [due to] flexibility, an inclination to exploration, and dependence on familiar structures” (p. 52).

Method

Participants

Participants were recruited using the convenience sampling method via two avenues. Firstly, the researchers approached students of the University of New York in Prague (UNYP) in person, with the questionnaire packet being handed out in paper format. Secondly, to facilitate a wider reach and accessibility to the study an online version of the questionnaire packet was made available. The online format was then distributed out to other students at UNYP, as well as the researchers’ personal contacts via social media and private messaging. There were 68 participants, however, four had to be dropped due to incomplete data, making the final total number of participants qualified for statistical analysis $n = 64$. Demographic information were not collected, however, as most participants were already known to the researchers, the majority of the participants were in the early twenties age group.

Materials

First, the participants were asked to sign an informed consent form (see Appendix A), in which they were informed that this study is not anonymous, as there was need to collect their responses on one the scale in validation process again after a period of seven weeks due to the test-retest reliability purposes. After giving their informed consent, participants moved on to fill in the questionnaires, in the following order.

Authentic Decision and Self-Awareness Scale. The Authentic Decision and Self-Awareness Scale (ADSAS; see Appendix B) was the newly-developed 11-item questionnaire being studied. It is designed to measure two aspects of self-determination theory: authentic decision and self-awareness. All items are rated on a 5-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree.” A sample item for the subscale of Authentic Decision is: “Whenever I make an important decision, I prioritize my own values and needs over what others expect of me.” A sample item for the subscale of Self-Awareness is: “I am aware of the way I feel at any given moment.” Three out of the 11 questions are reversed-scored.

Perceived Choice and Awareness of Self Scale. The Perceived Choice and Awareness of Self Scale (PCASS; see Appendix C) was formerly labeled as the Self-Determination Scale but was renamed to better capture the assessed constructs. This scale is purported to measure the same constructs the newly-developed scale is supposed to measure and will be used for convergent validity purposes. According to scale authors, “this scale assesses individual differences (trait level) in *perceived choice* and *awareness of self*. Perceived choice reflects feeling a sense of choice with respect to one’s behavior and awareness of self reflects being aware of one’s feelings and one’s sense of self” (SDT [Weblink], n.d.b). The PCASS contain 10 items on a 5-point Likert scale which asks participants to rate how much they agree with two presented statements (A and B) with

options ranging from “Only A feels true” to “Only B feels true.” A sample item of a Perceived Choice subscale is: “A. I always feel like I choose the things I do. B. I sometimes feel that it’s not really me choosing the things I do.” A sample item of Awareness of Self subscale is: “A. My emotions sometimes seem alien to me. B. My emotions always seem to belong to me.” In a previous research, “this scale was shown to have good internal consistency (alphas ranging from .85 to .93 in numerous samples) and adequate test-retest reliability ($r = .77$ over an 8-week period)” (Sheldon, Ryan & Reis, 1996, p. 1273).

Alienation Scale. The Alienation Scale (see Appendix D) is purported to measure a construct (self-alienation) that is considerably on the opposite spectrum of the constructs measured by the ADSAS. Hence, its scores will be used for discriminant validity purposes. According to scale developers, alienation is composed of three components: powerlessness, meaninglessness and social isolation (Rayce, Kreiner, Damsgaard, Nielsen & Holstein, 2018). They define powerlessness as “the expectancy or probability held by the individual that his own behavior cannot determine the occurrence of the outcomes, or reinforcements, he seeks” (p. 3); meaninglessness as “a low expectancy that satisfactory predictions about future outcomes of [one’s] behavior can be made” (p. 3); and, social isolation as “low expectancy for inclusion and social acceptance” (p. 3). The Alienation Scale contains 11 items on a 5-point Likert scale (with the exception of one question on a 4-point Likert scale) that measures those three components on the subscales; however, in this study the researchers used only the total score obtained by adding up the scores on individual items. A sample item reads: “How often do you feel helpless?” with responses ranging from “never” to “always.” Six out of 11 items were reverse scored. Developers of the scale do not include internal consistency coefficient in their construct validation paper but mention that the scale had low test-retest reliability, which was improved if it was expressed by test-true score correlation, when the reliability coefficients of subscales ranged from .62 to .83.

Procedure

Face Validity. Face validity refers to the judgment of how relevant the items of the questionnaire appear to be. This is the most subjective part of validation process, as it does not rely on any quantitative data but is qualitative in nature, based on the participants' judgements to comment on the test and how it appears to them. Several participants were asked to report their thoughts of the ADSAS scale after its completion and their views are reported later in the paper. The researchers also used their own common sense and opinion when developing the test items, and consulted other measures present in the literature, in order to arrive at item wordings that appeared to us to be the most relevant to the purported constructs.

Content Validity. To estimate the content validity of the questionnaire, the researchers used clearly defined terms, experts' opinions and a literature review. Three panelists (Bethany Butzer, Vartan Agopian and Zeynep Deniztokar) were selected from the University of New York in Prague and independently completed the content validity form on a scale whereby "0" meant the item is not necessary or not essential and "1" meant the item is essential for the questionnaire. The formula developed to measure content validity ratio is " $CVR = n - (N/2)/(N/2)$ " (n: the number of panelists rating 'essential', N: the number of panelists) (Lawshe, 1975, p.190). The items with Content Validity Ratio index below zero are usually removed, but after consultation with professor Vartan Agopian, the researchers decided to reword and keep those items.

Criterion-Related Validity. Criterion-related validity refers to the extent to which the ADSAS scale is related to other already well-established measure. Firstly, the scores on the ADSAS were correlated with the scores on the PCASS, a scale which purports to measure the same constructs of Perceived Choice and Self-Awareness, which are named Authentic Decision and Self-Awareness in ADSAS. In order to assess this category of validity, Pearson

product-moment correlation was computed between total scores on ADSAS and PCASS to assess convergent validity, whereby a significant positive correlation was expected.

Afterwards, this was also done for the Authentic Decision subscale of ADSAS with the Perceived Choice subscale of PCASS, and the Self-Awareness subscale of ADSAS and the Awareness of Self subscale of PCASS, to determine the convergent validities of each of the subscales. Additionally, to assess discriminant validity, the scores on ADSAS were correlated with the scores on the Alienation Scale, a scale which purports to measure a construct unrelated, and arguably opposite, to autonomy. Here, a significant negative correlation was expected.

Construct Validity. Construct validity is an umbrella term for previous two types of validity (criterion-related and content), which aims to portray how well the test items are able to differentiate the level of authentic decision and self-awareness present in the participants. In other words, participants who obtain higher scores on the test should in reality possess the greater amount of the construct than low-scorers. Validating this thoroughly would require having another type of assessment of the constructs in question (such as behavioral observation). In this current research condition, the researchers used factor analysis to examine it.

Factor Analysis. Factor analysis is a complex statistical procedure. In this research, method of Principal Axis Factoring was used to determine, whether individual items of ADSAS loaded on the two purported subscales of Authentic Decision and Self-Awareness, and what is the magnitude of that loading. Also, factor analysis was run in order to provide data for the relevance of individual items and whether there are some items, which may be better deleted or reworded. Performing factor analysis involved two steps that had to be performed prior to the examination of actual factor structure of test items and their loadings.

Those two steps were computing the Kaiser-Meyer-Olkin (KMO) test or sampling adequacy and Bartlett's test of Sphericity.

KMO is an index to measure the linearity of the relationship between variables in order to determine whether data set is suitable to run the most likelihood analysis (Kaiser, 1974). Values can vary between 0 and 1. Even though 0.6 is enough to run the analysis, values bigger than 0.8 is expected to have useful analysis are regarded as more sufficient sampling. The KMO values below 0.5 are 'unacceptable', those between 0.5 and 0.6 are 'miserable', those between 0.6 and 0.7 are 'mediocre', whereas values ranged between 0.7 and 0.8 are 'middling', those between 0.8 and 0.9 are 'meritorious', and values bigger than 0.9 are 'marvelous' (Kaiser, 1974). Additionally, Bartlett's test of Sphericity was run to measure the correlation matrix, which showed whether the factor analysis was meaningful or not, which also had to be statistically significant. Furthermore, only factor loadings above 0.3 were to be included.

Internal Consistency. Internal consistency refers to degree to which individual items of the test (and its subscales) are related to each other. In other words, it measures homogeneity of test items. It was assessed by coefficient Cronbach's alpha, which refers to the mean of all possible split-half correlations and uses Spearman-Brown formula to correct for odd number of items, as in these instances the two halves can never be precisely equal. Values of Cronbach's alpha are in the interval between 0 and 1, with higher values meaning higher internal consistency. As a rule of thumb, the cut-off point is usually .5, and anything below is not acceptable. In this current analysis, general Cronbach's alpha was computed, as well as individual Cronbach alphas with different items deleted, in order to assess, whether deleting of some item might result in increased internal consistency. In other words, whether there were any items, which does not fit the other ones in measuring the construct in question.

Split-half Reliability. Testing for this type of reliability involved running Pearson product-moment correlation on two equivalent halves of test scores. For this analysis to make sense, items measuring both constructs should appear in both halves, which was assured by manual specification of both halves of scores. Also, as ADSAS involves 11-items, which is an odd number impossible to divide into two equivalent halves, correlation coefficient of split-half reliability was adjusted using Spearman-Brown formula. Positive and strong correlations was expected to be obtained.

Test-retest Reliability. Test-retest reliability refers to the extent to which the test gives stable results over time. In order to assess it, ADSAS was administered twice to the same group of participants with seven weeks in between the measurements. Then, the Pearson product-moment correlation was computed between the individual participants scores at initial measurement (test) and after seven weeks (retest), with significant and strong positive correlations expected.

Results

Validity Analyses

Face Validity. One of the participants reported his thoughts about the questionnaire. He mentioned that it was a fairly challenging exercise for him and it made him reflect quite hard. He found it as a positive attribute of ADSAS. Furthermore, two other participants mentioned that they were unsure about the meanings of some of the items on the Self-Awareness subscale and asked for more clarification.

Content Validity. According to the content validity ratio (CVR), items number 2, 6, 8 and 10 received a “No”. These items are: 2. When I am experiencing an emotion, I get so aware of it that sometimes it makes me feel uncomfortable.; 6. I have difficulties regulating the way I feel even when I want to. (*reversed scored*); 8. When I think about my inner world,

I am always aware of the way I feel.; and, 10. My body always express how I feel regardless of whether it is positive or negative. These items belong to the Self-Awareness subscale.

However, these above-mentioned items, along with items number 1, 3, 4, 5 and 7 have also been reworded before item analysis was done, according to the observations given by the panelists. These items are: 1. Whenever I make an important decision, I prioritize my own values and needs over what others expect of me.; 3. When others ask me to do something, I feel pressured to do it. (*reverse scored*); 4. I am aware of the way I feel at any given moment.; 5. I am fully responsible for my decisions.; and, 7. When I make decisions, being true to myself is more important to me than not upsetting others. These items, with the exception of item 4, belong to the Authentic Decision subscale.

Only items 9 and 11, each belonging to the Authentic Decision and the Self-Awareness subscale respectively, remain unchanged from its initial conception. These items are: 9. I sometimes find myself doing something just to please other people, rather than out of my own interest. (*reverse scored*); and, 11. I am able to articulate my feelings to others, even when it is uncomfortable.

Additionally, item discriminant analysis was used to assess each item individually according to their Corrected Item-Total Correlation. The results showed that items 2 and 10 received negative scorings, -.230 and -.299 respectively. The remaining items received positive correlations, ranging from item 3 receiving the lowest positive score (.129) to item 11 receiving the highest positive score (.455) (see Table 1). Hence, depending on the results of the other following analyses, items 2 and 10 may be considered for removal or revision in the final version of the questionnaire.

Table 1
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Whenever I make an important decision, I prioritize my own values and needs over what others expect of me.	34.56	20.758	.283	.491
2. When I am experiencing an emotion, I get so aware of it that sometimes it makes me feel uncomfortable.	35.11	25.020	-.230	.611
3. When others ask me to do something, I feel pressured to do it.	35.67	21.208	.129	.528
4. I am aware of the way I feel at any given moment.	34.78	18.809	.409	.450
5. I am fully responsible for my decisions.	33.97	21.555	.293	.497
6. I have difficulties regulating the way I feel even when I want to.	35.48	18.793	.311	.474
7. When I make decisions, being true to myself is more important to me than not upsetting others.	34.92	18.613	.379	.455
8. When I think about my inner world, I am always aware of the way I feel.	34.61	19.607	.402	.460
9. I sometimes find myself doing something just to please other people, rather than out of my own interest.	35.80	17.783	.424	.436
10. My body always expresses how I feel regardless of whether it is positive or negative.	34.89	25.813	-.299	.629
11. I am able to articulate my feelings to others, even when it is uncomfortable.	35.05	17.791	.455	.428

Criterion-related Validity. Criterion-related validity analyses were computed for convergent and discriminant evidences, using two already established scales. For the convergent validity analysis, the Perceived Choice and Awareness of Self Scale (PCASS) were used. For the discriminant validity analysis, the Alienation Scale (AS) was used.

Additionally, the Authentic Decision and Self-Awareness subscales of the ADSAS were analyzed with the Perceived Choice and Awareness of Self subscales of the PCASS respectively to determine their convergent evidences. Data were assumed to be normally distributed, and the Pearson correlation coefficient was computed for the analyses.

Total. Items in the ADSAS were correlated with the PCASS to determine its convergent validity. The result showed a significant positive correlation, $r(62) = .588$, $p = .000$ (see Table 2). Therefore, the ADSAS attained criterion-related (convergent) validity.

Furthermore, items in the ADSAS were correlated with the AS to determine its discriminant validity. The result showed a significant negative correlation, $r(62) = -.509$, $p = .000$ (see Table 3). Therefore, the ADSAS attained criterion-related (discriminant) validity.

Table 2
Correlations

		ADSAS total	PCASS total
ADSAS_total	Pearson Correlation	1	.588**
	Sig. (2-tailed)		.000
	N	64	64
PCASS_total	Pearson Correlation		1
	Sig. (2-tailed)	.000	
	N	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3
Correlations

		ADSAS total	AS total
ADSAS_total	Pearson Correlation	1	-.509**
	Sig. (2-tailed)		.000
	N	64	64
AS_total	Pearson Correlation		1
	Sig. (2-tailed)	.000	
	N	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

Authentic Decision Subscale. Items on the Authentic Decision subscale of the ADSAS were correlated with the Perceived Choice subscale of the PCASS. Results showed a significant positive correlation $r(62) = .354, p = .004$ (see Table 4). Therefore, the Authentic Decision subscale attained criterion-related validity.

Table 4
Correlations

		ADSAS choice	PCASS choice
ADSAS_choice	Pearson Correlation	1	.354**
	Sig. (2-tailed)		.004
	N	64	64
PCASS_choice	Pearson Correlation		1
	Sig. (2-tailed)	.004	
	N	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

Self-Awareness Subscale. Items on the Self-Awareness subscale of the ADSAS were correlated with the Awareness of Self subscale of the PCASS. Results showed a significant positive correlation $r(62) = .424, p = .000$ (see Table 5). Therefore, the Self-Awareness subscale also attained criterion-related validity.

Table 5
Correlations

		ADSAS awareness	PCASS awareness
ADSAS_awareness	Pearson Correlation	1	.424**
	Sig. (2-tailed)		.000
	N	64	64
PCASS_awareness	Pearson Correlation		1
	Sig. (2-tailed)	.000	
	N	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

Construct Validity. Construct validity analysis was used to determine whether the ADSAS measures the constructs that it purports to measure, namely, authentic decision-

making and self-awareness. Because there are a number of ways a construct validity analysis may be run, the researchers have used factor analysis in this current research to identify the specific variables of each item within the ADSAS that discriminates a test-taker based on the above-mentioned constructs.

Factor Analysis. Factor analysis was run in order to investigate the construct validity of ADSAS. All eleven items were entered and prior to investigating factor loadings, Kaiser-Meyer-Olkin Measure index was computed and result of .607 suggests that data show good sampling adequacy (see Table 6). Also, Bartlett's test of sphericity yielded significant result ($\chi^2(55) = 134.098, p = .000$) indicating that data were suitable for dimension reduction (see Table 6). With these assumptions for factorizations met, we continued further to investigating factor loadings.

As ADSAS consists of two subscales, factor analysis was instructed by the researchers to produce two factors. For validation purposes, the method of Principal Axis Factoring is said to be the most suitable one, which is the reason the researchers used this extraction method with varimax rotation. Based on Eigenvalues, total of 4 factors exceeded value of 1, which means that SPSS could identify up to four factors in the data, which can be also seen by visual inspection of the scree plot (see Table 7 and Figure 1). However, as was already said, two factors were forced and hence also eventually produced. Item loadings on factors which are below .4 level were considered as to not load on any of the factors.

Items 4, 8, and 11 loaded on Factor 1 with values .765, .584, and .527 respectively (see Table 8). Items 7, 9, 6, and 1 loaded on Factor 2 with values .606, .534, .464, and .407 respectively. Also item 3 almost loaded on Factor 2, as the value approximated the .4 threshold (.372). Item 5 did not load on any factor above .4 level, and neither did items 2 and 10.

From the scale development, odd items 1, 3, 5, 7, and 9 were expected to load on one factor of Authentic Decision, whereas even items 2, 4, 6, 8, 10, plus item 11, were expected to load on the second factor of Self-Awareness. Factor analysis yielded two factors, and from the analysis above it can be observed that all items which loaded on Factor 1 (4, 8, and 11) reflected those aimed to portray the subscale of Self-Awareness, and most items (with the exception of item 6) which loaded on Factor 2 (1, 6, 7, 9, and almost also item 3) reflected those which were aimed to measure Authentic Decision, which can provide us with some sense of confidence in the factor structure of ADSAS.

The only questionable item, which loaded on the different factor than it was supposed to, is item 6, which reads “I have difficulties regulating the way I feel even when I want to.” However, although item 6 loaded on Factor 2 at .464 level, it was not that lacking behind in its loading on Factor 1 (.372), indicating that this item is perhaps on the border between the two subscales. Items 2, 5 and 10 did not load on any factor, and hence may be considered for removal from the final version of the questionnaire.

Table 6

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.607
Bartlett's Test of Sphericity	Approx. Chi-Square	134.098
	df	55
	Sig.	.000

Table 7
Total Variance Explained

Factor	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.832	25.744	25.744	1.590	14.450	14.450
2	1.539	13.990	39.733	1.488	13.529	27.979
3	1.296	11.783	51.517			
4	1.225	11.133	62.650			
5	.966	8.782	71.431			
6	.813	7.387	78.818			
7	.652	5.930	84.748			
8	.526	4.783	89.532			
9	.477	4.337	93.868			
10	.346	3.144	97.013			
11	.329	2.987	100.000			

Extraction Method: Principal Axis Factoring.

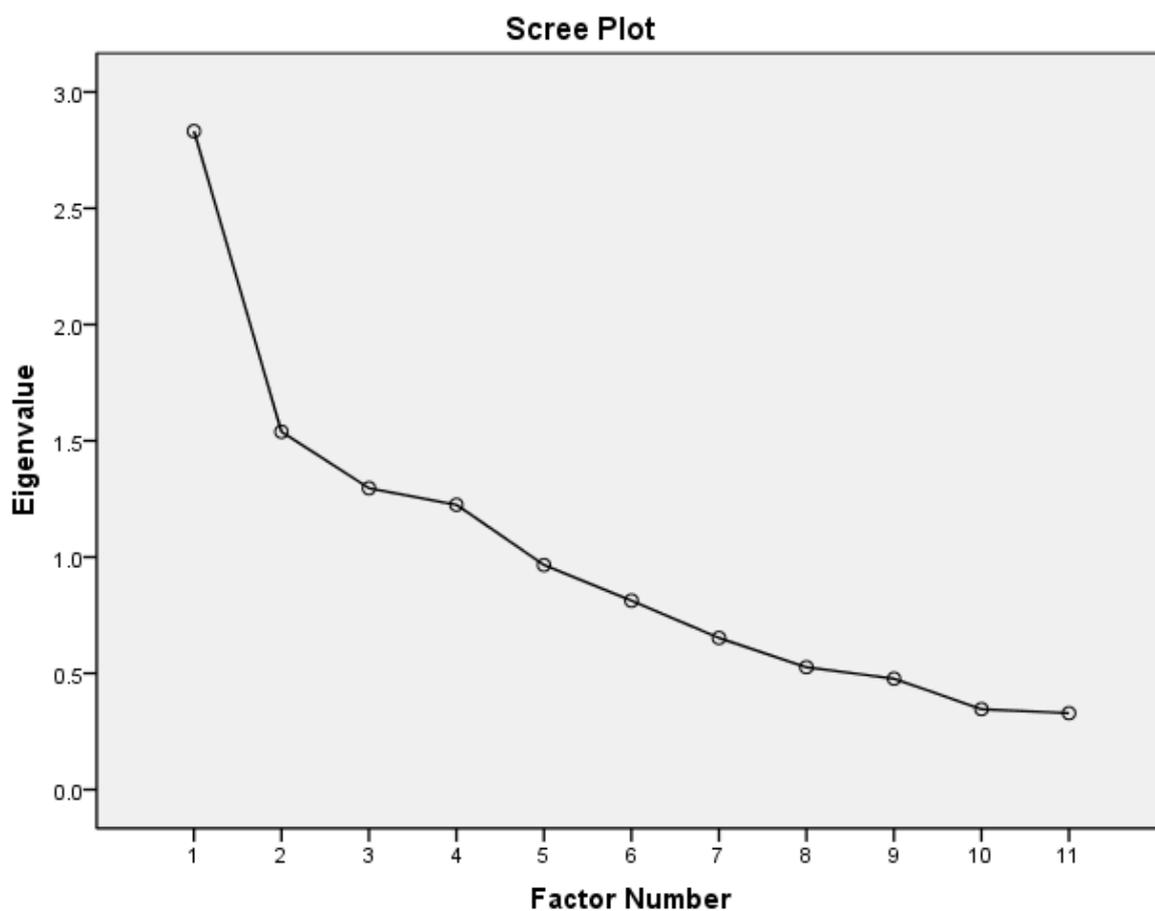


Figure 1. Scree plot

Table 8
Rotated Factor Matrix^a

	Factor	
	1	2
4. I am aware of the way I feel at any given moment.	.765	-.010
8. When I think about my inner world, I am always aware of the way I feel.	.584	.030
11. I am able to articulate my feelings to others, even when it is uncomfortable.	.527	.155
5. I am fully responsible for my decisions.	.264	.141
7. When I make decisions, being true to myself is more important to me than not upsetting others.	.212	.606
9. I sometimes find myself doing something just to please other people, rather than out of my own interest.	.327	.534
10. My body always expresses how I feel regardless of whether it is positive or negative.	.051	-.506
6. I have difficulties regulating the way I feel even when I want to.	.372	.464
1. Whenever I make an important decision, I prioritize my own values and needs over what others expect of me.	.097	.407
3. When others ask me to do something, I feel pressured to do it.	.020	.372
2. When I am experiencing an emotion, I get so aware of it that sometimes it makes me feel uncomfortable.	-.121	-.128

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Reliability Analyses

Internal Consistency. Cronbach’s alpha was used to determine the internal consistency of the ADSAS. ADSAS contains 11 items with Cronbach’s alpha $\alpha = .528$ (see Table 9). The Authentic Decision subscale contains 5 items ($\alpha = .574$; see Table 10) and the Self-Awareness subscale contains 6 items ($\alpha = .298$; see Table 11). Therefore, while the alpha of the ADSAS, as well as its Authentic Decision subscale, is acceptable, the alpha of its Self-Awareness subscale is low.

Table 9
Reliability Statistics of ADSAS

Cronbach's Alpha	N of Items
.528	11

Table 10

<i>Reliability Statistics of Authentic Decision subscale</i>	
Cronbach's Alpha	N of Items
.574	5

Table 11

<i>Reliability Statistics of Self-Awareness subscale</i>	
Cronbach's Alpha	N of Items
.298	6

However, analysis of the Item-Total Statistics showed that if items 2 or 10 are deleted, the alpha will be higher (.611 or .629 respectively; see Table 1). Upon the removal of *both* items 2 and 10, the ADSAS, now containing 9 items, reported a Cronbach's alpha $\alpha = .700$ (see Table 12), and the Self-Awareness subscale (4 items) reported a Cronbach's alpha $\alpha = .641$ (see Table 13), which fall in the acceptable to high range. Therefore, both of these items may be considered for removal in the final version of the questionnaire.

Table 12

<i>Reliability Statistics of 9-item ADSAS</i>	
Cronbach's Alpha	N of Items
.700	9

Table 13

<i>Reliability Statistics of 4-item Self-Awareness subscale</i>	
Cronbach's Alpha	N of Items
.641	4

Split-half Reliability. Split-half reliability analysis was used to determine the reliability of the items amongst each other using the Spearman-Brown Coefficient for Unequal Length. The items have been divided such that the items from each subscale appears in each of the two halves. However, because there is an odd number of items in the Authentic

Decision subscale, there is an extra item of that subscale in the first half. The result showed a positive correlation, $r_s(62) = .662$ (see Table 14).

Table 14
Reliability Statistics

Cronbach's Alpha	Part 1	Value	.363
		N of Items	
	Part 2	Value	.144
		N of Items	
	Total N of Items		11
Correlation Between Forms			.493
Spearman-Brown Coefficient	Equal Length		.660
	Unequal Length		.662
Guttman Split-Half Coefficient			.644

- a. The items are: 1. Whenever I make an important decision, I prioritize my own values and needs over what others expect of me., 7. When I make decisions, being true to myself is more important to me than not upsetting others., 6. I have difficulties regulating the way I feel even when I want to. , 8. When I think about my inner world, I am always aware of the way I feel., 10. My body always expresses how I feel regardless of whether it is positive or negative., 9. I sometimes find myself doing something just to please other people, rather than out of my own interest..
- b. The items are: 9. I sometimes find myself doing something just to please other people, rather than out of my own interest., 3. When others ask me to do something, I feel pressured to do it. , 5. I am fully responsible for my decisions., 2. When I am experiencing an emotion, I get so aware of it that sometimes it makes me feel uncomfortable., 4. I am aware of the way I feel at any given moment., 11. I am able to articulate my feelings to others, even when it is uncomfortable..

Test-retest Reliability. Out of the 64 participants, 41 filled the ADSAS questionnaire again after 8-9 weeks, resulting in a dropout rate of 39%. Pearson correlations were run between initial and retest scores for total scores on ADSAS as well as for individual subscales. There was a statistically significant positive correlation between initial and retest total scores, $r(39) = .574, p = .000$, which was even higher when items 2 and 10 which showed some issues in previous analyses were omitted, $r(39) = .704, p = .000$ (see Table 15). For Authentic Decision subscale, there was also statistically significant positive correlation, $r(39) = .625, p = .000$ (see Table 16). However, there was no statistically significant

correlation between scores on Self-Awareness subscale, be it including all items, $r(39) = .094, p = .559$, or excluding items 2 and 10, $r(39) = .162, p = .313$ (see Table 17).

Table 15

Correlations

		ADSAS_ total	RT_ ADSAS _total	ADSAS_ total_wo_ 2_10	RT_ ADSAS _total_wo_ 2_10
ADSAS_total	Pearson Correlation	1	.574**	.965**	.696**
	Sig. (2-tailed)		.000	.000	.000
	N	64	41	64	41
RT_ADSAS_ total	Pearson Correlation	.574**	1	.539**	.902**
	Sig. (2-tailed)	.000		.000	.000
	N	41	41	41	41
ADSAS_total_ wo_2_10	Pearson Correlation	.965**	.539**	1	.704**
	Sig. (2-tailed)	.000	.000		.000
	N	64	41	64	41
RT_ADSAS_ total_wo_2_10	Pearson Correlation	.696**	.902**	.704**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	41	41	41	41

** . Correlation is significant at the 0.01 level (2-tailed).

Table 16

Correlations

		ADSAS_ choice	RT_ ADSAS _choice
ADSAS_choic e	Pearson Correlation	1	.625**
	Sig. (2-tailed)		.000
	N	64	41
RT_ADSAS_ choice	Pearson Correlation	.625**	1
	Sig. (2-tailed)	.000	
	N	41	41

** . Correlation is significant at the 0.01 level (2-tailed).

Table 17

Correlations

		ADSAS_ awareness	ADSAS_ awareness_ wo_2_10	RT_ADSAS_ awareness	RT_ADSAS_ awareness_ wo_2_10
ADSAS_ awareness	Pearson Correlation	1	.901**	.094	.226
	Sig. (2-tailed)		.000	.559	.156
	N	64	64	41	41
ADSAS_ awareness_ wo_2_10	Pearson Correlation	.901**	1	-.073	.162
	Sig. (2-tailed)	.000		.650	.313
	N	64	64	41	41
RT_ADSAS_ awareness	Pearson Correlation	.094	-.073	1	.797**
	Sig. (2-tailed)	.559	.650		.000
	N	41	41	41	41
RT_ADSAS_ awareness_ wo_2_10	Pearson Correlation	.226	.162	.797**	1
	Sig. (2-tailed)	.156	.313	.000	
	N	41	41	41	41

** . Correlation is significant at the 0.01 level (2-tailed).

The Final Questionnaire

Based on the findings of the above analyses, the final version of the questionnaire is presented below. None of the items have been reworded; however, two items have been dropped. As was found in the analyses, both items 2 and 10 received a “No” in the CVR analysis, were negatively correlated with the other items in the item discriminant analysis, did not load on any factor in the factor analysis, and contributed to a lower Cronbach alpha for both the total ADSAS and its Self-Awareness subscale in the internal consistency analysis. Therefore, these items were removed from the final questionnaire.

The final questionnaire stems are as follows:

1. Whenever I make an important decision, I prioritize my own values and needs over what others expect of me.
2. I am aware of the way I feel at any given moment.

3. When others ask me to do something, I feel pressured to do it. (*reverse scored*)
4. I have difficulties regulating the way I feel even when I want to. (*reversed scored*)
5. I am fully responsible for my decisions.
6. When I think about my inner world, I am always aware of the way I feel.
7. When I make decisions, being true to myself is more important to me than not upsetting others.
8. I am able to articulate my feelings to others, even when it is uncomfortable.
9. I sometimes find myself doing something just to please other people, rather than out of my own interest. (*reverse scored*)

The questionnaire is designed with two subscales: Authentic Decision and Self-Awareness. Odd items 1, 3, 5, 7, and 9 refer to the Authentic Decision subscale, whereas even items 2, 4, 6, and 8 to the Self-Awareness subscale. All items are rated on a 5-point Likert scale ranging from “Strongly Disagree” (1) to “Strongly Agree” (5). Before computing the total score, items 3, 4, and 9 should be reverse-scored by subtracting the participant’s score from 6. After doing so, the sum of the scores is then computed to receive a total score. The test user may assess the test taker either on each individual subscale separately, or on the entire test as a whole to assess a person’s capacity of self-determination based on his autonomy.

Discussion

Based on the results of statistical analyses, two items from the developing questionnaire were deleted as the data showed greater content validity, better internal consistency and improved factor structure without them. The final ADSAS questionnaire consists of 9 items, four of which are dedicated to the Self-Awareness subscale, and the remaining five to the Authentic Decision subscale. ADSAS has been shown to have significant convergent and discriminant validities and good construct validity assessed by

factor analysis, as items loaded on the expected subscales. Internal consistency was good, especially upon the removal of the two questionable items, which were not homogeneous with the others. Test-retest reliability was also significant for total ADSAS scores and scores on Authentic Decision subscale; however, no significance or even trend towards significance was found in the Self-Awareness subscale, which may point to potential fluidity of the self-awareness construct. Therefore, the ADSAS seems to be more useful to capture a state of autonomy of test taker in any one moment in time, but not to be used as a measure of trait autonomy. All in all, the final version of the questionnaire is overall a valid and reliable measure of autonomy and its subparts regarding authentic decision and self-awareness.

However, it is not clear as to what extent the newly developed scale captures the entirety of the autonomy construct realm, as some researchers cited in the literature review believed autonomy construct as also having an aspect of taking responsibility for one's action in it (Chirkov, Ryan, Kim & Kaplan, 2003) or an aspect of being sensitive to other people (Bekker & van Assen, 2006), and this scale was not developed to include it. That may be a possible direction for future research on autonomy with aim of theoretical unification of the construct, as well as to determine whether the operational definitions of autonomy within SDT may be expanded to include other definitions that have been studied outside of the theory by researchers such as Bekker and van Assen.

Nevertheless, the ADSAS was shown to be a measure which is suitable for use in future research investigating autonomy as an alternate to PCASS. It may be suggested that other researchers use this measure in their studies in order to provide further evidence for its reliability and validity, as well as to uncover possible issues present within the scale but was not observed in this pilot validation study.

Conclusion

Probably all humans strive for a greater well-being, and for that, autonomy seems to be an important ingredient (Sheldon, Ryan & Reis, 1996). The present study provides a new way of assessment of autonomy within the areas of making authentic decisions and of having an awareness of one's internal self, which may be of use both to researchers, but also for curious individuals who like to explore themselves to see whether there is something they may do to improve their lives. Although there are no formal norms developed yet for this scale, it may still prove a useful tool for self-reflection of intrigued individuals. The researchers encourage people to use ADSAS for both research and personal purposes.

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Appendix A

INFORMED CONSENT FORM

1. **Summary:** This research study will examine motivation and emotions. If you agree to participate, you will be asked to answer survey questions that ask about how you make decisions and how you feel.
2. **Your right to withdraw/discontinue:** You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.
3. **Benefits:** Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted and you may learn something about this area of research (i.e., motivation and emotions).
4. **Additional information:** You will be given additional information about the study after your participation is complete.
5. **Time commitment:** If you agree to participate in the study, it may take up to 5 minutes to complete the survey.
6. **No Confidentiality Agreement:** All data from this study will be used in statistical validation studies. Hence, your responses will be coded, and you will be required to complete the first part of the questionnaire again in 7 weeks time. Your answers will be kept from inappropriate disclosure and will be accessible only to the researchers. The researchers are not interested in anyone's individual responses.
7. **Risks:** The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns.
8. **Researcher Contact Information:** This research study is being conducted by Dan Bialożył and Nur Farizah Binte Mohd Sedek for a Psychological Measurements course. The course instructor is Mr Vartan Agopian, Lecturer in the Psychology department at the University of New York in Prague. If you have questions or concerns about your participation in this study, you may contact either researcher at xbialozytd@student.unyp.cz or xsedekn@student.unyp.cz.
9. **Results of the Study:** You may obtain information about the outcome of the study at the end of the Spring 2019 semester by contacting the researcher listed above.
10. **Personal Copy of Consent Form:** You will be provided with a blank, unsigned copy of this consent form at the beginning of the study.
11. **Verification of Adult Age:** By signing below, you attest that you are 18 years old or older.

12. **Verification of Informed Consent:** By signing below, you are indicating that you have freely consented to participate in this research study.

PARTICIPANT'S FULL NAME (printed): _____

PARTICIPANT'S SIGNATURE: _____ DATE: _____

Appendix B

Authentic Decision & Self Awareness Scale (ADSAS)

Please read the statements and think about which statement seems true to you at this point in your life. Please circle the answer that corresponds to your motivational and emotional experiences.

1 = Strongly disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

1. Whenever I make an important decision, I prioritize my own values and needs over what others expect of me.

1 2 3 4 5

2. When I am experiencing an emotion, I get so aware of it that sometimes it makes me feel uncomfortable.

1 2 3 4 5

3. When others ask me to do something, I feel pressured to do it.

1 2 3 4 5

4. I am aware of the way I feel at any given moment.

1 2 3 4 5

5. I am fully responsible for my decisions.

1 2 3 4 5

6. I have difficulties regulating the way I feel even when I want to.

1 2 3 4 5

7. When I make decisions, being true to myself is more important to me than not upsetting others.

1 2 3 4 5

8. When I think about my inner world, I am always aware of the way I feel.

1 2 3 4 5

9. I sometimes find myself doing something just to please other people, rather than out of my own interest.

1 2 3 4 5

10. My body always expresses how I feel regardless of whether it is positive or negative.

1 2 3 4 5

11. I am able to articulate my feelings to others, even when it is uncomfortable.

1 2 3 4 5

Appendix C

Perceived Choice & Awareness of Self Scale (PCASS)

Instructions: Please read the pairs of statements, one pair at a time, and think about which statement within the pair seems more true to you at this point in your life. Indicate the degree to which statement A feels true, relative to the degree that Statement B feels true, on the 5-point scale shown after each pair of statements. If statement A feels completely true and statement B feels completely untrue, the appropriate response would be 1. If the two statements are equally true, the appropriate response would be a 3. If only statement B feels true. And so on.

1.

A. I always feel like I chose the things to do.

B. I sometimes feel that it's not really me choosing the things I do.

Only A feels true 1 2 3 4 5 Only B feels true

2.

A. My emotions sometimes seem alien to me.

B. My emotions always seem to belong to me.

Only A feels true 1 2 3 4 5 Only B feels true

3.

A. I choose to do what I have to do.

B. I do what I have to, but I don't feel like it is really my choice.

Only A feels true 1 2 3 4 5 Only B feels true

4.

A. I feel that I am rarely myself.

B. I feel like I am always completely myself.

Only A feels true 1 2 3 4 5 Only B feels true

5.

A. I do what I do because it interests me.

B. I do what I do because I have to.

Only A feels true 1 2 3 4 5 Only B feels true

6.

A. When I accomplish something, I often feel it wasn't really me who did it.

B. When I accomplish something, I always feel it's me who did it.

Only A feels true 1 2 3 4 5 Only B feels true

7.

A. I am free to do whatever I decide to do.

B. What I do is often not what I'd choose to do.

Only A feels true 1 2 3 4 5 Only B feels true

8.

A. My body sometimes feels like a stranger to me.

B. My body always feels like me.

Only A feels true 1 2 3 4 5 Only B feels true

9.

A. I feel pretty free to do whatever I choose to.

B. I often do things that I don't choose to do.

Only A feels true 1 2 3 4 5 Only B feels true

10.

A. Sometimes I look into the mirror and see a stranger.

B. When I look into the mirror I see myself.

Only A feels true 1 2 3 4 5 Only B feels true

Appendix D

Alienation scale

Please indicate your response to each question by circling one of the options below.

1. If you try hard enough, how often do you know what to do to overcome a problem?
never rarely sometimes often always

2. How often can you manage things you set out to do?
never rarely sometimes often always

3. How often do you feel helpless?
never rarely sometimes often always

4. How often do you feel there is little meaning in the things you do in your daily life?
never seldom sometimes often very often

5. How often do you feel you don't really know what is happening?
never seldom sometimes often very often

6. School prepares me for what I want to do when I leave.
strongly disagree disagree neither agree nor disagree agree strongly agree

7. How often do you feel left out of things?
never rarely sometimes often always

8. Do you feel close to your family?
never rarely sometimes often always

9. Are there people you can turn to for support when you are unhappy?
never rarely sometimes often always

10. Do you ever feel lonely?
no yes, sometimes yes, often yes, very often

11. I feel I belong to several different groups of friends.
strongly disagree disagree neither agree nor disagree agree strongly agree

Sadly Thankful? Practicing Gratitude to Elevate Affect States on Depressive Individuals

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Abstract

Nurturing gratitude has been found to be imperative to the flourishing of a person. Regularly journaling experiences that lead to a feeling of gratitude remarkably increases well-being. Expressing gratitude also enhances social bonding, as well as immediately uplifts emotional states. However, little is yet known of its implementation amongst people who suffers from depressive disorders. These are individuals who experience pervasive negative feelings such as sorrow, bitterness, or pessimism, as well as experiencing physiological discomfort and mental distortions. This study, therefore, aims to understand whether accomplishing a gratitude exercise elevates or diminishes positive and negative affects amongst depressed individuals. Participants were tasked either one of two interventions, whereby one recalled a gratitude experience, while the other a relief experience. They completed a set of questionnaires that measure their level of depressive symptoms, using the Center for Epidemiologic Studies Depression Scale (CES-D). They were also asked to rate how they were feeling before and after the experiment, using the Positive and Negative Affect Schedule (PANAS) questionnaire. Data were then computed factorially using two three-way mixed design ANOVA statistical analyses to determine whether there was a statistically significant difference in the participants' level of depressive symptoms and their positive and negative affects, respectively. The results suggest that while interactions between the three factors have occurred, the findings could not be confirmed due to a lack of statistical significance. Future research may attempt to bring gratitude intervention research further into clinical psychology settings.

Keywords: gratitude, depression, positive psychology

Sadly Thankful? Practicing Gratitude to Elevate Affect States on Depressive Individuals

In *Positive Psychology*, Compton and Hoffman (2013) classified gratitude as one of four *sacred emotions*, with its nurturance as being imperative to the flourishing of a person. Emmons defined gratitude as the positive emotion that a person feels when being at the receiving end of a generous deed (cited in Compton & Hoffman, 2013, p. 237). The emotion of gratitude is linked to positive affect, which is a psychoneurological system within an individual to seek out advantageous circumstances through pleasurable feelings, thinking patterns, and pro-social actions (Taylor, Lyubomirsky, & Stein, 2017, p. 267). Conversely, the negative affect system is what deters an individual from harmful situations by avoiding what may cause it displeasure (p. 267).

However, while the benefits of practicing gratitude on positive affect has been found to be favorable (e.g. Layous et al., 2017), little is yet known of its implementation within the context of depressive disorders. According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013), individuals with depressive disorders are described as having pervasive negative feelings such as sorrow, bitterness, or pessimism, as well as experiencing physiological discomfort and mental distortions. As such, their responses to interventions developed within the field of positive psychology, primarily suited to normally functioning persons, may have averse or unforeseen outcomes.

Literature Review

A number of studies have shown that practicing gratitude leads to psychological health. One example was conducted by Emmons and McCullough (2003) examining the effects of valuing advantageous situations over difficulties, finding that those who regularly journal about events to be thankful for reported a remarkable increase in their well-being.

Furthermore, expressing gratitude towards the giver enhances social support, leading to the nurturance of interpersonal relationships (Algoe, Fredrickson, & Gable, 2013). More recently, however, Layous et al. (2017) discovered that doing a gratuitous act enhances one's immediate positive affect right after performing the activity through evoking socially pleasant emotions, while at the same time also induces negative affect through the particular emotion of social indebtedness.

Despite uplifting evidences of the benefits of gratitude, Layous et al. (2017) observed that due to cognitive distortions experienced by those who suffer from depressive symptoms, performing a gratitude exercise may contribute to a reversal of the effect that was intended. An explanation may be due to the depressed person's inferior and highly vigilant sense of self that stigmatizes these recipients of an altruistic act, causing them to feel unworthy of such kindness or to be obligated to return the favor (Mathews & Green, 2010). Another reason may be that pessimistic cognitive patterns present in depressive individuals contributes to the feeling of being compelled to repay the kindness (Mathews & Shook, 2013).

However, findings in the broader field of positive psychology present conflicting evidences. A meta-analysis conducted by Sin and Lyubomirsky (2009) revealed that interventions using positive psychology exercises does elevate feelings of happiness and reduces depression. This is also found in a recent study done by Taylor et al. (2017) on a number of positive activity intervention that increases positive affect and reduces negative affect on anxious and depressed individuals. Furthermore, gratitude intervention experiments, such as one done by Sergeant and Mongrain (2011) on self-effacing individuals, also reported receptivity toward increased well-being. Therefore, as noted by Layous et al. (2017), further studies are needed to tease out the factors responsible for these inconsistent findings,

particularly because highly depressed people are those who are more likely to seek positive interventions, such as gratitude exercises.

Research Question

Following the above literature review and the limitations found therein, the following question arises: 1. Does completing a gratitude exercise increase positive affects among depressed individuals?; and, 2. Does completing a gratitude exercise decrease negative affects among depressed individuals?

Hypothesis

Based on the preceding paragraphs, it is hypothesized that: 1. Participants with a higher level of depression who perform a gratitude exercise will demonstrate a *higher* post-intervention *positive* affect than those who perform the relief exercise; and, 2. Participants with a higher level of depression who perform a gratitude exercise will demonstrate a *lower* post-intervention *negative* affect than those who perform the relief exercise.

Method

Participants

Participants were recruited through the University of New York in Prague campus and online through the author's personal Facebook account via the convenience sampling method. Data were collected from 56 participants, out of which seven had to be discarded due to incompleteness of the experiment, making the total number of participants to be $n = 49$. There were roughly twice as many females as there were males (see Figure 1). A large percentage were ethnically White/Caucasian, followed by Asian/Indian, while the rest identified with a variety of ethnicities (see Figure 2). Their ages ranged from 18 to 41 years old (see Table 1).

Procedure

Prior to the experiment being conducted, the study was reviewed by Professor Bethany Butzer, the course instructor of Research Methods for Social Sciences, to determine the likelihood of hidden ethical issues. Following approval, a printed out informed consent form (see Appendix A) was distributed to each in-person participant before the start of the experiment. After giving consent, the participants was randomly handed either one of two questionnaire sheets, which allocated them into either one of two conditions. Participants in the experimental group were prompted to “think about an experience in the past when someone did something for [them] for which [they] have felt very grateful.” Examples that were given were such as: “Your partner helping you out with chores or taking you out on a special outing;” and, “A close relative or friend giving you wise advise for an important decision.” Contrarily, participants in the control group received a set of questionnaires instructing them to “think about an experience in the past for which [they] have narrowly avoided a bad outcome and felt relief.” Examples that were given were such as: “Losing something but then finding it;” and, “Narrowly avoiding an accident.” After having thought of an experience, each participant was then asked to “write a short paragraph (min. 5 sentences) about the experience” (see Layous et. al, 2017, p. 5). Both sets of questionnaires also contained instrumentations measuring for the participants’ symptoms of depression pre-test, as well as their affect states before and after the experimental intervention (the CES-D and PANAS questionnaires; see below). Lastly, the participants were asked their demographic information. Once the participants handed in their completed questionnaires, they were then given the debriefing form (see Appendix B). For online participants, the same set of questionnaires were formatted on Google Forms, of which two non-descript links were

formed. Participants were randomly assigned either one to complete, after which they were displayed the debriefing form.

Instrumentation

Two well-established measures were used to gather data regarding the participants' symptoms of depression and their affect states.

Center for Epidemiologic Studies Depression Scale (CES-D). Radloff (1977) created the Center for Epidemiologic Studies Depression Scale (CES-D; see Appendix C) as an instrumentation that measures symptoms of depression across population distributions of different demographic groups. It is a 20-item questionnaire whereby participants rated how often they experienced depressive symptoms over the past week. Sample items from the questionnaire included "I had trouble keeping my mind on what I was doing," "My sleep was restless," and, "I felt that people dislike me." The measure also included positive items, such as "I felt hopeful about the future," and "I enjoyed life," which were then reversed scored. Participants assessed each item on a scale of 0 ("rarely or none of the time") to 3 ("most or all of the time"), garnering a total score ranging from 0 to 60. A higher score signifies the participant as having more symptoms of depression. The CES-D has been found to be highly reliable, with an internal consistency of between .85 and .90 on the Cronbach's alpha coefficient (p. 391), as well as having validity for analyzing the distribution of depressive symptoms across the broader public (p. 385).

Positive and Negative Affect Schedule (PANAS). The Positive and Negative Affect Schedule (PANAS; see Appendix D) questionnaire was developed by Watson, Clark and Tellegan (1988) to measure a number of emotions that were categorized as either *positive affects* (PA) or *negative affects* (NA). The questionnaire comprises of 20 items, which participants indicated on a 5-point Likert scale ranging from 1 ("very slightly") to 5 ("very

much”) as to the extent to which they were feeling each emotion. Half of these items measure PA, such as interested, excited, determined, attentive, and active. The other half measure NA, such as distressed, upset, guilty, jittery, and ashamed. Therefore, the total scores on each group of emotions may range between 10 to 50, whereby the higher the score, the higher the degree of emotions per category that was experienced by an individual participant. The PANAS has been found to be highly reliable when tested on a non-clinical population, with Cronbach’s alpha coefficient of .89 for PA and .85 for NA, as well as having construct validity (Crawford & Henry, 2004, p. 262).

For the purposes of this study, the participants were asked to rate the affects as pertaining to how they were feeling “right now.” When the questionnaire is being measured for emotions that are felt in the moment, according to Watson et al. (1988), the mean score of the PA category is $M = 29.7$ ($SD = 7.9$), whereas that of the NA category is $M = 14.8$ ($SD = 5.4$). Due to the design of this study, the questionnaire was split into two parts of ten affects each based on the internal correlation of one affect to another (Crawford & Henry, 2004, p. 254), such that five affects of each category were assigned to appear in either one of the two parts in a pre-test, post-test procedure.

Demographics questionnaire. A demographics questionnaire comprising of questions to elicit the participants’ age, gender, and ethnicity (see Appendix E).

Research Design

The research was conducted quantitatively using a factorial experimental design. Three independent variables were assessed. The first independent variable comprised of the data gathered using the CES-D measure. Because a categorical variable was needed for data analysis, the participants were grouped according to their levels of depressive symptoms: Low (0 to 15); Moderate (16 to 30); High (31 to 45); and, Very High (46 to 60). However,

because no participant reported very high depressive symptoms, the fourth level was omitted from the analysis. The second independent variable consisted of the two conditions of the experiment, namely the *gratitude* intervention and the *relief* intervention. The third independent variable was the pre-test, post-test factor derived from the participants' PANAS scores of either positive affect or negative affect, before and after the experiment. The dependent variable comprised of either the participants' positive or negative affect scores.

Data Analysis

Data were analyzed using IBM Statistical Package for the Social Sciences (SPSS). Two three-way mixed design ANOVA statistical analyses were applied per the variables mentioned above. Additionally, descriptive statistics were also computed on the participants' scores on the CES-D and PANAS instrumentations, and the demographics questionnaire, to report for the means, standard deviation, and ranges of these measures on the sample.

Results

Descriptive Statistics

Slightly more than half of the participants partook in the gratitude than in the relief intervention (see Figure 3). Their average scores on the PANAS scale were higher for positive affect than for negative affect, with positive affect increasing slightly after the experiment, while negative affect decreased slightly (see Table 2). Data were normally distributed for the positive affect scores in both pre-test and post-test conditions, while assumptions of normality were violated for negative affect scores, as assessed by Shapiro-Wilk's test of normality (see Table 3). Furthermore, the participants' depressive symptoms scores on the CES-D scale range from 4 to 44, with an average of 19.76 (see Table 4), and the data were normally distributed (see Table 5). When the scores were computed into a categorical variable, participants with low depressive symptoms comprised the highest

percentage, followed by those with moderate depressive symptoms, and then those with high depressive symptoms (see Table 6 and Figure 4).

Test of Hypothesis

Two mixed design ANOVAs were used to determine whether there was a statistically significant difference in the participants' level of depressive symptoms and their positive and negative affects, respectively, in the pre-test, post-test experimental design, between participants who had been tasked either the gratitude or the relief intervention conditions.

ANOVA test for positive affect. To test for the differences in positive affect, a three-way mixed ANOVA was used. Preliminary checks were conducted to ensure that the data assumed homogeneity of variances and equality of covariances, as assessed by Levene's test of homogeneity of variances and Box's test of equality of covariances, respectively, (see Tables 7 and 8). Preliminary analyses of the line plots suggested that there were interactions between the three factors since the intervention lines were not parallel (see Figures 5 to 7).

The ANOVA results showed that the main effects of neither the interventions nor the depressive symptom levels were statistically significant, $F(1,43) = 3.251, p = .078, \eta^2 = .070$; $F(2,43) = 1.321, p = .277, \eta^2 = .058$, respectively, (see Table 9), even though participants reported slightly higher positive affect in the gratitude condition (see Table 10), as well as among those with low level of depressive symptoms (see Table 11). There was also no statistical significance in the interaction between the intervention factor and the depressive symptom levels on positive affect, $F(2,43) = .351, p = .706, \eta^2 = .016$ (see Table 9), even though a higher positive affect average was reported for those with low depressive symptoms in the gratitude condition than the other conditions (see Table 12).

Furthermore, the main effect of the pre-test, post-test factor on positive affect was not statistically significant, $F(1,43) = .855, p = .360, \eta^2 = .019$ (see Table 13). Participants

reported a marginal increase in positive affect in the post-test condition (see Table 14). Also, neither the interactions between the pre-test, post-test factor and the interventions, nor the depressive symptom levels, were statistically significant on positive affect, $F(1,43) = 2.221$, $p = .143$, $\eta^2 = .049$; $F(2,43) = 2.944$, $p = .063$, $\eta^2 = .120$, respectively, (see Table 13), with participants performing similarly overall (see Tables 15 and 16).

The interaction between all three factors, namely, the gratitude and relief interventions; the levels of depressive symptoms; and, the pre-test, post-test conditions, on positive affect was not statistically significant, $F(2,43) = .129$, $p = .879$, $\eta^2 = .006$ (see Table 13). The highest positive affect mean was reported for those with low depressive symptoms equally at pre- and post-test in the gratitude condition (see Table 17), however, neither difference was statistically significant, $F(2,43) = 2.803$, $p = .072$, $\eta^2 = .115$; $F(2,43) = .468$, $p = .629$, $\eta^2 = .021$, respectively, (see Table 18). Pairwise comparisons of the simple main effects with a Bonferroni adjustment revealed that there were no statistically significant differences between any of the groups (see Table 19).

ANOVA test for negative affect. To test for the differences in negative affect, a three-way mixed ANOVA was also used. The data assumed homogeneity of variances for pre-test scores, but violated assumptions of homogeneity of variances for post-test scores, as assessed by Levene's test of homogeneity of variances (see Table 20). The data assumed equality of covariances, as assessed by Box's test of equality of covariances (see Table 21). Preliminary analyses of the line plots suggested that there were interactions between the intervention factor on the participants' negative affect before and after the experiment among those with moderate depressive symptoms, as well as among those with high depressive symptoms, since the intervention lines were not parallel; however, there was no interaction among those with low depressive symptoms (see Figures 8 to 10).

The results showed that there was a statistically significant main effect of the intervention on the negative affect, $F(1,43) = 4.727, p = .035, \eta^2 = .099$ (see Table 22), with those completing the gratitude intervention reporting lower negative affect than the relief (see Table 23). Similarly, there was also a statistically significant main effect between depressive symptom levels on negative affect, $F(2,43) = 5.041, p = .011, \eta^2 = .190$ (see Table 22), with those who are low in depressive symptoms reporting the lowest negative affect, followed by those with moderate depressive symptoms, and those with high depressive symptoms (see Table 24). A post hoc Tukey revealed that there was a significant mean difference between those with low and high depressive symptoms ($2.87, p = .019$; see Table 25). However, the interaction effect between the intervention factor and the depressive symptom levels on negative affect showed no statistical significance, $F(2,43) = .271, p = .764, \eta^2 = .012$ (see Table 22), with participants showing similar patterns of negative affect as found in the two preceding analyses (see Table 26).

The main effect of the pre-test, post-test factor on negative affect was found to be statistically significant, $F(1,43) = 12.978, p = .001, \eta^2 = .232$ (see Table 27), with participants reporting a decrease in negative affect post-test (see Table 28). Furthermore, statistical significance was also found in the interaction between pre-test, post-test factor and depressive symptom levels on negative affect, $F(2,43) = 3.803, p = .030, \eta^2 = .150$ (see Table 27), whereby participants with high depressive symptoms reporting the largest decrease in negative affect before and after the experiment (see Table 29). However, the interaction between pre-test, post-test factor and intervention did not yield statistical significance, $F(1,43) = .039, p = .844, \eta^2 = .001$ (see Table 27), with participants in both interventions performing similarly before and after the experiment (see Table 30).

The interaction between all three factors, namely, the gratitude and relief interventions; the levels of depressive symptoms; and, the pre-test, post-test conditions, on negative affect was not found to be statistically significant, $F(2,43) = 1.328, p = .276, \eta^2 = .058$ (see Table 27). However, the highest negative affect mean was reported for those with high depressive symptoms at the pre-test period of the relief condition (see Table 31) and this difference was statistically significant, $F(2,43) = 3.533, p = .038, \eta^2 = .141$ (see Table 32). Pairwise comparisons of the simple main effects with a Bonferroni adjustment revealed that there was a slight statistically significant mean difference between this group and those with moderate depressive symptoms in a similar pre-test period of the relief condition ($5.778, p = .043$; see Table 33).

Discussion

Summary of Findings

The findings of the mixed design ANOVAs demonstrate that while the line plots suggest that change in affect states have happened in the direction that had been expected – which is that the participants with a higher level of depression who perform a gratitude exercise will demonstrate a *higher* post-intervention *positive* affect, and consequently, a *lower* post intervention *negative* affect, than those who perform the relief exercise – the null hypotheses may not be fully rejected due to the results being mostly not statistically significant. Specifically, the first hypothesis is found to be entirely unsupported, since no statistically significant results were derived from the ANOVA test for positive affect. Meanwhile, the ANOVA test for negative affect revealed that while statistical significances were found in the main effects of the intervention, the level of depressive symptoms, and the pre- and post-test factor, as well as a slight, statistically significant simple main effect found between the high and moderate depressive symptoms groups of the relief condition in the pre-

test period, the interaction effect of all three factors was not statistically significant. Hence, the second hypothesis also cannot be fully confirmed.

Interpretation of Findings

The findings may be interpreted by integrating the representations of results of the ANOVA tests, namely, by considering the areas of statistical significance, by evaluating the averages, and by observing the line plots. Firstly, even though no statistical significance was found for the test on positive affects, the findings show that doing a gratitude writing task does have a higher average change, alluding to evidences of the enhancing effect of doing a gratitude exercise that has been previously found in the studies on gratitude and mental well-being (e.g. Emmons & McCullough, 2003; Layous et al., 2017). Furthermore, the present study also found that participants who are moderate in levels of depressive symptoms reported a higher change of positive affect than those who are high in levels of depressive symptoms, suggesting that the precursor of a depressive state, such as cognitive distortions and an inferior sense of self, may have hindered the gratitude exercise from affecting a participant more positively, as observed by Layous et al. (2017).

On the other hand, the results of the present study show a more promising outcome of completing a gratitude exercise so as to reduce negative affect, with statistical significances found in the main effects mentioned in the summary. Between participants who did the gratitude intervention, the exercise has proven to be most beneficial to those with a high level of depressive symptoms. This may suggest that gratitude intervention experiments previously conducted on self-effacing individuals (e.g. Sergeant & Mongrain, 2011) were found to be successful not so much because the exercise elevated positive affects, but more so because the exercise reduced negative affects. Nevertheless, this present study also found that participants with high depressive symptoms in the relief condition reporting a higher post-

intervention decrease in negative affect than those in the gratitude intervention. Due to this, it may also suggest that there are exercises other than gratitude that are better employed for individuals who are predisposed to a pessimistic outlook to firstly reduce their feelings of gloom, before attempting to elevate their states to a more positive perspective through gratitude. Thus, this may be one of the reasons why there are as yet conflicting evidences as to the effect of gratitude on depression, as noted in the literature review.

Limitations

A number of limitations regarding the present study need to be considered in its overall evaluation. Firstly, the sample size was undeniably too small. With participants being divided into as few as 10 in the high depressive symptom group (see Table 6), a Type II error may have inevitably occurred, hence giving a false negative result. Secondly, the sample was derived from a population of mostly university students studying in a high-end, international college in Europe during the tail-end of their semester. Some systematic sampling biases may have occurred, such as the participants having similar affect states and levels of depressive symptoms due to the study being conducted during the weeks where they are needing to pursue deadlines. Even though the participants themselves are mostly mentally healthy young adults and did not report a very high level of depressive symptom, nevertheless, those who reported a high level of depressive symptom would have been categorized as moderate at any other given time. Furthermore, the design of the study itself needs to be considered. Due to time limitations, the experiment was conducted *en masse* by distributing questionnaires to the participants and the instructions for the interventions were also made minimal (as in, the participants needed to only write a minimum of five sentences). This may have resulted in the participants not being fully attentive and emotionally involved during the study, which may have dampened the effect the intervention was trying to elicit.

Implications and Future Research

Based on the interpretations of the findings mentioned above, a discernible implication may be noted. Studies in positive psychology have mainly focused on the elevation of positive affects in flourishing individuals. This present study suggests that a look in the other direction may also be worthwhile. This is because, when considering individual differences in personality and temperament, each person inevitably experiences both positive and negative affect states on a continuum at any given time. Moreover, the state of flourishing may also fluctuate should the individual find himself in demanding circumstances. Particularly, as in the case with gratitude intervention, future research may be done to examine the differences in cognitive patterns between depressed and non-depressed individuals while performing the exercise. Furthermore, gratitude intervention research may also be conducted additionally to other areas of mental health research, such as in clinical personality disorders to determine its efficacy in a non-positive psychology setting.

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Appendix A

INFORMED CONSENT FORM

1. **Summary:** This research study will examine the potential associations between life experiences and emotional states. If you agree to participate, you will be asked to answer survey questions that ask about your current emotions, as well as how you have felt and behaved over the past week. You will also be asked to recall and write about a specific experience you have had in the past.
2. **Your right to withdraw/discontinue:** You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.
3. **Benefits:** Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted and you may learn something about this area of research.
4. **Additional information:** You will be given additional information about the study after your participation is complete.
5. **Time commitment:** If you agree to participate in the study, it may take up to 10 minutes to complete the survey.
6. **Guarantee of Confidentiality:** All data from this study will be kept from inappropriate disclosure and will be accessible only to the researchers. The researchers are not interested in anyone's individual responses, only the average responses of everyone in the study.
7. **Risks:** The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns.
8. **Researcher Contact Information:** This research study is being conducted by Nur Farizah Binte Mohd Sedek for a Research Methods course. The course instructor is Dr. Bethany Butzer, Lecturer in the Psychology department at the University of New York in Prague. If you have questions or concerns about your participation in this study, you may contact the researcher at xsedekn@student.unyp.cz.
9. **Results of the Study:** You may obtain information about the outcome of the study at the end of the Fall 2018 semester by contacting the researcher listed above.
10. **Personal Copy of Consent Form:** You will be provided with a blank, unsigned copy of this consent form at the beginning of the study.

SADLY THANKFUL?

20

11. **Verification of Adult Age:** By signing below, you attest that you are 18 years old or older.
12. **Verification of Informed Consent:** By signing below, you are indicating that you have freely consented to participate in this research study.

PARTICIPANT'S FULL NAME (printed): _____

PARTICIPANT'S SIGNATURE: _____ DATE: _____

Appendix B

DEBRIEFING FORM

Title of Research: Sadly Thankful? Practicing Gratitude to Elevate Affect States on Depressive Individuals

Thank you for participating in this research. You have made an important contribution to a developing body of knowledge in psychology. Now that your participation is complete, we can tell you more about the study you have just participated in.

The current study was designed to investigate the effects of practicing gratitude exercises on individuals with depressive symptoms. While much has been studied on the benefits of gratitude on normally functioning people that leads to a flourishing of an individual (Algoe, Fredrickson, & Gable, 2013; Emmons & McCullough, 2003; Layous et al., 2017), there has been conflicting results on those with depressive tendencies (Layous et al., 2017; Sergeant & Mongrain, 2011). Therefore, there is a need to conduct further studies to tease out the factors responsible for these inconsistent findings, particularly because highly depressed people are those who are more likely to seek positive interventions, such as gratitude exercises.

In order to test these ideas, two types of interaction tasks were used. Half of the participants in the present study were tasked to recall an experience for which they felt grateful. The other half of the participants in the present study were tasked to recall an experience for which they felt relief. Both groups of participants also complete the same set of questionnaire regarding their depressive symptoms using the Center for Epidemiologic Studies Depression Scale (CES-D), as well as rate their emotional states before and after the gratitude/relief intervention using the Positive and Negative Affect Schedule (PANAS) questionnaire.

The following are results are expected:

1. Participants with a higher level of depression who perform a gratitude exercise will demonstrate a *higher* post-intervention *positive* affect than those who perform the relief exercise.
2. Participants with a higher level of depression who perform a gratitude exercise will demonstrate a *lower* post-intervention *negative* affect than those who perform the relief exercise.
3. Participants who perform a relief exercise will not demonstrate any post-intervention change in either positive or negative affects.

If you have any further questions, please feel free to contact Nur Farizah Binte Mohd Sedek (e-mail: xsedekn@student.unyp.cz).

For more information on this topic, some references are provided below.

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Appendix C

CES-D I

Indicate the extent you are feeling this way **right now**.

Interested

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Distressed

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Excited

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strong

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Guilty

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Scared

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hostile

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Inspired

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Determined

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attentive

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Jittery

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Active

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Afraid

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix D

PANAS

Below is a list of the ways you might have felt or behaved.
Indicate how often you have felt this way **during the past week**.

1. I was bothered by things that usually don't bother me.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. I did not feel like eating; my appetite was poor.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. I felt that I could not shake off the blues even with help from my family or friends.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. I felt I was just as good as other people.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. I had trouble keeping my mind on what I was doing.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. I felt depressed.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. I felt that everything I did was an effort.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. I felt hopeful about the future.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. I thought my life had been a failure.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. I felt fearful.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. My sleep was restless.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. I was happy.

Rarely or none of the time (less than 1 day) <input type="radio"/>	Some or a little of the time (1-2 days) <input type="radio"/>	Occasionally or a moderate amount of time (3-4 days) <input type="radio"/>	Most or all of the time (5-7 days) <input type="radio"/>
--	---	---	--

13. I talked less than usual.

Rarely or none of the time (less than 1 day) <input type="radio"/>	Some or a little of the time (1-2 days) <input type="radio"/>	Occasionally or a moderate amount of time (3-4 days) <input type="radio"/>	Most or all of the time (5-7 days) <input type="radio"/>
--	---	---	--

14. I felt lonely.

Rarely or none of the time (less than 1 day) <input type="radio"/>	Some or a little of the time (1-2 days) <input type="radio"/>	Occasionally or a moderate amount of time (3-4 days) <input type="radio"/>	Most or all of the time (5-7 days) <input type="radio"/>
--	---	---	--

15. People were unfriendly.

Rarely or none of the time (less than 1 day) <input type="radio"/>	Some or a little of the time (1-2 days) <input type="radio"/>	Occasionally or a moderate amount of time (3-4 days) <input type="radio"/>	Most or all of the time (5-7 days) <input type="radio"/>
--	---	---	--

16. I enjoyed life.

Rarely or none of the time (less than 1 day) <input type="radio"/>	Some or a little of the time (1-2 days) <input type="radio"/>	Occasionally or a moderate amount of time (3-4 days) <input type="radio"/>	Most or all of the time (5-7 days) <input type="radio"/>
--	---	---	--

17. I had crying spells.

Rarely or none of the time (less than 1 day) <input type="radio"/>	Some or a little of the time (1-2 days) <input type="radio"/>	Occasionally or a moderate amount of time (3-4 days) <input type="radio"/>	Most or all of the time (5-7 days) <input type="radio"/>
--	---	---	--

18. I felt sad.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. I felt that people dislike me.

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. I could not get “going.”

Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix E
Demographics Questionnaire

Your Gender:

Male
Female

Your Age: _____

Please select the race/ethnicity category that best describes you:

Black / African American
Native American / American Indian / Alaskan Native
White or Caucasian
Asian / Indian
Latino / Hispanic
Native Hawaiian / Other Pacific Islander
Two or more races
Other:

Tables

Table 1

Statistics of participants' age.

<u>Age</u>		
N	Valid	49
	Missing	0
Mean		23.45
Median		22.00
Mode		21
Std. Deviation		4.144
Variance		17.169
Skewness		2.083
Std. Error of Skewness		.340
Kurtosis		6.018
Std. Error of Kurtosis		.668
Range		23
Minimum		18
Maximum		41

Table 2

Statistics of participants' PANAS scores.

		PANAS (Positive) Before	PANAS (Positive) After	PANAS (Negative) Before	PANAS (Negative) After
N	Valid	49	49	49	49
	Missing	0	0	0	0
Mean		13.71	14.06	9.73	8.31
Median		14.00	15.00	10.00	7.00
Mode		15	15	5	7
Std. Deviation		3.702	4.375	3.690	3.001
Variance		13.708	19.142	13.616	9.009
Skewness		.087	.276	.811	1.003
Std. Error of Skewness		.340	.340	.340	.340
Kurtosis		-.620	.122	1.277	.038
Std. Error of Kurtosis		.668	.668	.668	.668
Range		15	19	17	11
Minimum		7	6	5	5
Maximum		22	25	22	16

Table 3

Tests of Normality of PANAS scores.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PANAS (Positive) Before	.095	49	.200*	.977	49	.444
PANAS (Positive) After	.116	49	.100	.973	49	.325
PANAS (Negative) Before	.110	49	.192	.926	49	.005
PANAS (Negative) After	.219	49	.000	.874	49	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 4

Statistics of participants' CES-D scores.

CES-D		
N	Valid	49
	Missing	0
Mean		19.76
Median		19.00
Mode		6 ^a
Std. Deviation		10.443
Variance		109.064
Skewness		.301
Std. Error of Skewness		.340
Kurtosis		-.769
Std. Error of Kurtosis		.668
Range		40
Minimum		4
Maximum		44

a. Multiple modes exist. The smallest value is shown

Table 5

Tests of Normality of CES-D scores.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CES-D	.104	49	.200*	.961	49	.106

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 6

Statistics of CES-D scores.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Low Depressive Symptoms	21	42.9	42.9	42.9
Moderate Depressive Symptoms	18	36.7	36.7	79.6
High Depressive Symptoms	10	20.4	20.4	100.0
Total	49	100.0	100.0	

Table 7

Levene's Test of Equality of Error Variances^a

		Levene Statistic	df1	df2	Sig.
PANAS (Positive) Before	Based on Mean	.337	5	43	.887
	Based on Median	.270	5	43	.927
	Based on Median and with adjusted df	.270	5	37.730	.927
	Based on trimmed mean	.327	5	43	.894
PANAS (Positive) After	Based on Mean	.411	5	43	.838
	Based on Median	.349	5	43	.880
	Based on Median and with adjusted df	.349	5	36.010	.880
	Based on trimmed mean	.409	5	43	.840

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Intervention + CESD_nom + Intervention * CESD_nom
Within Subjects Design: time

Table 8

*Box's Test of
Equality of
Covariance
Matrices^a*

Box's M	12.716
F	.699
df1	15
df2	911.169
Sig.	.788

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Intervention + CESD_nom + Intervention * CESD_nom
Within Subjects
Design: time

Table 9

Tests of Between-Subjects Effects

Measure: PANAS_Positive

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	15311.374	1	15311.374	636.639	.000	.937
Intervention	78.196	1	78.196	3.251	.078	.070
CESD_nom	63.561	2	31.780	1.321	.277	.058
Intervention * CESD_nom	16.861	2	8.431	.351	.706	.016
Error	1034.164	43	24.050			

Table 10

Estimates (Intervention)

Measure: PANAS_Positive

Intervention	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Gratitude	14.735	.688	13.348	16.122
Relief	12.769	.846	11.064	14.475

Table 11

Estimates (CES-D)

Measure: PANAS_Positive

CES-D	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low Depressive Symptoms	14.832	.758	13.304	16.360
Moderate Depressive Symptoms	13.139	.817	11.491	14.787
High Depressive Symptoms	13.286	1.196	10.873	15.699

Table 12

*Intervention * CES-D*

Measure: PANAS_Positive

Intervention	CES-D	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Gratitude	Low Depressive Symptoms	16.300	1.097	14.089	18.511
	Moderate Depressive Symptoms	14.333	1.156	12.002	16.664
	High Depressive Symptoms	13.571	1.311	10.928	16.215
Relief	Low Depressive Symptoms	13.364	1.046	11.255	15.472
	Moderate Depressive Symptoms	11.944	1.156	9.613	14.276
	High Depressive Symptoms	13.000	2.002	8.962	17.038

Table 13

Tests of Within-Subjects Effects

Measure: PANAS_Positive

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	5.528	1	5.528	.855	.360	.019
	Greenhouse- Geisser	5.528	1.000	5.528	.855	.360	.019
	Huynh-Feldt	5.528	1.000	5.528	.855	.360	.019
	Lower- bound	5.528	1.000	5.528	.855	.360	.019
time * Intervention	Sphericity Assumed	14.366	1	14.366	2.221	.143	.049
	Greenhouse- Geisser	14.366	1.000	14.366	2.221	.143	.049
	Huynh-Feldt	14.366	1.000	14.366	2.221	.143	.049
	Lower- bound	14.366	1.000	14.366	2.221	.143	.049
time * CESD_nom	Sphericity Assumed	38.080	2	19.040	2.944	.063	.120
	Greenhouse- Geisser	38.080	2.000	19.040	2.944	.063	.120
	Huynh-Feldt	38.080	2.000	19.040	2.944	.063	.120
	Lower- bound	38.080	2.000	19.040	2.944	.063	.120
time * Intervention * CESD_nom	Sphericity Assumed	1.668	2	.834	.129	.879	.006
	Greenhouse- Geisser	1.668	2.000	.834	.129	.879	.006
	Huynh-Feldt	1.668	2.000	.834	.129	.879	.006
	Lower- bound	1.668	2.000	.834	.129	.879	.006
Error(time)	Sphericity Assumed	278.120	43	6.468			
	Greenhouse- Geisser	278.120	43.000	6.468			
	Huynh-Feldt	278.120	43.000	6.468			
	Lower- bound	278.120	43.000	6.468			

Table 14

Estimates (time)

Measure: PANAS_Positive

time	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	13.491	.554	12.373	14.608
2	14.013	.669	12.665	15.362

Table 15

*Intervention * time*

Measure: PANAS_Positive

Intervention	time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Gratitude	1	14.052	.699	12.643	15.462
	2	15.417	.844	13.716	17.119
Relief	1	12.929	.860	11.195	14.663
	2	12.609	1.037	10.517	14.701

Table 16

*CES-D * time*

Measure: PANAS_Positive

CES-D	time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Low Depressive Symptoms	1	15.377	.770	13.824	16.930
	2	14.286	.929	12.412	16.160
Moderate Depressive Symptoms	1	12.333	.831	10.658	14.009
	2	13.944	1.003	11.923	15.966
High Depressive Symptoms	1	12.762	1.216	10.309	15.215
	2	13.810	1.468	10.850	16.769

Table 17

Estimates (all factors)

Measure: PANAS_Positive

Intervention	CES-D	time	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Gratitude	Low Depressive	1	16.300	1.115	14.052	18.548
	Symptoms	2	16.300	1.345	13.587	19.013
	Moderate Depressive	1	13.000	1.175	10.630	15.370
	Symptoms	2	15.667	1.418	12.807	18.526
	High Depressive	1	12.857	1.332	10.170	15.544
	Symptoms	2	14.286	1.608	11.044	17.528
Relief	Low Depressive	1	14.455	1.063	12.311	16.598
	Symptoms	2	12.273	1.282	9.686	14.859
	Moderate Depressive	1	11.667	1.175	9.297	14.036
	Symptoms	2	12.222	1.418	9.363	15.081
	High Depressive	1	12.667	2.035	8.562	16.771
	Symptoms	2	13.333	2.456	8.381	18.286

Table 18

Univariate Tests

Measure: PANAS_Positive

Intervention time			Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Gratitude	1	Contrast	69.658	2	34.829	2.803	.072	.115
		Error	534.351	43	12.427			
	2	Contrast	16.933	2	8.466	.468	.629	.021
		Error	777.933	43	18.091			
Relief	1	Contrast	39.215	2	19.607	1.578	.218	.068
		Error	534.351	43	12.427			
	2	Contrast	3.074	2	1.537	.085	.919	.004
		Error	777.933	43	18.091			

Each F tests the simple effects of CES-D within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Table 19

Pairwise Comparisons

Measure: PANAS_Positive

Intervention	time	(I) CES-D	(J) CES-D	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
							Lower Bound	Upper Bound
Gratitude	1	Low Depressive Symptoms	Moderate Depressive Symptoms	3.300	1.620	.143	-7.335	7.335
			High Depressive Symptoms	3.443	1.737	.162	-.885	7.771
		Moderate Depressive Symptoms	Low Depressive Symptoms	-3.300	1.620	.143	-7.335	.735
			High Depressive Symptoms	.143	1.777	1.000	-4.283	4.569
		High Depressive Symptoms	Low Depressive Symptoms	-3.443	1.737	.162	-7.771	.885
			Moderate Depressive Symptoms	-.143	1.777	1.000	-4.569	4.283
	2	Low Depressive Symptoms	Moderate Depressive Symptoms	.633	1.954	1.000	-4.235	5.502
			High Depressive Symptoms	2.014	2.096	1.000	-3.208	7.236
		Moderate Depressive Symptoms	Low Depressive Symptoms	-.633	1.954	1.000	-5.502	4.235
			High Depressive Symptoms	1.381	2.144	1.000	-3.959	6.721
		High Depressive Symptoms	Low Depressive Symptoms	-2.014	2.096	1.000	-7.236	3.208
			Moderate Depressive Symptoms					

			Moderate Depressive Symptoms	-1.381	2.144	1.000	-6.721	3.959
Relief	1	Low Depressive Symptoms	Moderate Depressive Symptoms	2.788	1.584	.257	-1.159	6.735
			High Depressive Symptoms	1.788	2.296	1.000	-3.932	7.508
		Moderate Depressive Symptoms	Low Depressive Symptoms	-2.788	1.584	.257	-6.735	1.159
			High Depressive Symptoms	-1.000	2.350	1.000	-6.855	4.855
		High Depressive Symptoms	Low Depressive Symptoms	-1.788	2.296	1.000	-7.508	3.932
			Moderate Depressive Symptoms	1.000	2.350	1.000	-4.855	6.855
	2	Low Depressive Symptoms	Moderate Depressive Symptoms	.051	1.912	1.000	-4.712	4.813
			High Depressive Symptoms	-1.061	2.770	1.000	-7.962	5.841
		Moderate Depressive Symptoms	Low Depressive Symptoms	-.051	1.912	1.000	-4.813	4.712
			High Depressive Symptoms	-1.111	2.836	1.000	-8.175	5.953
		High Depressive Symptoms	Low Depressive Symptoms	1.061	2.770	1.000	-5.841	7.962
			Moderate Depressive Symptoms	1.111	2.836	1.000	-5.953	8.175

Based on estimated marginal means
 a. Adjustment for multiple comparisons: Bonferroni.

Table 20

Levene's Test of Equality of Error Variances^a

		Levene Statistic	df1	df2	Sig.
PANAS (Negative) Before	Based on Mean	1.235	5	43	.309
	Based on Median	.390	5	43	.853
	Based on Median and with adjusted df	.390	5	22.579	.851
	Based on trimmed mean	1.140	5	43	.354
PANAS (Negative) After	Based on Mean	2.467	5	43	.047
	Based on Median	1.187	5	43	.331
	Based on Median and with adjusted df	1.187	5	35.224	.335
	Based on trimmed mean	2.402	5	43	.052

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Intervention + CESD_nom + Intervention * CESD_nom

Within Subjects Design: time

Table 21

*Box's Test of
Equality of
Covariance
Matrices^a*

Box's M	21.775
F	1.196
df1	15
df2	911.169
Sig.	.268

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Intervention + CESD_nom + Intervention * CESD_nom
Within Subjects
Design: time

Table 22

Tests of Between-Subjects Effects

Measure: PANAS_Negative

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	7291.790	1	7291.790	523.284	.000	.924
Intervention	65.862	1	65.862	4.727	.035	.099
CESD_nom	140.491	2	70.245	5.041	.011	.190
Intervention * CESD_nom	7.539	2	3.770	.271	.764	.012
Error	599.191	43	13.935			

Table 23

Estimates (Intervention)

Measure: PANAS_Negative

Intervention	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Gratitude	8.588	.523	7.533	9.644
Relief	10.392	.644	9.094	11.691

Table 24

Estimates (CES-D)

Measure: PANAS_Negative

CES-D	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low Depressive Symptoms	7.927	.577	6.764	9.090
Moderate Depressive Symptoms	9.222	.622	7.968	10.477
High Depressive Symptoms	11.321	.911	9.485	13.158

Table 25

Multiple Comparisons

Measure: PANAS_Negative

Tukey HSD

(I) CES-D	(J) CES-D	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low Depressive Symptoms	Moderate Depressive Symptoms	-1.25	.848	.315	-3.30	.81
	High Depressive Symptoms	-2.87*	1.014	.019	-5.34	-.41
Moderate Depressive Symptoms	Low Depressive Symptoms	1.25	.848	.315	-.81	3.30
	High Depressive Symptoms	-1.63	1.041	.272	-4.15	.90
High Depressive Symptoms	Low Depressive Symptoms	2.87*	1.014	.019	.41	5.34
	Moderate Depressive Symptoms	1.63	1.041	.272	-.90	4.15

Based on observed means.

The error term is Mean Square(Error) = 6.967.

*. The mean difference is significant at the

Table 26

*Intervention * CES-D*

Measure: PANAS_Negative

Intervention	CES-D	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Gratitude	Low Depressive Symptoms	6.900	.835	5.217	8.583
	Moderate Depressive Symptoms	8.722	.880	6.948	10.497
	High Depressive Symptoms	10.143	.998	8.131	12.155
Relief	Low Depressive Symptoms	8.955	.796	7.350	10.560
	Moderate Depressive Symptoms	9.722	.880	7.948	11.497
	High Depressive Symptoms	12.500	1.524	9.427	15.573

Table 27

Tests of Within-Subjects Effects

Measure: PANAS_Negative

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	72.439	1	72.439	12.978	.001	.232
	Greenhouse- Geisser	72.439	1.000	72.439	12.978	.001	.232
	Huynh-Feldt	72.439	1.000	72.439	12.978	.001	.232
	Lower- bound	72.439	1.000	72.439	12.978	.001	.232
time * Intervention	Sphericity Assumed	.219	1	.219	.039	.844	.001
	Greenhouse- Geisser	.219	1.000	.219	.039	.844	.001
	Huynh-Feldt	.219	1.000	.219	.039	.844	.001
	Lower- bound	.219	1.000	.219	.039	.844	.001
time * CESD_nom	Sphericity Assumed	42.454	2	21.227	3.803	.030	.150
	Greenhouse- Geisser	42.454	2.000	21.227	3.803	.030	.150
	Huynh-Feldt	42.454	2.000	21.227	3.803	.030	.150
	Lower- bound	42.454	2.000	21.227	3.803	.030	.150
time * Intervention * CESD_nom	Sphericity Assumed	14.824	2	7.412	1.328	.276	.058
	Greenhouse- Geisser	14.824	2.000	7.412	1.328	.276	.058
	Huynh-Feldt	14.824	2.000	7.412	1.328	.276	.058
	Lower- bound	14.824	2.000	7.412	1.328	.276	.058
Error(time)	Sphericity Assumed	240.012	43	5.582			
	Greenhouse- Geisser	240.012	43.000	5.582			
	Huynh-Feldt	240.012	43.000	5.582			
	Lower- bound	240.012	43.000	5.582			

Table 28

Estimates (time)

Measure: PANAS_Negative

time	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	10.436	.533	9.362	11.511
2	8.544	.445	7.647	9.442

Table 29

*CES-D * time*

Measure: PANAS_Negative

CES-D	time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Low Depressive Symptoms	1	8.618	.741	7.125	10.112
	2	7.236	.619	5.988	8.484
Moderate Depressive Symptoms	1	9.333	.799	7.722	10.945
	2	9.111	.668	7.765	10.458
High Depressive Symptoms	1	13.357	1.170	10.998	15.716
	2	9.286	.977	7.315	11.257

Table 30

*Intervention * time*

Measure: PANAS_Negative

Intervention	time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Gratitude	1	9.586	.672	8.230	10.942
	2	7.590	.562	6.458	8.723
Relief	1	11.286	.827	9.619	12.954
	2	9.498	.691	8.105	10.892

Table 31

Estimates (all factors)

Measure: PANAS_Negative

Intervention	CES-D	time	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Gratitude	Low Depressive Symptoms	1	7.600	1.072	5.438	9.762
		2	6.200	.896	4.393	8.007
	Moderate Depressive Symptoms	1	9.444	1.130	7.166	11.723
		2	8.000	.944	6.096	9.904
	High Depressive Symptoms	1	11.714	1.281	9.130	14.298
		2	8.571	1.071	6.412	10.731
Relief	Low Depressive Symptoms	1	9.636	1.022	7.575	11.698
		2	8.273	.854	6.550	9.995
	Moderate Depressive Symptoms	1	9.222	1.130	6.943	11.501
		2	10.222	.944	8.318	12.126
	High Depressive Symptoms	1	15.000	1.957	11.053	18.947
		2	10.000	1.635	6.702	13.298

Table 32

Univariate Tests

Measure: PANAS_Negative

Intervention time			Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Gratitude	1	Contrast	69.834	2	34.917	3.038	.058	.124
		Error	494.152	43	11.492			
	2	Contrast	27.147	2	13.574	1.692	.196	.073
		Error	345.052	43	8.024			
Relief	1	Contrast	81.203	2	40.602	3.533	.038	.141
		Error	494.152	43	11.492			
	2	Contrast	20.697	2	10.349	1.290	.286	.057
		Error	345.052	43	8.024			

Each F tests the simple effects of CES-D within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Table 33

Pairwise Comparisons

Measure: PANAS_Negative

Intervention	time	(I) CES-D	(J) CES-D	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
							Lower Bound	Upper Bound
Gratitude	1	Low Depressive Symptoms	Moderate Depressive Symptoms	-1.844	1.558	.729	-5.725	2.036
			High Depressive Symptoms	-4.114	1.671	.054	-8.276	.048
		Moderate Depressive Symptoms	Low Depressive Symptoms	1.844	1.558	.729	-2.036	5.725
			High Depressive Symptoms	-2.270	1.708	.573	-6.526	1.986
		High Depressive Symptoms	Low Depressive Symptoms	4.114	1.671	.054	-.048	8.276
			Moderate Depressive Symptoms	2.270	1.708	.573	-1.986	6.526
	2	Low Depressive Symptoms	Moderate Depressive Symptoms	-1.800	1.302	.521	-5.043	1.443
			High Depressive Symptoms	-2.371	1.396	.290	-5.849	1.106
		Moderate Depressive Symptoms	Low Depressive Symptoms	1.800	1.302	.521	-1.443	5.043
			High Depressive Symptoms	-.571	1.428	1.000	-4.128	2.985
		High Depressive Symptoms	Low Depressive Symptoms	2.371	1.396	.290	-1.106	5.849
			Moderate Depressive Symptoms					

			Moderate Depressive Symptoms	.571	1.428	1.000	-2.985	4.128
Relief	1	Low Depressive Symptoms	Moderate Depressive Symptoms	.414	1.524	1.000	-3.382	4.210
			High Depressive Symptoms	-5.364	2.208	.058	-10.864	.137
		Moderate Depressive Symptoms	Low Depressive Symptoms	-.414	1.524	1.000	-4.210	3.382
			High Depressive Symptoms	-5.778*	2.260	.043	-11.408	-.148
		High Depressive Symptoms	Low Depressive Symptoms	5.364	2.208	.058	-.137	10.864
			Moderate Depressive Symptoms	5.778*	2.260	.043	.148	11.408
	2	Low Depressive Symptoms	Moderate Depressive Symptoms	-1.949	1.273	.399	-5.121	1.222
			High Depressive Symptoms	-1.727	1.845	1.000	-6.324	2.869
		Moderate Depressive Symptoms	Low Depressive Symptoms	1.949	1.273	.399	-1.222	5.121
			High Depressive Symptoms	.222	1.888	1.000	-4.483	4.927
		High Depressive Symptoms	Low Depressive Symptoms	1.727	1.845	1.000	-2.869	6.324
			Moderate Depressive Symptoms	-.222	1.888	1.000	-4.927	4.483

Based on estimated marginal means

*. The mean difference is significant at the

b. Adjustment for multiple comparisons: Bonferroni.

Figures

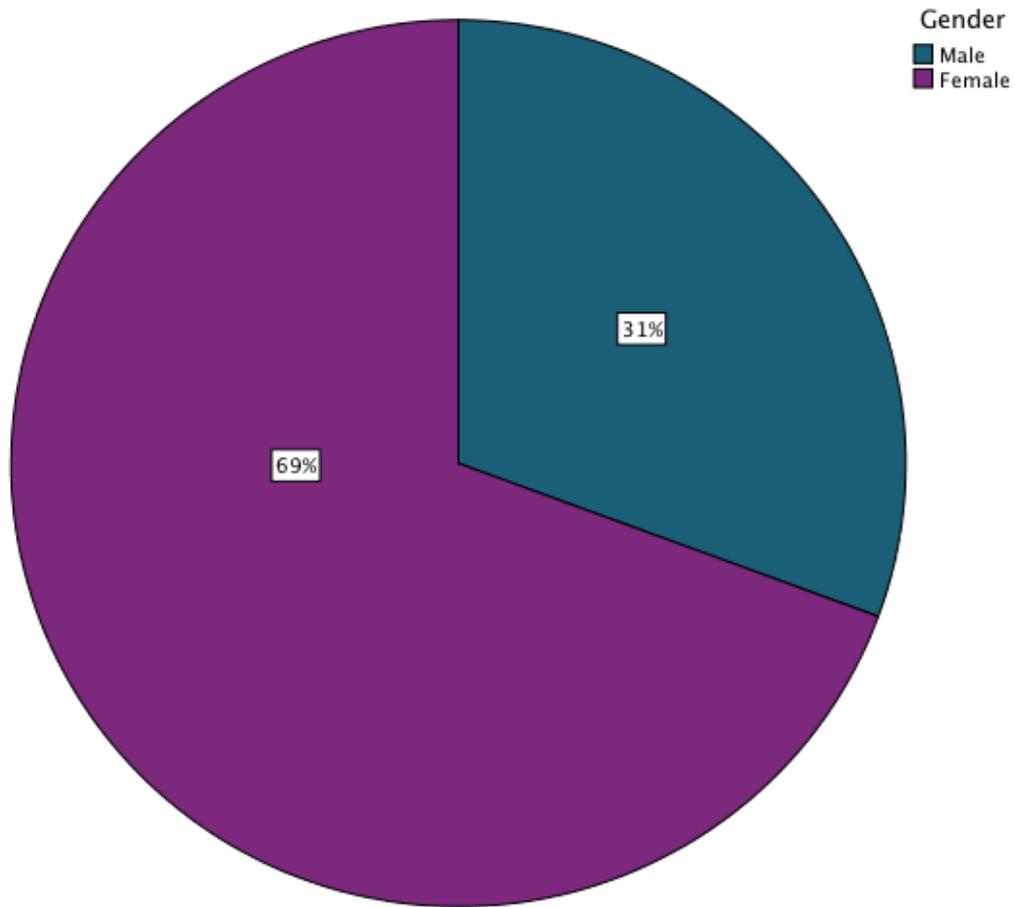


Figure 1. Gender of participants.

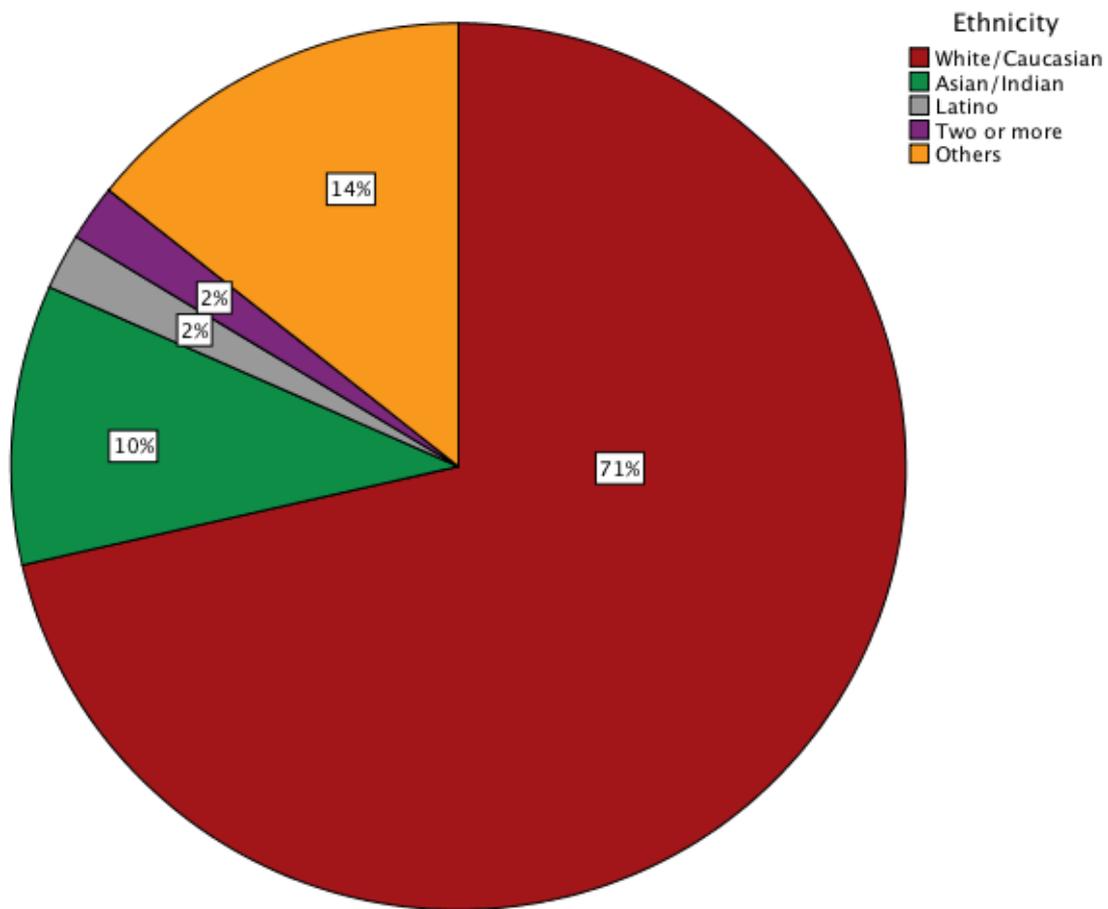


Figure 2. Ethnicity of participants.

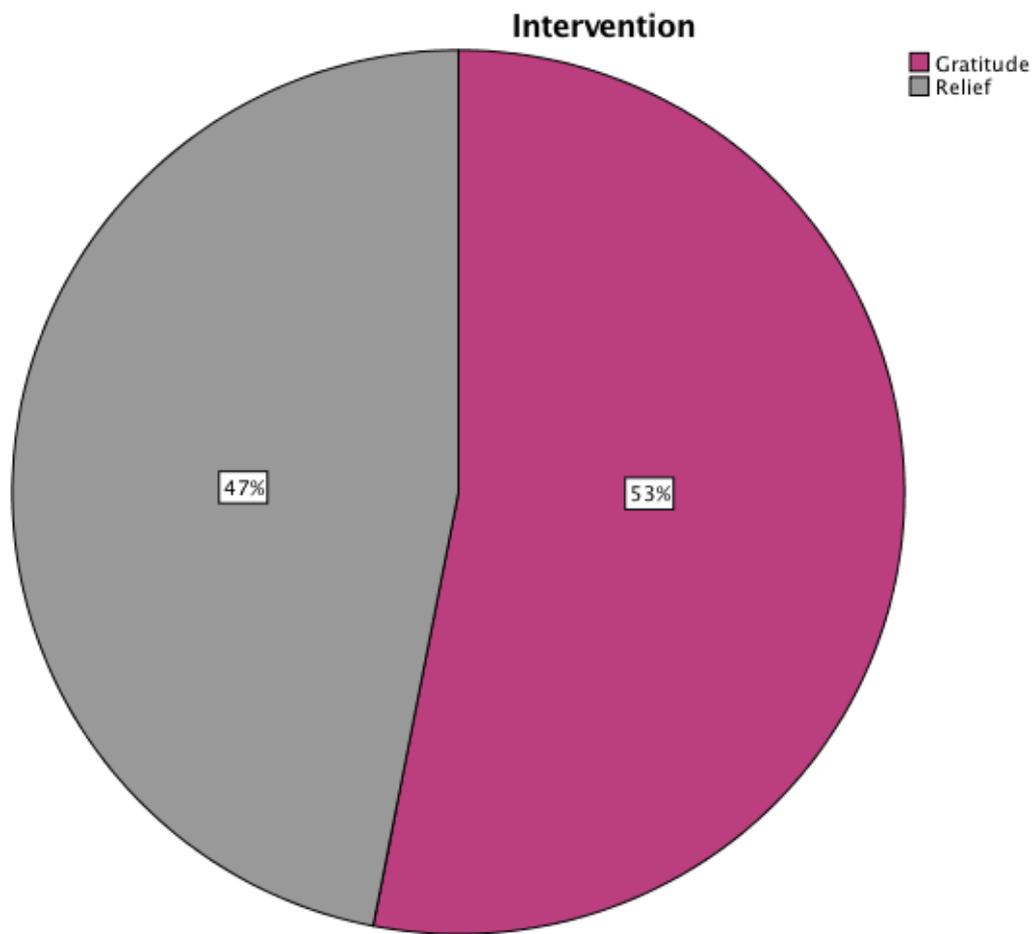


Figure 3. Intervention breakdown of participants.

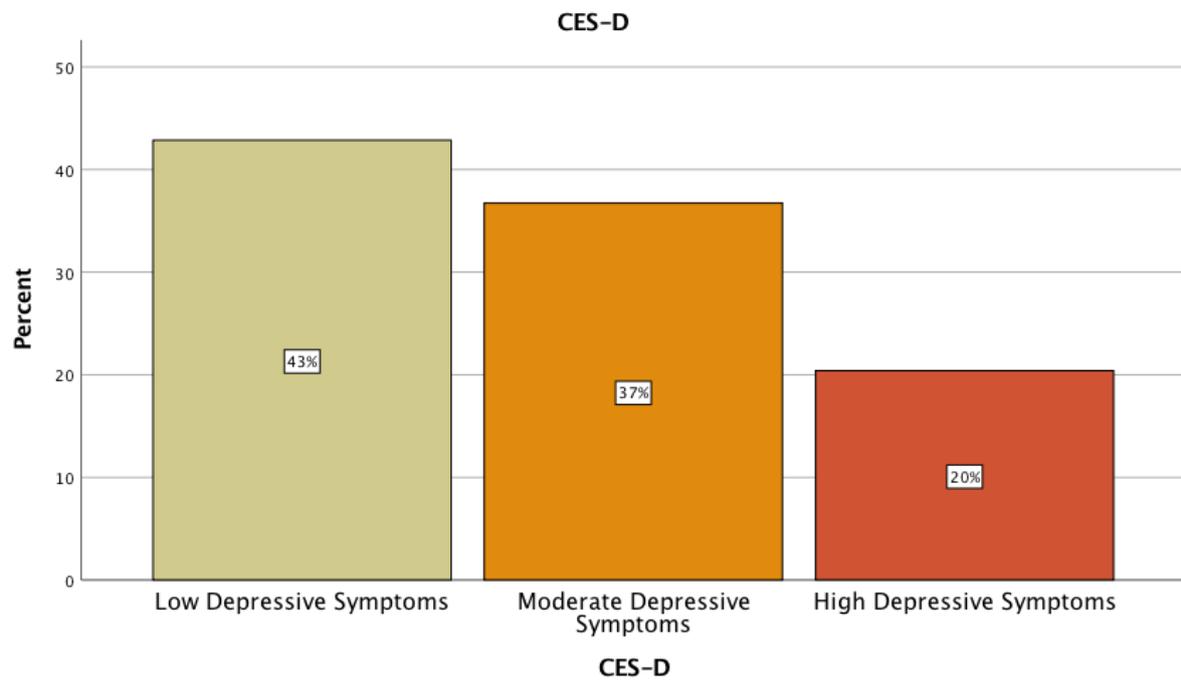


Figure 4. CES-D categorical breakdown of participants.

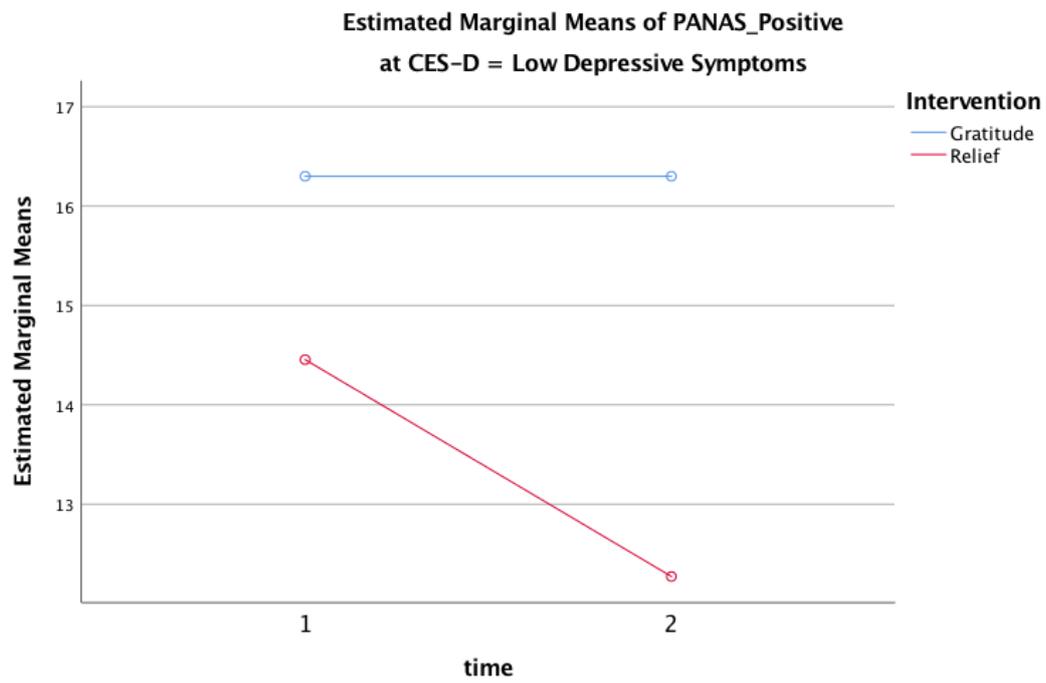


Figure 5. Line plot of low depressive symptoms * intervention * time on PANAS Positive.

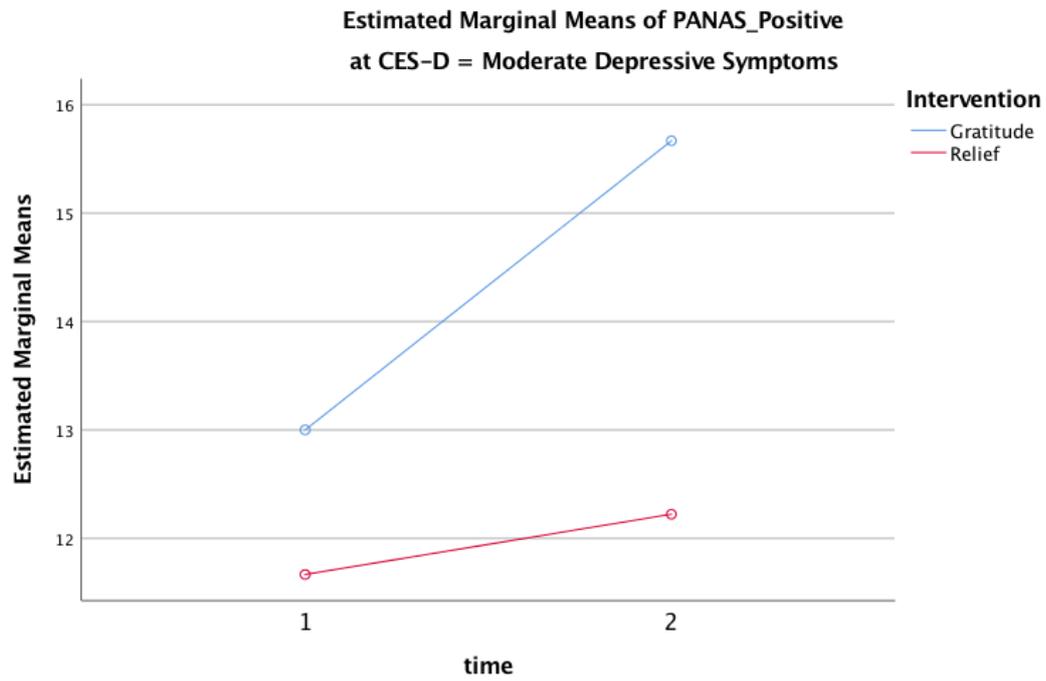


Figure 6. Line plot of moderate depressive symptoms * intervention * time on PANAS Positive.

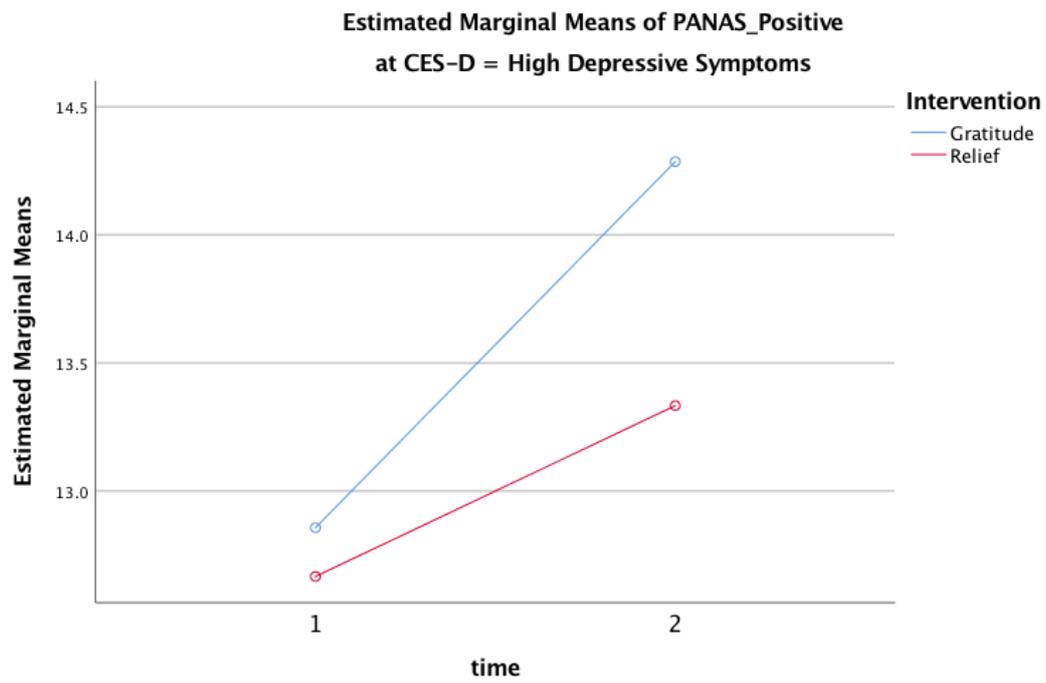


Figure 7. Line plot of high depressive symptoms * intervention * time on PANAS Positive.

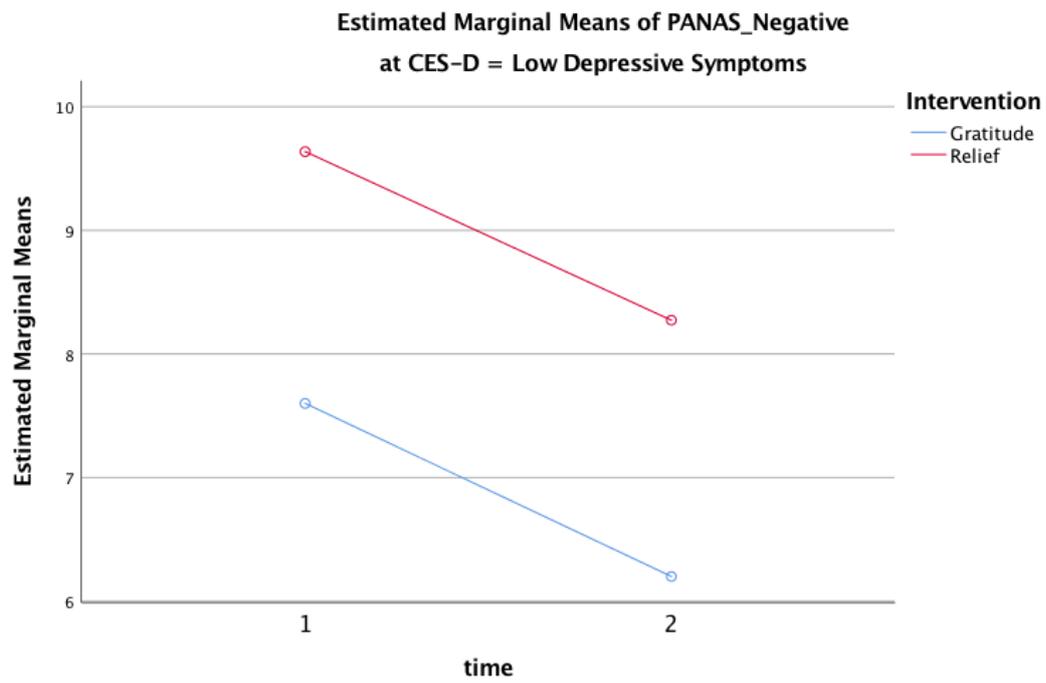


Figure 8. Line plot of low depressive symptoms * intervention * time on PANAS Negative.

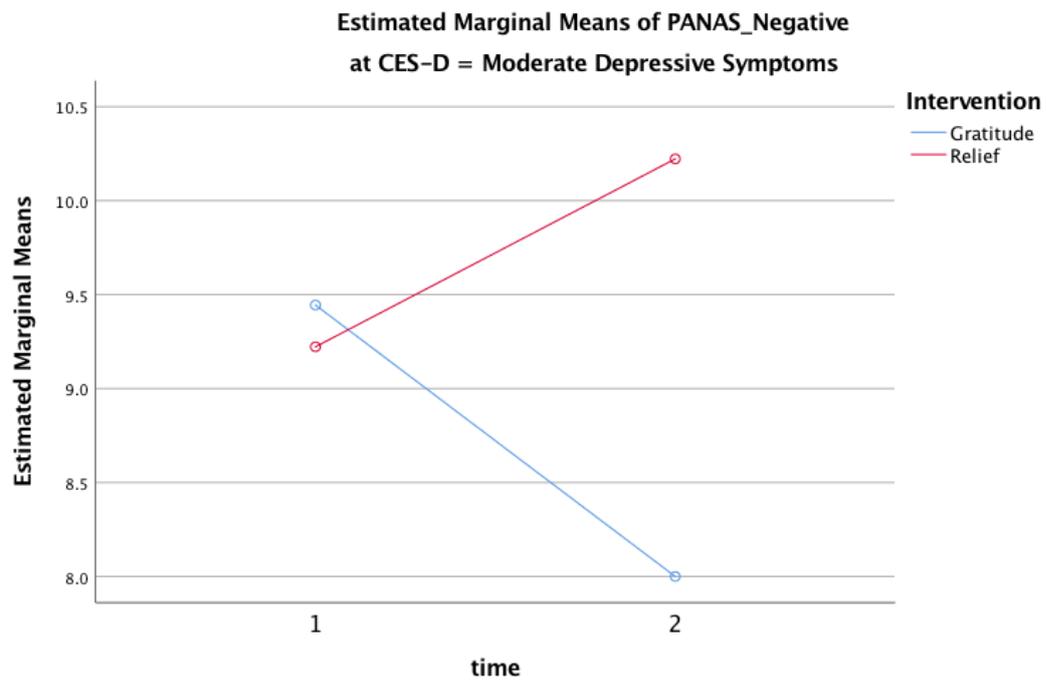


Figure 9. Line plot of moderate depressive symptoms * intervention * time on PANAS Negative.

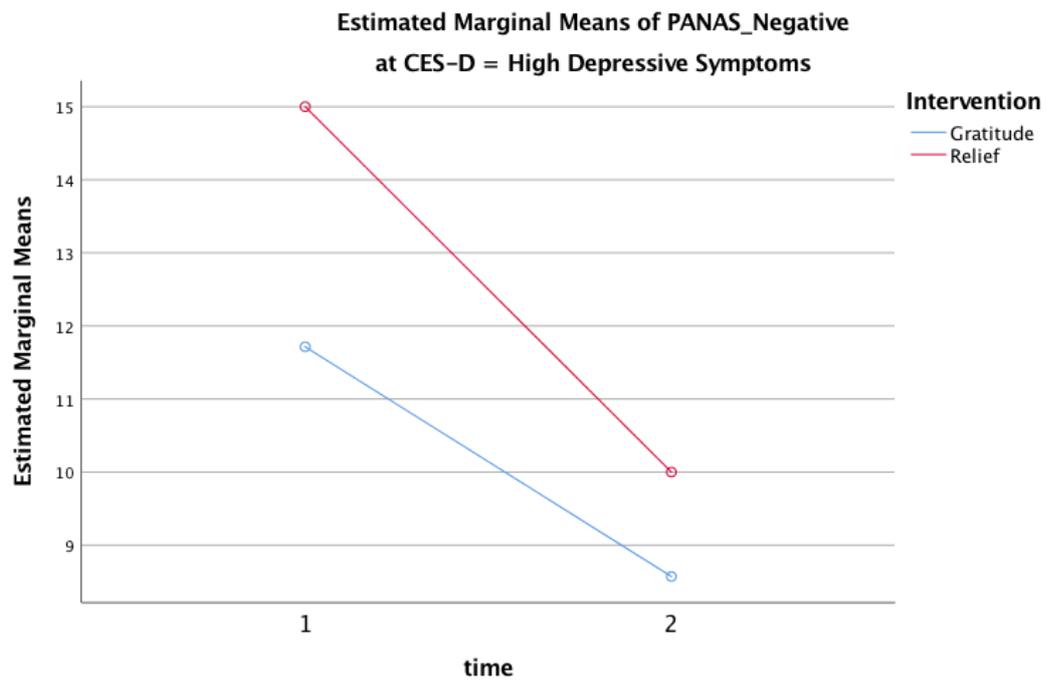


Figure 10. Line plot of high depressive symptoms * intervention * time on PANAS Negative.

The Effect of Sleep on Short-Term Memory during Midterm and Non-Midterm Week

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Abstract

The aim of this research was to examine the effect of sleep on short-term memory (STM) during midterm and non-midterm week. Cognitive performance in relation to short-term memory was examined in two separate conditions of midterm and non-midterm week among university students with the amount of sleep being a key variable. A visual free recall task on items revealed to them for a certain amount of time was employed in two said separate occasions. The hypothesis was that students' STM performance during the midterm week in combination with sleep deprivation will be inferior to performance during non-midterm week with no sleep deprivation. Students performed significantly better in non-midterm week than in midterm week. Sleep deprivation also showed significant results in relation to short-term memory performance. However, in combination with each other, said variables did not show significance. Together, these findings suggest that both sleep deprivation and stressful situation (midterm week) have a significant impact on one's STM performance.

Keywords: short-term memory, sleep deprivation, midterm week, non-midterm week, university students

The effect of sleep on short-term memory during midterm and non-midterm week

Many factors influence one's short-term memory (STM) performance. One of the leading aspects is sleep deprivation which is common among university students. Students' lack of sleep occurs mainly due to extensive university workload and is prominent in the exam period (for the purposes of this paper, the midterm week).

One of the researches conducted to examine this problematic was done by Pilcher and Walters (1997). The experiment included college students as subjects and focused on sleep deprivation in relation to their cognitive performance. The results showed that students who had been sleep deprived for a longer time period were significantly worse in cognitive performance compared to students who had been sleep deprived for a shorter time period (Pilcher & Walters, 1997). This research may be considered as outdated; however, the significance of the results is indisputable.

More recent research on similar topic was done by Chraif (2012). Area of sleep deprivation in connection to STM and attention of unnoticeable features was researched among university students. It employed the tachistoscope test which includes a set number of pictures that are shown to the participant for one second, and it tests the STM in terms of attention to details in the image, therefore the participant's perception of the background instead of the figure. The results were conclusive, and they showed that sleep deprived individuals had a significantly lower performance in recalling the details (Chraif, 2012). The problematic of this study may be the fact that the images were flashed for a very short time period, therefore not allowing subject to focus on the background (details) rather than the figure. Most individuals, sleep deprived or not, would have significant difficulties with observing details in such short time period.

The problematic of STM in terms of cognitive tasks has been a subject of research (Elkin & Murray, 1974). According to the Atkinson and Shiffrin model, STM is the second consecutive store (following sensory memory) through which the information flows and it only holds it for a few minutes. On average, a person can hold up to 7 ± 2 items in STM. Information can be retained in STM through maintenance rehearsal. Many factors influence the performance of STM, one of which is the previously stated amount of sleep (Sternberg & Sternberg 2009).

A study conducted by Elkin and Murray (1974) researched how sleep loss affects short-term recognition memory (STRM). The experiment focused on the auditory aspect as the participants had to listen through headphones and decide whether or not a probe that was presented after a list of numbers had been present in the said list. The conclusion was that sleep deprived subjects were impaired in comprehension of the list of numbers and therefore made mistakes with the probe number. Additionally, participants had trouble with retention of the initial numbers and both of these problems are considerably linked to lack of sleep (Elkin & Murray, 1974). The limitation to this experiment may be that the experiment was performed on an auditory level and that may have distorted the results as mistakes in encoding tend to occur mostly at auditory level.

From Elkin and Murray's (1974) research results it can be inferred that amount of sleep directly influences one's cognitive abilities, including STM. However, different tasks affect STM in different ways, such as problems with encoding, retrieving/recalling or presenting results.

One of the early studies related to the topic of effect of induced sleep deprivation on STM was done by Williams, Gieseking and Lubin (1966). The study examined the effect of sleep loss on memory of U.S. Army men. Sleep loss was induced to ensure the purpose of the research. Two experiments were performed to research the said two variables. One of the

studies focused on free recall with no rehearsal, whereas the other focused on picture-recognition. The results showed that sleep loss had a significant effect on free recall, whereas the picture-recognition task was not affected by sleep loss. Another test was performed to examine, whether one night of recovery sleep would change the performance in participants with the picture-recognition task. The results put forward that participants' performance dropped considerably. Picture-recognition was used instead of free recall because of the risk of maintenance rehearsal (Williams et al., 1966). The limitation to this experiment may be the inability to perform the same type of experiment again, as maintenance rehearsal may disrupt the findings. The problematic of the experiment being outdated and surpassed by other research should be noted as well, as we cannot entirely rely on the results and conclusions of it.

A recent study on induced sleep deprivation was conducted by Bruin, van Run, Staaks and Meijer (2016). The study examined how controlled sleep influences cognitive performance in adolescents. The researchers used readily available online databases which included necessary data for the experiment. The experiment adds on to the previous research as it confirms the hypothesis that sleep deprivation negatively affects cognitive performance and attention, therefore STM as well (Bruin, van Run, Staaks & Meijer, 2016). The drawback of this study may be the method of it, as it used data that was available online without the certainty of it being entirely legitimate. The study is rather an assessment than an experiment as it makes use of secondary data.

The previously stated two studies incorporated induced sleep deprivation in the experiments for control purposes. In our research there was no possibility of doing so, therefore we had to assume that during the midterm week students would sleep less due to extensive workload and stress. This could be the potential limitation to our experiment as it is not a controlled variable.

This research paper will attempt to showcase the difference in STM performance of college students during the midterm week (combined with sleep deprivation) and a non-midterm week. The hypothesis of this experiment is that students' STM performance during the midterm week in combination with sleep deprivation will be inferior to performance during non-midterm week with no sleep deprivation.

Method

Participants

University students (65 female, 55 male, approximate age range: 18-26 years) participated in an experiment, which took place at the University of New York in Prague. Participants were asked to state their age, gender, major, nationality, and approximate amount of sleep (in hours). As the experiment was performed in two different situations, the participants had to be matched according to their demographics, since the same participants were unlikely to be available in both situations. The experiment offered no benefit for the participants. In total, 120 recorded participants (in two separate conditions) were selected randomly with the possibility to not take part in the experiment. Random sampling was used for larger variety of recordings in order to make inferences about the general population. All participants were included in the statistical analysis as there were no extreme outliers.

Materials and Procedure

The research area of effect of sleep on short-term memory (STM) was adapted from a study done by Chraif (2012). In the adapted study, a total of 14 different items, which could be categorized as school supplies (pencil case, workbook, computer, highlighter, pencil, ruler, eraser, scissors, phone, phone charger, flash drive, headphones, water bottle, school bag) were presented to the participants. The materials were spread on the table in front of the participants randomly and in such manner, so the items are easily visually accessible. Consent forms as well as a short questionnaire which included demographics, amount of sleep, and

space provided for recording the items was prepared for the participants to use. For the purpose of this experiment it was only necessary to only recognize the objects, not to be able to describe their features. The total number of objects was shown to each participant with no exception in the same manner (position on the table, position of the participant, light in the room).

The experiment was carried out twice in two different conditions. The first part of the experiment was carried out in the midterm examination week (first condition). The second part of the experiment was performed during a non-midterm school week (second condition). Both parts of the experiment were executed in the same manner, differing only in the previously said two conditions in order to compare participants' performances.

Participants were brought into the experiment room (library project room) either alone or in groups of two to three people where they were given consent forms and instructions for carrying out the task. They were informed that the task wouldn't take longer than five minutes. Following that, they were asked to fill out a short questionnaire regarding demographics and amount of sleep for the particular week in question (midterm/non-midterm week). They were asked to stand in front of the table with items which were covered to avoid maintenance rehearsal before the start of the experiment.

The participants were informed about the time limit for observation and the time limit for retrieval of the items (noting them down on the paper). The time was monitored by the researchers. There was no time in between the two tasks for rehearsal or potential decay of information as the recall was immediate. The participants were given 20 seconds to observe the items once uncovered. The participants had the possibility to approach the items on the table as closely as needed during this time limit. After the said time period the participants were signaled to turn around and start the immediate recall for which they had 30 seconds. In order for the immediate recall to be possible (limiting the loss of time), the participants were

asked to have their assigned papers and pens with them as they were observing the items. When the assigned time expired, participants were asked to return the papers containing the recorded items and were asked to leave. No practice trials were performed before the actual experiment.

Results

A mixed ANOVA was computed to see the effects of midterm and non-midterm week, and sleep on STM of students to confirm the initial hypothesis.

The assumption of homogeneity of variances, as assessed by Levene's test of Equality of Variances, was not violated ($p > .05$) (see Table 1). Mauchly's test of Sphericity showed that the assumption of sphericity was not violated ($p > .05$) (see Table 2). Box's test of equality of covariances showed that the assumption of equality of covariances was not violated ($p > .01$) (see Table 3).

The main effect of sleep on students' memory was statistically significant, $F(1, 57) = 2316.244, p = .000, \eta^2 = .976$ (see Table 4). The group who had more than 7 hours of sleep had the highest mean score of items remembered ($M = 7.625$), closely followed by the group with less than 6 hours of sleep ($M = 7.206$), and the group with 6 to 7 hours of sleep had the lowest mean of items remembered ($M = 8.129$) (see Table 5). According to the Post Hoc Tukey analysis, the significant difference lies between the group who had more than 7 hours of sleep and the group who had 6 to 7 hours of sleep ($0.92, p < .05$) (see Table 6).

The main effect of the related independent variable (midterm/non-midterm week) on students' memory was statistically significant, $F(1, 57) = 47.644, p = .000, \eta^2 = .455$ (see Table 7). During the midterm week the students had a lower mean STM ($M = 6.786$) than in the non-midterm week ($M = 8.520$) (see Table 8).

The interaction effect between sleep and midterm/non-midterm week was not statistically significant (see Table 7).

Therefore, the results provided evidence that both amount of sleep and selected conditions (midterm/non-midterm week) individually had a significant effect on STM. However, the said two variables combined showed no significance in relation to STM; therefore, the hypothesis was partially confirmed.

Discussion

The experiment had various possible outcomes. Both amount of sleep and the given condition (either midterm or non-midterm week) together, would affect the performance of STM. Another feasible result would be that only one variable (either the amount of sleep or the given condition) would have a significant impact on student's STM. Additionally, both amount of sleep and the given condition could have an effect on student's STM performance; however, not in interaction with each other. The initial hypothesis stated in the beginning was that both total hours of sleep and the set condition would have an effect on STM efficiency. The said hypothesis was partially supported by the results; however, the variables did not produce significant results in interaction with each other, therefore confirming the third hypothesis stated above.

As stated, the results showed that amount of sleep had a significant effect on STM performance, similar to Elkin and Murray's (1974) study which is consistent with this part of our initial hypothesis. The said research employed encoding on the auditory level which may be a certain limitation to the study, whereas our experiment involved visual encoding which may have reduced the number of potential errors. The research concluded that students with less than 7 hours of sleep performed worse on the cognitive task than those with more than 7 hours of sleep. Pilcher and Waters (1997) came to the same conclusion in their study of university students in terms of cognitive performance in relation to sleep deprivation.

Additionally, the condition given (midterm week) had a significant impact on STM performance which was potentially expected, since the workload of students was larger, and

the amount of stress was higher than in the second condition (non-midterm week).

However, the two said variables showed no significant interaction in terms of STM and its cognitive performance.

There were various limitations to this experiment, the most notable could be the sample size which was not large enough. Due to it not being extensive, we cannot infer the findings to a larger population. Moreover, the small sample size may have had impact on the significance in the interaction of said variables. Additionally, as previously stated, the problematic of sleep deprivation not being a controlled variable could have influenced the results.

The manner in which the experiment was conducted had certain drawbacks, such as the number of items (14) being too high. The problem with this could have been that the participants did not have sufficient time to note down all 14 pieces of information (even with the possibility of recalling all of them). Another difficulty with the number of items could be that STM can hold up to 7 ± 2 pieces of information in its storage, and for participants to be able to recall all 14 items it would be necessary to give them rehearsal time for maintaining the information in STM. However, if we gave them time for rehearsal there would be the possibility of them transferring the information into long-term memory through elaborative rehearsal, and therefore diverge from the initial hypothesis of the experiment.

Another problematic which occurred and was connected to the manner in which the experiment was performed was the loss of time due to the pen given to participants not working properly. Additionally, the loss of time was induced by participants distracting each other in case of the experiment being performed in groups of people. In situations where only one person performed the experiment distractions were not an issue.

The choice of participants is what may have been a drawback to the research as through matching them we determined that some had participated in the first condition (midterm

week) of the experiment. It could be stated that the participants who had performed in both conditions were indirectly primed as the items or their position did not change, and all the items belonged to the same category (school supplies), therefore making it easier to recall the items. It is unlikely that rehearsal had taken place as in the first condition the participants were not informed about the second part of the experiment (condition). Furthermore, according to Ebbinghaus' forgetting curve, there is a large probability of information decay in between the two conditions (Murre & Dros, 2015).

Matching the participants showed another problem in terms of using exact data they had provided. The said data could not be included, in this case the precise amount of sleep, as it was necessary to match the participants, and each of the participants differed in the amount of sleep stated. Therefore, hours of sleep had to be averaged to ensure the use of the statistical test necessary for confirmation of the initial hypothesis.

Due to many participants being bilinguals, and therefore holding a larger amount of words, the problem of retrieving them in English language had occurred. Thus, resulting in loss of time or not writing down the item they were able to recall because the word was missing. Loss of time also occurred among those who had stated details about the items (participants were explicitly informed to only state the item because of the time limitation).

Although further research on this topic is required in order to be able to make assumptions about the general population, the findings of this study indicate that amount of sleep and whether it was midterm or non-midterm week (separately) had a significant effect on STM in terms of cognitive performance of university students. The limitations in this study should be eliminated in further research, as well as ensuring the use of a larger sample to establish more definite results.

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Table 1

Levene's Test of Equality of Error Variances^a

	F	df1	df2	Sig.
Midterm	1.214	2	57	.304
Nonmidterm	.638	2	57	.532

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Sleep
Within Subjects Design: time

Table 2

Mauchly's Test of Sphericity^b

Measure:stm

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^a		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
time	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b. Design: Intercept + Sleep
Within Subjects Design: time

Table 3

*Box's Test of
Equality of
Covariance
Matrices^a*

Box's M	18.033
F	2.765
df1	6
df2	3742.948
Sig.	.011

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design:
Intercept +
Sleep
Within
Subjects
Design: time

Table 4

Tests of Between-Subjects Effects

Source	Measure:stm Transformed Variable:Average					
	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	4963.739	1	4963.739	2316.244	.000	.976
Sleep	20.048	2	10.024	4.678	.013	.141
Error	122.152	57	2.143			

Table 5
Estimates

Measure:stm				
Sleep	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
less than 6 hours	7.625	.366	6.892	8.358
6-7 hours	7.206	.251	6.703	7.709
more than 7 hours	8.129	.175	7.778	8.479

Table 6
Multiple Comparisons

Measure:stm							
	(I) Sleep	(J) Sleep	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	less than 6 hours	6-7 hours	.42	.444	.615	-.65	1.49
		more than 7 hours	-.50	.406	.434	-1.48	.47
	6-7 hours	less than 6 hours	-.42	.444	.615	-1.49	.65
		more than 7 hours	-.92*	.306	.011	-1.66	-.19
	more than 7 hours	less than 6 hours	.50	.406	.434	-.47	1.48
		6-7 hours	.92*	.306	.011	.19	1.66
Games-Howell	less than 6 hours	6-7 hours	.42	.346	.459	-.45	1.29
		more than 7 hours	-.50	.252	.136	-1.14	.13
	6-7 hours	less than 6 hours	-.42	.346	.459	-1.29	.45
		more than 7 hours	-.92*	.341	.030	-1.77	-.08
	more than 7 hours	less than 6 hours	.50	.252	.136	-.13	1.14
		6-7 hours	.92*	.341	.030	.08	1.77

Based on observed means.
The error term is Mean Square(Error) = 1.072.
*. The mean difference is significant at the .05 level.

Table 7
Tests of Within-Subjects Effects

Measure:stm

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
time	Sphericity Assumed	63.737	1	63.737	47.644	.000	.455
	Greenhouse-Geisser	63.737	1.000	63.737	47.644	.000	.455
	Huynh-Feldt	63.737	1.000	63.737	47.644	.000	.455
	Lower-bound	63.737	1.000	63.737	47.644	.000	.455
time * Sleep	Sphericity Assumed	5.546	2	2.773	2.073	.135	.068
	Greenhouse-Geisser	5.546	2.000	2.773	2.073	.135	.068
	Huynh-Feldt	5.546	2.000	2.773	2.073	.135	.068
	Lower-bound	5.546	2.000	2.773	2.073	.135	.068
Error(time)	Sphericity Assumed	76.254	57	1.338			
	Greenhouse-Geisser	76.254	57.000	1.338			
	Huynh-Feldt	76.254	57.000	1.338			
	Lower-bound	76.254	57.000	1.338			

Table 8
Estimates

Measure:stm

time	95% Confidence Interval			
	Mean	Std. Error	Lower Bound	Upper Bound
1	6.786	.202	6.382	7.190
2	8.520	.203	8.113	8.928

**The relationship between time spent on social networking sites and
social anxiety in adults**

Thesis by

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The relationship between time spent on social networking sites and social anxiety in
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Table of contents

1 Introduction.....	8
2 Social Anxiety and Social Networking Sites.....	10
2.1 Social Anxiety.....	10
2.2 Measuring Social Anxiety.....	14
2.2.1 The Social Anxiety Questionnaire for Adults (SAQ-A30)	14
2.2.2 The Social Phobia Inventory (SPIN).....	14
2.2.3 The Liebowitz Social Anxiety Scale (LSAS).....	15
2.2.4 The Social Interaction Anxiety Scale (The SIAS).....	15
2.3 Social Network Sites.....	16
2.4 Measurements of Time Spent on Internet Sites.....	25
2.4.1 Google Forms questionnaire inspired by questionnaire of Heckler and Hughes...25	
2.4.2 The Pew Internet Scale.....	25
2.4.3 An 18-items questionnaire on basic Facebook use.....	26
2.4.4 Inscreenmode survey.....	26
2.4.5 Instagram time-measuring tool.....	26
2.5 Previous Research on Social Anxiety and the Use of SNS.....	27
2.5.1 Link between time spent on social networking sites and social anxiety.....27	
2.5.2 Link between time spent on social networking sites, social anxiety and interactions with strangers.....	28
2.5.3 Link between time spent on social networking sites, social anxiety and speaking in public/talking to people in authority.....	30
2.5.4 Link between time spent on social networking sites, social anxiety and interactions with preferred gender.....	31

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

2.5.5 Link between time spent on social networking sites, social anxiety and criticism and embarrassment.....	32
2.5.6 Link between time spent on social networking sites, social anxiety and assertive expression of annoyance, disgust or displeasure.....	33
3 Hypotheses.....	34
4 Methodology.....	36
4.1 Introduction.....	36
4.2 Research design.....	36
4.3 Participants.....	37
4.4 Instrument.....	37
4.5 Procedure.....	38
4.6 Data analysis.....	39
5 Results.....	40
6 Discussion.....	45
7 Conclusion	49
7.1 Summary.....	49
7.2 Implications.....	49
7.3 Limitations.....	50
7.4 Further Research.....	51
8 References.....	52
9 Appendices.....	61
Appendix A.....	61
Appendix B.....	68
Appendix C.....	84

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Abstract

The study was conducted to explore associations between time spent on social networking sites (SNS) and social anxiety (SA). Social anxiety (SA), or fear of social situations, belongs to one of the most common psychological disorders worldwide. Previous research has found positive aspects regarding the use of Social Networking Sites (SNS) and social anxiety (Prizant-Passal et al., 2016). Communication in an online setting does not require one to use as many verbal/non-verbal cues compared to communication face-to-face (FTF). Those with SA fear being categorized as anxious based on the use of verbal/non-verbal cues, consequently, they may tend to spend more time communicating in an online setting than FTF. The use of SNS has started to be the most popular form of social interaction among adults, often substituting for FTF interaction. The aim of the thesis was to reveal important information about the relationship between time spent on SNS and SA in adults. The purpose was to support this area of research; that is, the link between social anxiety, social networking sites, and the relationship between the two variables, and to raise knowledge and awareness to the audience regarding the topic. 120 adult individuals participated in the research. The general hypothesis was the following: Social anxiety relates positively to the time spent on SNS. SA was examined in terms of five dimensions based on the SAQ-A30 (interactions with strangers, speaking in public/talking to people in authority, interactions with preferred gender, criticism and embarrassment, assertive expression of annoyance, disgust, and displeasure). SA, in the dimension “interactions with strangers”, was found to be marginally statistically significant with time spent on SNS. There was not found any statistically significant relationship in other dimensions, and total score of SA, relating to time spent on SNS.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Keywords: face-to-face interaction, social anxiety, social networking sites, time spent on social networking sites, use of social networking sites, verbal/non-verbal cues

Introduction

Since social anxiety is one of the most common psychological disorders in the general population, people encounter the disorder worldwide. Based on a study by the National Institute of Mental Health (2018), around 7 % of the American population has a social anxiety disorder. This prevalence rate is similar in European countries, while the disorder is comorbid in 70-80% of individuals (Lecrubier et al., 2000). Social anxiety (SA) complicates one's life in different ways. It causes difficulties in social behavior and interaction with others, initiating and creating romantic relationships, or performance in the work sphere (Lecrubier et al., 2000). One has social anxiety when fearing social situations, interacting with other people, thinking of the worst possible consequences resulting from this interaction, and the possible negative perception of oneself by others. At this point, social anxiety often results in the avoidance of social interaction and withdrawal from social situations (Brown, 2018).

Although face-to-face (FTF) interaction through dialogue or discussion is considered the deepest form of communicative interaction, many individuals substitute FTF interaction for interaction on digital SNS (Spitzer, 2014). In recent years, social interaction has become widely used via social networking sites (SNS). While interaction via SNS is popular, people tend to spend more time interacting on SNS than FTF. Research done by The Nielsen Company, a company that analyzes global data, showed that nowadays, young adults spend on average 6 hours and more per week on SNS (as cited in Heckler & Hughes, 2017).

Some associations between the use of SNS and SA have been claimed. For example, Prizant-Passal et al. (2016) found a strong correlation between social comfort online, as

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

well as time spent online, and higher levels of social anxiety, when age increases.

However, an association between SA and SNS may encourage questions on whether the use of SNS is more helpful or harmful for people with SA. The possible benefits and deficits of SNS are widely discussed by researchers. According to Spitzer (2014), the Internet is full of negative social contacts, with users, and criminals, faking identity and cheating. Large scale deception is relatively commonplace. Therefore, it is not surprising that the use of SNS may lead to mental health issues. When using computer-mediated-communication (CMC), one may develop social anxiety, which is strengthened in a FTF situations (Yen, 2012). On the other hand, a SNS may provide an individual with SA a possible comfort zone of interaction, perceiving this interaction on SNS as less frightening than FTF interaction (Prizant-Passal et al., 2016). However, if people with SA substitute FTF interaction for interaction on SNS, they can lack training in social behavior, which is needed in FTF interaction (Spitzer, 2014).

The thesis focuses on the relationship between time spent on SNS and social anxiety in adults. The author believes that the results may reveal important information on the relationship between social anxiety and social networking sites, and suggest ideas, which may determine new ways of SA treatment. In addition, this research should provide information for readers, which helps them think about, and evaluate self-perception in social situations, as well as the use and time spent on social networking sites, and the associations between these.

Social Anxiety and Social Networking Sites

2.1 Social Anxiety

According to the American Psychiatric Association (2013), social anxiety is defined as:

“A persistent fear of one or more social or performance situations, in which the person is exposed to unfamiliar people or to possible scrutiny by others. The individual fears that he or she will act in a way (or show anxiety symptoms) that will be embarrassing and humiliating” (p. 202).

Nevid and Rathaus (2016) define social anxiety in terms of the following:

“Social phobia (also called social anxiety disorder) is a persistent fear of social interactions, in which one might be scrutinized or judged negatively by others” (p.268).

According to Nevid and Rathaus (2016), “anxiety is an emotional state that is accompanied by subjective, behavioral, and physical features” (p. 268). Social anxiety develops approximately around the age of 15, and there is a high chance of social anxiety occurrence in people who have shy personalities (Nevid & Rathaus, 2016). For example, people high on shyness are likely to avoid social situations, while feeling nervous in the presence of others. Thus, a shy individual may develop the fear of social situations (social anxiety), while lacking social competencies due to avoidance of a social setting. Regarding diagnosis, the occurrence of social anxiety is probable if one feels anxious without rational reason, which would trigger social anxiety, and they feel extremely comfortable when being alone comparing to being in a social situation (Jefferson, 2001). On the other hand, individuals who experience anxious feelings only sometimes if facing a social event, these do not necessarily follow criteria for the diagnosis of a social anxiety disorder (Nevid & Rathaus, 2016). In addition, social

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

anxiety is specific anxiety, relating to fear of social situations. Anxiety occurs when one experiences repeating feelings of doubt and nervousness, predictions of negative outcomes, worrying, lessened self-control or difficulty to take a rest. Furthermore, social anxiety is accompanied by one's continuous fear of their own actions, which could result in embarrassment and negative judgment by other people (American Psychiatric Association, 2013). Moreover, people with social anxiety are very self-conscious of what others think, or might think, regarding their behavior and actions. For example, they tend to overthink and overanalyze others' perception of appropriateness regarding their speech, mimics, gestures or posture after social interaction exposure ends. One can get anxious in social situations, in which one feels a lack of control over the environment and others (Brown, 2018). Those with social anxiety can be aware of the irrationality related to their anxious feelings, however, this awareness and knowledge related to the issue, does not seem to have a strong impact on their beliefs and feelings (Jefferson, 2001). These specific characteristics in their behavior and thinking processes complicate their daily functioning. An individual with social anxiety thinks negatively about social events, in which they will participate in the near future. They may avoid some outdoor or indoor places, thus avoiding negative thoughts related to the possibility of embarrassment or failure (The National Institute of Mental Health, 2018).

The physical symptoms of social anxiety are the following: blushing, rise in the speed of heartbeat and sweat intensity, nausea, tremor, increased speed of breathing, feeling of lightheadedness or empty mind. In terms of social anxiety, muscle tension disorder may be developed in the way of psychosomatic symptoms, when expecting involvement in a social event (American Psychiatric Association, 2013).

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

The term social anxiety when used in the context of social phobia mainly relates to fear of being scrutinized by others when performing in public (e.g. performance phobia/anxiety). The latter is characterized by difficulties regarding public performance, such as involvement in public speaking, team games, performing art. However, one with only performance social anxiety disorder may not be avoidant of, and frightened by, social events, in which actions involving performance are absent. On the other hand, one with a social anxiety disorder in its full extent tends to avoid all kinds of social situations while feeling anxious and being unable to control feelings of anxiety, discomfort, and fear in such situations (American Psychiatric Association, 2013).

People with social anxiety are afraid of being categorized as anxious since they tend to expect negative outcomes when their social anxiety is revealed by others (American Psychiatric Association, 2013). A socially anxious individual may be categorized as such based on their repeating or characteristic behavior in terms of social interaction with other people (American Psychiatric Association, 2013). For example, one with social anxiety may appear overly polite and too passive, when leading a conversation with others, they tend to be self-conscious about their speech, having a low intensity of voice, not revealing much information about themselves, and using inappropriate eye-contact. Also, they may have a strange physical posture.

People with social anxiety have a preference for a workplace in which they are not exposed to social interaction, they tend to retire from a job early in life, thus avoiding daily social interactions, which accompany a career. Regarding gender-specific features of social anxiety, males tend to set up their own family later in life, and females may prefer a motherly role to role to a career, spending a lot of time at home. Social anxiety

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

in younger adolescents may show in the way of substance use, such as alcohol consumption, before entering a social event, such as parties. On the other hand, in older individuals with social anxiety there may be a higher risk of medical illness such as tachycardia (American Psychiatric Association, 2013). Based on the DSM-V, low social evaluation, inhibition or child abuse may trigger social anxiety, however, there is no conclusive verification regarding causality among the stated risk factors (American Psychiatric Association, 2013). Social anxiety seems to have a genetic basis, but the condition might be related to learning behavioral tendencies too. For example, obese people in early adulthood may become socially anxious based on the experience of maltreatment, or rejection, by their peers (American Psychiatric Association, 2013).

Moreover, social anxiety may occur in comorbidity with other psychological disorders. The most common disorders or illnesses that one experiences as comorbid with a social anxiety disorder are other anxiety disorders, depression, dysthymia, substance abuse. Those with social anxiety are likely to try to lessen feelings of anxiety through alcohol and drug consumption. When social anxiety is comorbid with another type of anxiety disorder, such cases may trigger depression due to feelings of loneliness or isolation. Regarding distinguishing a diagnosis of social anxiety, one may experience panic attacks, atypical depression or body dysmorphic disorder (American Psychiatric Association, 2013). One may develop an avoidant personality disorder. An avoidant personality disorder is accompanied by “a pervasive pattern of social inhibition, feelings of inadequacy, and hypersensitivity to negative evaluation that begins by early adulthood and is present in a variety of contexts” (American Psychiatric Association, 2013).

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

The persistent fear of social situations in terms of social anxiety disorder does not stop over a lifetime if one is not treated properly. If social anxiety is not treated, one may be unable to fulfill one's whole potential in the long-term (Nevid & Rathaus, 2016). Social anxiety is a serious issue in terms of daily functioning, people become unable to meet other people or get job positions, which require them to enter social situations (Jefferson, 2001).

2.2 Measuring Social Anxiety

2.2.1 The Social Anxiety Questionnaire for Adults (SAQ-A30)

The Social Anxiety Questionnaire for Adults was designed by Caballo, et al. and the CISO-A Research Team, it measures generalized social anxiety as well as social phobia and specific anxiety in people over 18 years old. The final version of the Social Anxiety Questionnaire for Adults (SAQ-A30) consists of 30 items and was created after many years via research in 18 countries in Latin America, as well as Spain and Portugal.

SAQ-A30 is considered by the research team a great tool to measure social anxiety (Caballo et. al., 2012). SAQ-A30 was used in this work to measure social anxiety.

2.2.2 The Social Phobia Inventory (SPIN)

The Social Phobia Inventory (SPIN) consists of 17 items scale, which measures a level of fear and avoidant behavior among various social settings. The Mini-Spin is considered effective regarding measuring social anxiety, while being based on three items and a scale of 0 to 4. Also, this measure focuses on the reasons for avoidance, such as being avoidant due to fear of embarrassment, or becoming center of attention (Hirai & Skidmore, 2011).

2.2.3 The Liebowitz Social Anxiety Scale (LSAS)

The Liebowitz Social Anxiety Scale (LSAS) was found by Dr. Michael R. Liebowitz, and it consists of 24 items, while 13 of the items are linked to performance social anxiety and the rest of items relates to social events (Morfitt, 2018). At this point, LSAS considers avoidant behavior as well as anxious feelings, and it belongs to effective questionnaires, which focus on measuring social anxiety (Forni et al., 2013).

2.2.4 The Social Interaction Anxiety Scale (The SIAS)

The Social Interaction Anxiety Scale (The SIAS) consists of 19 items, which focus on one's responses in terms of cognition, affection and behavior regarding social situations (Mattick & Clarke, 1998). In addition, items are measured in the way of the Likert scale from 0 to 4. Items of the SIAS have "one dimension based on an exploratory factor analysis considering 243 individuals with a diagnosis of social phobia" (Mattick & Clarke, 1998).

2.3 Social Network Sites

Boyd and Ellison (2007) refer to social networking sites as follows:

“Web-based services that allow individuals to construct a Public or semi-public profile within a bounded system articulate a list of other users with whom they share a connection and view and traverse their list of connections and those made by others within the system” (p.210).

Omekwu (2014) defines social networking sites in terms of the following:

“Social networking sites are modern interactive communication channels through which people connect to one another, share ideas, experiences, pictures, messages, and information of interest” (p. 2).

According to Omekwu (2014), social networking sites are highly used to satisfy the needs of people in terms of networking with others, as well as communication in public domains. They are interactive tools, which provide ways to inform and communicate between individuals in a simple and effective way, while using “the instrumentality of the Internet and the telecommunication gadgets” (Omekwu, 2014, p. 3). Internet-based social networks enable one to communicate with various audiences worldwide. Social networking sites such as Facebook and Instagram are a type of computer-mediated-communication (CMC). Another type of CMC is Instant messaging (IM) such as Messenger, which enables one to send real-time text messages, usually free of charge (Orr, 2012). Where social networking sites in the form of applications are available, people use these via smartphones (Sleeper, 2018).

A public profile creation is one of the requirements of such online platforms (Cheung, 2015). At this point, an online platform user tends to provide personal data to online

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

platforms, including photos or personal tastes, aspirations, as well as information about their peers or family members (Cheung, 2015). Social networking sites enable users to create an account including a profile, and then to search for people who have also established accounts on the same SNS. Adding friends and other people to contact list on SNS enables one to interact with them online (as cited in Orr, 2012). Next, social networking sites provide an opportunity to make, keep or build social relationships with people who share alike interests or backgrounds in the online way (Boyd & Ellison, 2007).

Since one is enabled to access social networking sites easily, this virtual way of interaction became widely used among various age categories, including university students (Omekwu, 2014). According to Awake (2011), radio stations got around fifty million users in thirty-eight years, TV channels got around the same number of users as radio stations in thirteen years. It took the Internet just four years. Social networking sites such as Facebook reached around two hundred million users in the duration of one year. In addition, university students nowadays own one and more public profiles on social networking sites (Aragon et al., 2014).

In the last 12 years there has been a strong increase in social media use (Pew, 2015). These are mostly used by people of 18 to 29 years of age with a 90 % penetration rate (as cited in Heckler & Hughes, 2017). According to Aragon et al. (2014), young adults tend to spend thirty minutes and more on interaction via SNS. In addition, around $\frac{1}{4}$ of overall social media use (approximately 6 hours and more per week) is the time spent on SNS, as stated by The Nielsen Company in 2017, also pointing to a 21% rise in terms of SNS use from 2015 (as cited in Heckler & Hughes, 2017). Regarding age

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

categories, Duggan, Ellison, Lampe, Lenhart, and Madden (2015) report that 73% of people between 30 and 49 years of age, 63% of 50 to 64 years old people, and those who are 65 and more years old, are using Facebook (as cited in Prizant-Passal et al., 2016). Approximately 80% to 90% of university students use Facebook, as reported by the Educause Learning Initiative (Aragon et al., 2014). In addition, around 82% of young adults access SNS via smartphones, while Facebook (FB) and Instagram (IG) belong to the category of social media platforms, on which adults tend to spend most of their time (Heckler & Hughes, 2017). Raacke and Bonds-Raacke (2008), found that 87.1% of participants spend 3 hours on average daily using Facebook, while logging-in to Facebook 4 times per day (as cited in Murphy & Tasker, 2011). In addition, Pempek, Yermolayeva, and Calvert (2009) showed that the average time spent on Facebook by adult participants was approximately 27.93 minutes daily during the week and 28.44 minutes daily on weekends (as cited in Murphy & Tasker, 2011).

Instagram is a social networking site owned by Facebook since 2012. IG enables one to share photos and videos including location and tags on the user's account. Also, one can pay for the promotion of their posts in order to make an advertisement on the platform (Constine, 2013). This platform provides users the capacity to "follow" other users' accounts, give and receive "likes" or comments on posts, or share and watch "instastories", which show one's moments of daily life. When adding an option to use "instastories" via the platform, users started to spend about 32 minutes more per day using Instagram. In addition, users younger than 25 years old spend over 32 minutes on IG daily, while individuals over 25 years of age spend on average upwards 24 minutes daily by using the platform (Instagram, 2017). According to Aragon (2014), social networking sites used in connection with educational settings may improve abilities to

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

study. Social networking sites enable one to get access to various types of platforms, such as educative, informative, entertaining, political or business. These platforms provide people an opportunity to fulfill their different needs in a virtual way (Awake, 2011).

One should consider negative aspects of the use of SNS too (Spitzer, 2014).

Approximately 39% of students tend to procrastinate on studying material to school while increasing time spent on social networking sites. Next, around 37% reported having sleep deprivation due to over use of social networking sites (Espinoza & Guvonen, 2011).

According to Kang (2015), a psychiatrist and the author of *The Dolphin Way*, there are serious issues connected with social media overuse, while pointing to the reduction of real-world skills. Latham (2011) agrees that social media such as Facebook negatively influences one's ability to create relationships with others in the real world. The more time individuals spend on interaction via SNS instead of FTF, the less they are capable of socially interacting FTF in the long-term. People find it difficult today to meet new people FTF, to make meaningful connections with others, as well as keeping relationships in the real-life way of interaction. Moreover, too much substituting of FTF for SNS interaction with parents weakens child-parents relationship (Spitzer, 2014). In addition, the use of SNS is related to brain functioning (Spitzer, 2014). For example, when one reduces the amount of FTF social interaction, it negatively affects the ability of brain related to social interaction. At this point, an appropriate social approach towards others is undermined by specific parts of the brain, and one's ability to socially function decreases if these parts of the brain are not used actively. For instance, the

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

amygdala is related to social thinking and empathy, the orbitofrontal cortex is linked with one's ability to adapt to the social situation (Spitzer, 2014).

While the use of interaction via social networking sites increases, face-to-face interaction decreases. Youth nowadays prefer communicating their feelings and ideas via typed text, use of gifs, emojis, or sending photos and pictures to direct social interaction. There is evident overuse of social networking sites mainly in teenagers and young adults, or the middle-aged (Kang, 2015). Moreover, research done by Dr. Ethan Kross, founder of the Emotion & Self Control Laboratory at the University of Michigan, shows that there is a direct link between increased social media use, mainly Facebook, and psychological issues (Kang, 2015). Since use of social networking sites influences daily life in university students, including their perceptions of others, self-perceptions, or behavioral attitudes, they are likely to be affected by negative sites of social media platforms (Li, 2016). For example, there is a connection between online platform use and low self-esteem (Li, 2016). Moreover, "feelings of inadequacy, jealousy, anxiety, and depression" are underlined by continuous inappropriate self-comparisons with other online platform users (Kang, 2015). At this point, inappropriate self-comparisons may negatively influence self-esteem. Also, the increased time spent on SNS via smartphones may lead to smartphone addiction as well as internet addiction, while developing a habit to fulfill social needs via the online setting (Sleeper, 2018). In addition, individuals who already have SA are likely to spend more time using smartphones in order to reduce SA, while those who do not have SA yet may develop the disorder through smartphone addiction (Sleeper, 2018). Research by Reid and Reid (2007) showed that people with SA prefer texting to calling. One uses fewer verbal/non-verbal cues in texting, and thus is at a lower risk of being seen as anxious, compared to

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

a call which uses using more verbal/non-verbal cues (e.g. voice-trembling) (as cited in Sleeper, 2018).

A great amount of time spent on communicating via SNS in adolescents seem to be related to conformity rather than social anxiety, those adolescents adapting to social norms of communication as online. Their use of social media platforms for communication may have an adaptive and normative character. On the other hand, interaction on SNS by adults may be more likely related to social anxiety, such as seeking safety in online communication. The anonymous setting of online communication enables them to show themselves to others in a way which makes them feel safe. Therefore, social anxiety in regard to SNS may reach higher levels in adults than adolescents (Prizant-Passal et al., 2016).

Regarding the cognitive-behavioral model of problematic internet use (PIU) (Davis, 2001), maladaptive thoughts in people with social anxiety are related to increased interaction on social media platforms (as cited in Prizant-Passal et al., 2016). Adult individuals with SA tend to spend more time on SNS than people without social anxiety, SNS providing them comfort in interaction with others. In addition, they are likely to believe that the social media environment is the only setting, in which they are admired and respected (Prizant-Passal et al., 2016). This belief may be underlined by receiving positive reactions towards their behavior in an online setting, while acting mostly appropriately due to having control over the behavior when communicating online. On the other hand, people with SA, experience issues related to social anxiety in an online setting too. Individuals with SA have concerns, which relate to interaction with other people, one of them is self-presentation. They may still have worries

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

regarding what other people think about them when interacting online. Someone with SA is more likely to use SNS passively (e.g. watching posts of other users), while not interacting actively (e.g. texting someone). In addition, they rarely post anything by themselves on SNS (Sleeper, 2018).

Considering strengths in the use of SNS by people with SA, SNS also provides tools which do not require one to actively interact through sending messages (e.g. watching “insta-stories”). They may feel that SNS provides a safe environment for them to interact. For example, putting “like” on someone’s post while having a feeling of interaction, even not interacting actively (e.g. text messages) (Sleeper, 2018). Use of SNS enables one to interact in an anonymous way while not risking negative judgments by others, and a-synchronized communication, such as one does not have to reply to the message right away. Such features enable individuals with SA to manage interaction with others, while feeling a sense of control over the interaction (Sleeper, 2018). All of these factors may lead someone with SA to be less anxious in an online setting than in offline environment (Yen, 2012).

Those with social anxiety believe they can present themselves, and develop relationships with others, more effectively in an online setting, rather than in an offline situation (Prizant-Passal et al., 2016). For example, self-presentation may be related to the development of the “real” self, as stated by McKenna et al. in 2002 (as cited in Orr, 2012). Based on the research, participants with SA showed low satisfaction on the need to belong when interacting FTF, since they were not able to show their “real” selves. By contrast, the online setting enables one with SA to express and develop a “real” self, as well as to create intimate online relationships (Orr, 2012). The anonymous setting in

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

online communication enables one to show themselves to others in a way over which they have control.

The negative aspects of SNS in relation to SA should also be considered. Rauch et al. (2014), showed that people with social anxiety have a higher level of social anxiety if checking the profile of the person on SNS that they are supposed to meet afterward, while the level of SA does not increase if the profile is unchecked before meeting the person. For instance, one with SA tends to overthink and make negative predictions about ongoing situations and people, who they are supposed to meet. When checking the profile of the person, one with SA may feel anxious about the meeting due to overthinking. At this point, SNS may discourage people with SA in FTF interaction, while anxious feelings developed in an online setting can trigger avoidance of in-person communication (as cited in Sleeper, 2018).

Shaw et al. (2015), showed another negative aspect of SNS use in people with SA is the risk of smartphone addiction (as cited in Sleeper, 2018). Since one with SA prefers SNS interaction to FTF interaction, they tend to spend even more time interacting on SNS than people without SA. Furthermore, as Rauch, 2014 showed, interacting on SNS does not always include active communication. At this point, one with SA may use SNS in a passive way (e.g. scrolling down through posts of other users, watching “insta-stories”), and this may consequently increase SA in one when interacting FTF (as cited in Sleeper, 2018). In addition, the comfort zone that individuals with SA find in terms of SNS use, does not support them in FTF interaction, while supporting them in avoidance of FTF interaction. Therefore, the use of SNS may lead to the maintenance and rise of SA level in socially anxious individuals (Sleeper, 2018).

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

In conclusion, where people with SA are likely to use SNS as a substitution, rather than as an additional tool for social interaction, they may experience a decrease in well-being due to lack of in-person contact (Sleeper, 2018).

2.4 Measurements of Time Spent on Internet Sites

2.4.1 Google Forms questionnaire inspired by questionnaire of Heckler and Hughes.

The author of the thesis made a questionnaire in Google Forms, while using questions on time spent on social networking sites and this was similar to a survey by Heckler and Hughes (2017). Google Forms is a survey application, which enables one to create own surveys to find out specific information from respondents (Google Docs Support, 2018). For example, one is enabled to insert questions and options to answer, create the questions as required field to answer, include additional information about the survey, choose the design of the survey, and to send the survey to selected participants in an online way easily (e.g. e-mail, social networking sites, etc.). There is more information about the use of Google Forms in the author's work in the section 4.4 Instrument; 4.4.2 Google Forms questionnaire inspired by the questionnaire of Heckler and Hughes.

2.4.2 Pew Internet Research scale

The Pew Internet Research scale was used by the researchers Primack et al. (2017) when studying associations between the use of multiple social media platforms and symptoms of depression and anxiety in U.S. young adults. Moreover, the Pew Internet Research scale was made by the Pew Research Center; the center provides information about different worldwide issues, as well as it enables one to find information about empirical social science research, public opinion polling, demographic information, media content analysis, etc. (Pew Research Center, 2019).

2.4.3 An 18-items questionnaire on basic Facebook use

In order to do research on Facebook use, Murphy and Tasker (2011) created an 18-items-questionnaire, while items were related to the measurement of one's number of contacts on FB, types of activities on FB, and time spent on FB. Then, the following items were analyzed: time spent on FB and ease of online communication.

2.4.4 Inscreenmode survey

The survey by Inscreenmode (2018) is linked with Erasmus+ project; "MODERation strategies of SCREEN abuse for Generation Y(outh)". The target group of the survey includes young participants in the age range from 16 to 25 years, and the survey collects personal data, data about personality features, data for use of online platforms daily, and data related to behavior and feeling, which is characteristic for one when overusing online setting. To measure the time spent on SNS, the survey provides the following item: "4. During the last month, how much time did you spend on each of the following applications on a daily basis?". While one chooses from following time categories/options: "less than 2 hours, between 3-5 hours, between 6-9 hours, more than 10 hours, not relevant to me" (Inscreenmode, 2018). Regarding time spent on SNS, the question is answered in terms of the following: "2. Social Network Sites (SNS) (except for Instagram), 3. Instagram" (Inscreenmode, 2018).

2.4.5 Instagram time-measuring tool

Instagram provides tool involved in platform settings, which measures the time a user spends on IG on average within a week. It starts to measure the time when entering the platform and ends when leaving the platform or switching it to other platforms on the

device (Instagram Help Center, 2019). A similar tool is provided via Facebook, called “Your time on FB” (Facebook, 2019).

2.5 Previous Research on Social Anxiety and the Use of SNS

2.5.1 Link between time spent on social networking sites and social anxiety

Since individuals with social anxiety find it comfortable to use social networking sites for interaction with others, a positive relationship between time spent online and social anxiety may be expected. However, the environment of SNS or CMC in which socially anxious individuals find comfort, is also full of negative social contacts, fake identities, cheaters and criminals, and such aspects can lead to stressful mental health conditions (Spitzer, 2014). Therefore, ideas such as whether SNS is more helpful or harmful for people with social anxiety, and whether the use of SNS causes social anxiety to some extent are debatable.

Murphy and Tasker (2011), found a significant relationship between time spent on Facebook and social anxiety. In addition, they found a strong correlation between perceived ease of online communication and social anxiety. However, their research did not confirm the causal relationship between the variables. Prizant-Passal et al. (2016) showed that the studies done on the relationship between time spent online and social anxiety rarely showed a positive relationship. The time spent on SNS was not measured properly as it was being included in the overall time spent online. There was research done by Primack et al. (2017) on the use of multiple social media platforms, and symptoms of depression and anxiety in U.S. young adults. Their results showed an association between increased time spent on social media and anxiety, and the relationship between the use of multiple social media platforms and anxiety. One of the

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

findings was a strong relationship between the total time of social media use and anxiety and depression. There were 1787 U.S. people of 19-32 years of age surveyed on depression and anxiety symptoms. The Patient-Reported Outcomes Measurement Information System and adapted Pew Internet Research scale were used in the research (Primack et al., 2017). In addition, users of 0 to 2 social networking sites were measured lower on depression and anxiety, comparing to users of 7 to 11 social networking sites (Primack et al., 2017).

According to Golbeck (2016), there is a positive relationship between social anxiety and the use of the internet, such as the level of social anxiety may increase if one cannot be online when desiring to be. The meta-review of research is based on analysis of findings done by 22 studies. It lasted 26 years to finalize the study and such findings included around 13,000 subjects. (Golbeck, 2016). In addition, withdrawal symptoms and loss of control over SNS use and time spent on them have been linked to problematic-internet-use (PIU) (Prizant-Passal et al., 2016).

2.5.2 Link between time spent on social networking sites, social anxiety, and interactions with strangers

Whereas someone with SA may feel comfortable when interacting with people in an anonymous way, they are likely to use the anonymous environment of SNS for interaction with strangers. According to Murphy and Tasker (2011), individuals with SA tend to spend more time interacting on SNS than in an offline setting due to anonymity. One with SA considers anonymous communication through SNS safe, since anonymity enables them not to be recognized in the case of receiving a negative evaluation by others (Prizant-Passal et al., 2016). In addition, anonymous setting in online communication reduces the risk of being socially rejected and emotionally hurt

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

(Esfandiari et al, 2013). For example, one with SA is enabled to talk to strangers as long as they desire to, while not revealing their real identity, thus, to avoid the fear of the social situation. On the other hand, anonymous interaction with strangers through SNS makes one disinhibited, exhibiting a lack of care about self-control and discourse directed towards others (Spitzer, 2014). This may result in online interaction related issues such as cyber-aggression, and this will be discussed later in terms of the dimension “assertive expression of annoyance, disgust or displeasure.”

According to Shaughnessy et al. (2017), individuals with high levels of SA tend to value interaction on SNS, since it enables control over the disclosure of personal data. In addition, people with SA are likely to use social media platforms, which provide tools for privacy protection, since they have control over self-presentation in a SNS environment. While desiring to make a positive impression on others, control over privacy seems to be important for those with SA when interacting with strangers. Information about a user made available for strangers, influences their perception of the user. Keeping some information private, one may avoid potential negative evaluation by others. Knowing that everything that is posted online will be permanently available to some extent, may increase levels of SA due to fear of future evaluation by others (Liu, 2010 as cited in Yen, 2012). Esfandiari et al. (2013), found that adolescents use CMC when being high on apprehension and fear of negative evaluation (AFNE), while being low on tension and inhibition in social contact (TISC). In addition, being high on anxiety and AFNE causes adolescents to engage in relationships with people who do not observe and evaluate them. The online setting provides anonymity and control over privacy helps one with SA to avoid the experience of being observed and judged by others.

2.5.3 Link between time spent on social networking sites, social anxiety, and speaking in public/talking to people in authority

While communication apprehension is directly related to anxiety in communication with others, it positively relates to social anxiety (Simonis, n.d.). Since individuals experience less communication apprehension in an online setting, they tend to spend more time communicating online, than FTF (Simonis, n.d.). Moreover, communication apprehension is involved in performance anxiety, which is accompanied by difficulties in social behavior such as speaking in public, working in a team, or performing art (American Psychiatric Association, 2013). Bülent and Dereboy (2011) found that 90% of students had a high level of anxiety in public performance in an educational setting, e.g. issues with public speaking. For example, as Edward et al. has stated in 2003, participants of the study who believed that their public speech would be evaluated afterward were high on SA (as cited in Yen, 2012). At this point, some researchers debating anxiety in terms of communication believe that being anxious when communicating is related to conditioning-based reinforcement linked with communication (Simonis, n.d.).

Some studies substitute the term communication apprehension for state anxiety, while reporting that people high on anxiety in communication are likely to search for sources of communication in order to satisfy their social needs (Simonis, n.d.). Furthermore, as Reid and Reid claimed in 2007, communication apprehension leads one to prefer texting to talk FTF, while simultaneously having the time to decide about what and how to say something. The time differential makes one with SA feel a sense of control over the conversation and to consider communication safe (as cited in Sleeper, 2018). In addition, individuals with SA are likely to apply a-synchronicity in online communication, such as time lag in communication reciprocity (Yen, 2012). According

to Spitzer (2014), individuals talking more FTF than through texts, are more successful in social relationships. For example, one communicating more FTF than via SNS may be more successful in social relationships, since practicing social skills, which are essential for social interaction in-person.

Considering talking to people in authority, someone with SA prefers online interaction to FTF interaction. For instance, when communicating to people in authority online, one may prepare what to say in order to avoid potential negative evaluation by the person in authority. However, there are some risks of SNS use when people in authority have access to one's information online. Since one's account on SNS includes a contact list, posting information on SNS means revealing one's information before an online audience. For example, online posts with the content of free time (e.g. drinking with friends) by one with or without SA may leave a negative impression on people in authority (e.g. a boss, a professor, etc.). Therefore, SNS may complicate one's interaction with people in authority.

2.5.4 Link between time spent on social networking sites, social anxiety, and interactions with preferred gender

According to Brown (2018), it is optimal for one to desire being accepted and liked by other people. On the other hand, this desire is a problem if it turns into obsession and discourages one from dating. Moreover, if one becomes socially anxious in terms of dating, they experience dating anxiety. It is optimal for people to have dating anxiety to some extent, while a moderate and high level of SA is likely to keep one from dating. McKenna and Bargh (1999) found that people with social anxiety establish fewer relationships in an offline setting, while building more relationships in an online setting (as cited in Orr, 2012). At this point, individuals with SA spend more time dating on

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

SNS than FTF, e.g. due to having control over their behavior towards the person they date (Brown, 2018). In addition, dating via the use of SNS became popular among people with SA since SNS enables one to avoid emotional intimacy, which is perceived as risky by people high on SA (Brown, 2018).

Furthermore, Stevens and Morris in 2007 studied associations between SA and the use of CMC related to dating in university students (as cited in Orr, 2012). Based on the results of the study, participants who “probably” had SA would use web-cameras for establishing romantic relationships. Since web-cameras may reduce the recognition of anxious behavior when using them for communication (e.g. blushing may not be well seen due to the low intensity of lightning), people with SA are likely to use them for communication (Orr, 2012). In addition, SNS such as FB or IG enable one to interact via video-calling, thus using web-cameras for interaction in dating may also be related to time spent on SNS.

2.5.5 Link between time spent on social networking sites, social anxiety, and criticism and embarrassment

Individuals high on SA are likely to spend time on SNS for interaction for several reasons, one of them is the avoidance of criticism and embarrassment. For example, asynchronous communication available via SNS enables one to nail text messages to the extent to which their message will not cause them embarrassment or rejection based on the negative evaluation by message receiver (Shaughnessy et al., 2017). At this point, SNS provide a safe environment for one with SA to interact while reducing chances for possible embarrassment and rejection (Prizant-Passal et al., 2016).

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Whereas SNS enables one to avoid revealing physiological characteristics when being anxious, such as trembling, they are less likely to experience embarrassment when communicating in an online setting (Shaughnessy et al., 2017). Since one with SA considers the use of non-verbal cues important for communication with others, they are likely to be measured high on comfort online (Prizant-Passal et al., 2016).

2.5.6 Link between time spent on social networking sites, social anxiety and assertive expression of annoyance, disgust or displeasure

When interacting via SNS, one easily loses self-control related to the assertive expression of annoyance, disgust or displeasure. Since people with SA tend to spend more time interacting via SNS than FTF, they are at high risk of being exposed to cyber-aggression. In addition, a study by Sheldon in 2008 showed that individuals may initiate cyber-aggression while using fake identities containing fake information about gender and age (as cited in Simonis, n.d.). According to Spitzer (2014), individuals interacting online may care less about morality, and they are likely to use words and expressions, which they would not use in FTF interaction. Also, when not interacting FTF actively or often enough, one's awareness of appropriateness related to verbal expression is weakened. For example, in the last 10 years, individuals in the clinical setting got used to threaten others regarding suicide commitment via text messages (Spitzer, 2014). Cludius, Stevens, Bantin, Gerlach, and Hermann (2013) showed that people with SA may drink to support assertive behavior towards others in an online and offline social setting (as cited in Heckler & Hughes, 2017).

Hypotheses

The aim of the study was to get the essential information about associations between social anxiety and time spent on social networking sites to encourage researchers to focus on the topic, and to inform readers about the issue. The author would like to answer the question: Does social anxiety relate to time spent on SNS? To answer the question, 6 hypotheses stated below were set up based on SA dimensions and the total score of SA, inspired by questionnaire SAQ-A30.

H01: Social anxiety in interactions with strangers does not relate to time spent on social networking sites

Ha1: Social anxiety in interactions with strangers relates positively to time spent on social networking sites

H02: Social anxiety in speaking in public/talking to people in authority does not relate to time spent on social networking sites

Ha2: Social anxiety in speaking in public/talking to people in authority relates positively to time spent on social networking sites

H03: Social anxiety in interactions with preferred gender does not relate to time spent on social networking sites

Ha3: Social anxiety in interactions with preferred gender relates positively to time spent on social networking sites

H04: Social anxiety in criticism and embarrassment does not relate to time spent on social networking sites

Ha4: Social anxiety in criticism and embarrassment relates positively to time spent on social networking sites

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

H05: Social anxiety in an assertive expression of annoyance, disgust or displeasure does not relate to time spent on social networking sites

Ha5: Social anxiety in an assertive expression of annoyance, disgust or displeasure relates positively to time spent on social networking sites

H06: Social anxiety does not relate to time spent on social networking sites

Ha6: Social anxiety relates positively to time spent on social networking sites

Methodology

4.1 Introduction

The study on the relationship between social anxiety and time spent on SNS in adults was done in order to reveal whether, and to what extent, social anxiety is related to time spent on social networking sites. Previous studies found associations between levels of social anxiety and time spent online, including time spent on SNS. Since previous research on social anxiety and time spent on social networking sites confirmed the relationship between the two, as well as associations between social anxiety and social networking sites, the author believes that more research considering the relationship should be done.

4.2 Research design

The Author of the work will conduct a study in the form of exploratory research, while the aim is to explore associations between social anxiety and time spent on social networking sites. In addition, the study has a quantitative character, and is not experimental. The study considers the dependent variable (social anxiety with 6 subscales; interactions with strangers, speaking in public/ talking with people in authority, interactions with preferred gender, criticism and embarrassment, assertive expression of annoyance, disgust or displeasure, the total score of SA) and independent variable (time spent on SNS with categories; less than 30 minutes, 30-60 minutes, 1-2 hours, 2-3 hours, 3 hours +). Moreover, one standardized questionnaire on social anxiety (SAQ-A30) and additional questions on use of SNS and socio-demographic information are used, while 99% of all questions in a questionnaire booklet have a close-ended character (See Appendix A).

4.3 Participants

There were 120 respondents who agreed on participation in the research. Moreover, 91 females and 29 males were selected from university and online setting, while belonging to the following age categories: 18-21 (30%), 22-25 (53.33%), 25+ (16.67%) (See Figure 1 and 2, Appendix C). Next, participants came from multicultural settings; Europe (74.17%), USA (1.67%), Asia (7.50%) alike Russia (7.50%), Other (9.17%) (See Figure 3, Appendix C). In addition, all participants filled a questionnaire booklet properly, therefore there were not any errors revealed regarding participants when analyzing data.

4.4 Instrument

4.4.1 The Social Anxiety Questionnaire for Adults (SAQ-A30)

The Social Anxiety Questionnaire for Adults was designed by Caballo, et al. and CISO-A Research Team and it measures generalized social anxiety as well as social phobia and specific anxiety in people over 18 years old. The final version of the Social Anxiety Questionnaire for Adults (SAQ-A30) consists of 30 items, while considering the total score of SA and 5 dimensions in terms of which social anxiety is measured: interactions with strangers, speaking in public/ talking with people in authority, interactions with a preferred gender, criticism and embarrassment, assertive expression of annoyance, disgust or displeasure (Caballo et al, 2012). Regarding dimension “interactions with preferred gender”, an original term is “interactions with the opposite sex.” However, the author of the thesis substituted the term for “interactions with preferred gender”, as suggested by the founders of SAQ-A30 to avoid discrimination of “people whose sexual tendency is their same gender” (Caballo et al., 2012). In addition, the options to answer questions of SAQ-A30 are following, based one participant’s feeling related to the level

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

of unease, stress or nervousness: Not at all or very slightly- 1 Slight - 2 Moderate- 3 High- 4 Very high or extremely high- 5. Each dimension relates to 6 particular items of the questionnaire followingly: interactions with strangers (question no. 10, 13, 15, 17, 19, & 22), speaking in public/ talking with people in authority (question no. 3, 7, 12, 18, 25, & 29) , interactions with preferred gender (question no. 4, 6, 20, 23, 27, & 30), criticism and embarrassment (question no. 1, 8, 16, 21, 24, & 28), assertive expression of annoyance, disgust or displeasure (question no. 2, 5, 9, 11, 14, & 26). The total score of SA is counted by summing up total scores of all 5 dimensions. (Caballo et al., 2012).

4.4.2 Google Forms questionnaire inspired by questionnaire of Heckler and

Hughes

To measure the time spent on social networking sites in adults, the author used Google Forms; an administration application for the creation of questionnaires that belongs to the Google Drive office (Google Docs Support, 2018). The author of the thesis created a questionnaire in Google Forms while focusing on time spent on social networking sites, and this was inspired by the questionnaire of Heckler and Hughes (2017). It includes questions or statements with multiple choice form of answers so one needs to choose options, which suit them. The author used the main question regarding time spent on SNS followingly: “How much time do you spend on social networking sites per day?” Considering answers, participants could choose from the following options, similarly to options by Heckler and Hughes (2017): less than 30 minutes, 30-60 minutes, 1-2 hours, 2-3 hours, 3 hours +.

4.5 Procedure

Regarding the procedure, informed consent and questionnaire booklet including a survey on time spent on SNS, SAQ-A30 and socio-demographic information was put in

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Google Forms and made together with a survey with 5 sections (See Appendix A). The first section included informed consent within basic information regarding research. Then, the questionnaire booklet was provided, starting with additional information in the second section. The first part of the survey “Use of SNS” consisted of questions focusing on time and use related to SNS. Next, the second part of the survey was the following: Questionnaire for Adults (SAQ-A30) made of 30 items, considering a total score of SA and 5 dimensions related to SA: interactions with strangers, speaking in public/ talking with people in authority, interactions with preferred gender, criticism and embarrassment, assertive expression of annoyance, disgust or displeasure. The third part of the survey included socio-demographic information.

The questionnaire booklets were provided to adults in the form of an online survey and a printed version in order to increase the number of respondents. In addition, potential participants got an appropriate explanation regarding research and could ask the author for additional information. Then, the survey was filled by respondents who approved participation in the research by signing informed consent.

4.6 Data analysis

After collecting all answers, data was processed in PASW Statistics (SPSS). Following on, one-way ANOVA for unrelated scores was used to analyze collected data.

Dependent variable (social anxiety with 6 subscales; interactions with strangers, speaking in public/ talking with people in authority, interactions with preferred gender, criticism, and embarrassment, assertive expression of annoyance, disgust or displeasure, and total score of SA) and independent variable (time spent on SNS with time categories; less than 30 minutes, 30 minutes-60 minutes, 1-2 hours, 2-3 hours and 3 hours +) were considered. Firstly, descriptive statistics were done for all variables.

Next, normality tests were used to determine whether there is homogeneity of variances in each variable, as well as to find out whether data were normally distributed. In addition, tests of between-subjects effects determined the potential significance among subscales, and Tukey post hoc tests were used to show potential significance among positive mean differences.

Results

5.1 Descriptive statistics

A one-way ANOVA for unrelated scores was conducted to determine if the social anxiety score in terms of 5 dimensions and total score based on SAQ-A30 was related to the range of time spent on social networking sites (SNS) (See Table 5, Appendix B). There were 120 male and female participants classified into five groups according to the average time they spend on social networking sites: less than 30 minutes, 30-60 minutes, 1-2 hours, 2-3 hours and 3 hours + (See Table 1, Appendix B).

Firstly, the social anxiety score in dimension “interactions with strangers” was lowest for participants who spend 30-60 minutes on SNS ($M = 13.45$), compared to participants who spend less than 30 minutes on SNS ($M = 13.62$), participants who spend 1-2 hours on SNS ($M = 14.44$), participants who spend 2-3 hours on SNS ($M=16.26$) and those who spend 3 hours + on SNS ($M=17.68$) (See Table 1, Appendix B).

Next, social anxiety score in dimension “speaking in public/talking to people in authority” was considered, while the lowest score for participants who spend less than 30 minutes on SNS ($M = 14.23$), compared to participants who spend 2-3 hours on SNS ($M = 16.04$), participants who spend 30-60 minutes on SNS ($M=16.74$), participants

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

who spend 1-2 hours on SNS ($M=16.94$) and those who spend 3 hours + on SNS ($M=17.80$) (See Table 6, Appendix B).

Followingly, social anxiety score in dimension “interactions with preferred gender” was found to be the lowest for participants who spend less than 30 minutes on SNS ($M = 14.61$), compared to participants who spend 30-60 minutes on SNS ($M = 16.32$), participants who spend 1-2 hours on SNS ($M = 17.15$), participants who spend 3 hours + on SNS ($M=18.63$) and those who spend 2-3 hours on SNS ($M=19.13$) (See table 10, Appendix B).

Moreover, social anxiety score in dimension “criticism and embarrassment” was lowest for participants who spend less than 30 minutes on SNS ($M = 17.23$), compared to participants who spend 1-2 hours on SNS ($M = 17.63$), participants who spend 3 hours + on SNS ($M = 18.00$), participants who spend 30-60 minutes on SNS ($M=18.55$) and those who spend 2-3 hours on SNS ($M=18.65$) (See Table 14, Appendix B).

Also, descriptive statistics of social anxiety score in dimension “assertive expression of annoyance, disgust or displeasure” showed the lowest score for participants who spend less than 30 minutes on SNS ($M = 15.77$), compared to participants who spend 1-2 hours on SNS ($M = 16.12$), participants who spend 30-60 minutes on SNS ($M = 17.00$) alike participants who spend 3 hours + on SNS ($M=17.00$) and those who spend 2-3 hours on SNS ($M=17.36$) (See Table 18, Appendix B).

Finally, social anxiety score in terms of the total score was lowest for participants who spend less than 30 minutes on SNS ($M = 75.46$), compared to participants who spend 30-60 minutes on SNS ($M = 82.07$), participants who spend 1-2 hours on SNS ($M = 82.27$), participants who spend 2-3 hours on SNS ($M=87.44$) and those who spend 3 hours + on SNS ($M=89.11$) (See Table 22, Appendix B).

5.2 Normality Tests

Considering normality tests, data was not normally distributed for dimension “interactions with strangers,” as assessed by Shapiro-Wilk test ($p = .005$); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > .05$) (See Tables 2 and 5, Appendix B).

Similarly to dimension “interactions with strangers”, data was not normally distributed for dimension “speaking in public/talking to people in authority,” as assessed by Shapiro-Wilk test ($p = .020$); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > .05$) (See Tables 5 and 7, Appendix B).

Next, data was normally distributed for dimension “interactions with preferred gender”, as assessed by Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > .05$) (See Tables 5 and 11, Appendix B).

Also, data was normally distributed for dimension “criticism and embarrassment,” as assessed by Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > .05$) (See Tables 5 and 15, Appendix B).

Next, data was normally distributed for dimension “assertive expression of annoyance, disgust or displeasure,” as assessed by Shapiro-Wilk test ($p > .05$), and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > .05$) (See Tables 5 and 19, Appendix B).

Lastly, data was normally distributed for the total score of social anxiety as assessed by the Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > .05$) (See Tables 5 and 23, Appendix B).

5.3 Test of Hypotheses

A one-way ANOVA for unrelated scores was run to determine the relationship between social anxiety score in terms of 5 dimensions including total score based on SAQ-A30, and time spent on social networking sites (SNS).

Regarding dimension “interactions with strangers”, the difference between time categories was marginally statistically significant, $F(4, 115) = 2.439, p = .051, \eta^2 = .078$ (See Table 3, Appendix B). Tukey post hoc analysis did not reveal any significant relationship between positive mean differences (See Table 4, Appendix B). Since the difference was only partially significant, the first null hypothesis, which states that social anxiety in interactions with strangers does not relate to time spent on social networking sites should not be rejected.

However, there was not a statistically significant difference between time categories in terms of dimension “speaking in public/talking to people in authority”; $F(4, 115) = 0.754, p = .557, \eta^2 = .026$ (See Table 8, Appendix B). In addition, Tukey post hoc analysis did not reveal any significant relationship between positive mean differences (See Table 9, Appendix B). Therefore, the second null hypothesis, which states that social anxiety in speaking in public/talking to people in authority does not relate to time spent on social networking sites cannot be rejected.

Similarly, there was not a statistically significant difference between time categories in dimension “interactions with preferred gender”; $F(4, 115) = 1.853, p = .124, \eta^2 = .061$ (See Table 12, Appendix B). Tukey post hoc analysis did not reveal any significant relationship between positive mean differences (See Table 13, Appendix B). Therefore, the third null hypothesis, which states that social anxiety in interactions with preferred gender does not relate to time spent on social networking sites cannot be rejected.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Next, there was not a statistically significant difference between time categories in dimension “criticism and embarrassment”; $F(4, 115) = 0.309, p = .872, \eta^2 = .011$ (See Table 16, Appendix B). Tukey post hoc analysis did not reveal any significant relationship between positive mean differences (See Table 17, Appendix B). Therefore, the fourth null hypothesis, which states that social anxiety in criticism and embarrassment does not relate to time spent on social networking sites cannot be rejected.

Also, there was not found any statistically significant difference between time categories in dimension “assertive expression of annoyance, disgust or displeasure”; $F(4, 115) = 0.363, p = .835, \eta^2 = .012$ (See Table 20, Appendix B). Tukey post hoc analysis did not reveal any significant relationship between positive mean differences. (See Table 21, Appendix B). Therefore, the fifth null hypothesis, which states that social anxiety in an assertive expression of annoyance, disgust or displeasure does not relate to time spent on social networking sites cannot be rejected.

Finally, there was not a statistically significant difference between time categories in terms of social anxiety total score; $F(4, 115) = 0.953, p = .436, \eta^2 = .032$ (See Table 24, Appendix B). Tukey post hoc analysis did not reveal any significant relationship between positive mean differences (See Table 25, Appendix B). Therefore, the sixth null hypothesis, which states that social anxiety does not relate to time spent on social networking sites cannot be rejected.

Discussion

There were 120 people from multiple cultures participating in the research on the relationship between time spent on social networking sites and social anxiety, 91 females and 29 males ranging by age followingly: 18-21 (30%), 22-25 (53.33%), 25+ (16.67%) (See Figure 1 and 2, Appendix C). In addition, among all 5 dimensions, selected participants reached the highest level of SA in dimension “criticism and embarrassment” ($M= 18.08$), comparing to dimension “interactions with preferred gender” ($M= 17.28$), then “assertive expression of annoyance, disgust or displeasure” ($M= 16.68$), “speaking in public/ talking to people in authority” ($M= 16.56$), and the dimension “interactions with strangers” ($M= 14.96$) (See Table 26, Appendix B).

The purpose of the study was to explore associations between time spent on SNS and social anxiety in adults while using the following hypotheses. After a proper data analysis and the use of one-way ANOVA for unrelated scores, the first hypothesis, “social anxiety in interactions with strangers relates positively to the time spent on social networking sites” was partially confirmed. There was found a marginally significant relationship between time spent on SNS and SA in interactions with strangers; $F(4, 115) = 2.439, p = .051, \eta^2 = .078$ (See Table 3, Appendix B). Tukey post hoc analysis did not reveal any significant relationship between positive mean differences (See Table 4, Appendix B). Similarly, the study by Murphy and Tasker (2011) reported a significant relationship between time spent on Facebook and total score of social anxiety measured with LSAS; $r(388) = .132$.

Regarding the rest of hypotheses, there was not found any statistically significant relationship between time spent on SNS and the rest of dimensions and total score of SA. Moreover, the second hypothesis “social anxiety in speaking in public/talking to

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

people in authority relates positively to time spent on social networking sites” was not confirmed based on the test of between-subject effects: $F(4, 115) = 0.754, p = .557, \eta^2 = .026$ (See Table 8, Appendix B). The third hypothesis was the following: social anxiety in interactions with preferred gender relates positively to the time spent on social networking sites. Moreover, the third hypothesis was not confirmed based on the following: $F(4, 115) = 1.853, p = .124, \eta^2 = .061$ (See Table 12, Appendix B). Next, the fourth hypothesis “social anxiety in criticism and embarrassment relates positively to time spent on social networking sites” was also not confirmed: $F(4, 115) = 0.309, p = .872, \eta^2 = .011$ (See Table 16, Appendix B). Similarly, the fifth hypothesis “social anxiety in an assertive expression of annoyance, disgust or displeasure relates positively to time spent on social networking sites” was not confirmed: $F(4, 115) = 0.363, p = .835, \eta^2 = .012$ (See Table 20, Appendix B). Lastly, the sixth hypothesis “social anxiety relates positively to time spent on social networking sites” was not confirmed: $F(4, 115) = 0.953, p = .436, \eta^2 = .032$ (See Table 24, Appendix B).

Considering other studies on the relationship between time spent on SNS and social anxiety, most of the studies showed that there was not found almost any statistically significant relationship between time spent on SNS and SA. According to Prizant-Passal et al. (2016), two studies from four doing research on the use of SNS and social anxiety focused on time spent on SNS, while one of them by Murphy and Tasker in 2011, which as previously stated in the work, found a positive relationship between time spent on Facebook and social anxiety. However, other studies did not focus on time spent on SNS separately from time spent online while linking it with SA, and those did not find a positive relationship on time spent online and social anxiety. For example, a study on the relationship between time spent online and social anxiety by Prizant-Passal et al. (2016) did not show a correlation between the two. At this point, there was not enough

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

research done on the relationship between time spent on SNS separately from time spent online while relating to social anxiety. In addition, using total time spent online as measuring tool may not be the most effective, since it may not reveal differences related to time spent by specific uses of an online setting, such as time spent on SNS. For example, different features of specific activities online may differ in a way they affect social anxiety. Moreover, type of internet use is an important indicator in the relationship between time spent online and SA, while SA is in different relationships with various uses of the internet, considering the extent of time spent by the uses (Prizant-Passal et al., 2016).

Furthermore, some studies focused on time spent on SNS, while not considering social anxiety itself, but aspects linked with it. For instance, the results of the studies by Baker and Oswald in 2010 and Sheldon in 2008, focusing on aspects linked with social anxiety in terms of social inhibition, such as shyness, unwillingness to communicate in FTF interaction and level of loneliness did not reveal a significant relationship between stated issues and time spent on SNS (as cited in Prizant-Passal et al., 2016).

The author believes one of the reasons for non-significant results found in their study is unsatisfactory amount of research done on the relationship between time spent on SNS and SA. According to Prizant-Passal et al. (2016), findings on the use of SNS are too limited to conduct proper research on the relationship between SNS and SA.

Next, the results of the study might not show significance since an independent variable might not be set up in an appropriate way. At this point, the independent variable (time spent on SNS) considered five categories presenting time range (less than 30 minutes, 30 minutes-60 minutes, 1-2 hours, 2-3 hours, 3 hours +), among which the participants

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

were supposed to choose based on their average time spent on SNS per day. For example, as it was previously stated, it is difficult to measure time spent online since one spends time online by specific uses. At this point, it may be difficult for participants to know how much time they spend specifically by using SNS when being online. Considering measuring tools, measuring the frequency of SNS use (number of times one access SNS platform daily) and intensity (the extent of SNS platform use once logging-in) could contribute to better findings related to time spent on SNS linked to SA (Orr, 2012). Moreover, SNS such as Instagram recently started to provide a measuring tool for the time spent specifically on this platform (Instagram Help Center, 2019). There is not enough information on the relevance of the tool, while the author suggests time-measuring tools involved in each SNS specifically could be an appropriate tool to measure time spent on SNS in future research.

Lastly, there might not be found any significant relationship between time spent on SNS and SA in the study since it is too early to do proper research on the topic due to limited information about SNS. At this point, social networking sites in terms of online interactive tool serve people for less than 20 years. For example, the first social networking site considered in the Millennial era was Friendster launched in 2002, followed by MySpace and then LinkedIn in 2003, and the dominating social media platform Facebook in 2004 (Editorial Team, 2016).

Conclusion

7.1 Summary

While social anxiety (SA) is one of the most common anxiety disorders, as well as one of the most common psychological disorders in general population, it brings difficulties in social interaction, feelings, and behavior to many people worldwide. Next, communication via social networking sites (SNS) is a preferable way of social interaction nowadays, since adult individuals substitute communication face-to-face (FTF) for the online form of communication. If spending more time on interaction on SNS than FTF, one may develop social anxiety due to neglected real-life social skills. Since people with SA prefer social interaction via SNS to in-person interaction, they are likely to spend more time on SNS than individuals without SA. Although social anxiety may be decreased when interacting via SNS, it remains present or increased in individuals with SA when interacting FTF. Whereas research on the relationship between time spent on social networking sites and social anxiety is limited, the number of studies on the topic should be increased in order to bring important findings relating to mental health.

7.2 Implications

Studying the topic of the relationship between time spent on SNS and SA is important for several reasons. Firstly, whether the time spent on SNS rather decreases or increases levels of social anxiety is debatable. For instance, recent research showed, substituting in-person communication for computer-mediated-communication via SNS, thus spending more time on interaction via SNS than FTF, seems to decrease levels of SA only short-term, while in the long-term perspective leading to reduction of the social skills needed for face-to-face interaction (Prizant-Passal et al., 2016). Next, findings on the relationship between brain functioning and use of online setting for interaction

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

showed, when FTF interaction is used less than interaction on SNS, parts of the brain related to social competencies decrease quality of functioning (Spitzer, 2014). When a quality of functioning in parts of brain related to social competencies decreases, one may become less capable of social interaction with others FTF. Although, adult individuals who have already developed social competencies through FTF interaction are less likely to be negatively affected by use of SNS, they may develop superficial approach to others when using SNS for social interaction. Developing superficial approach to others, one may lack deeper understanding in others when interacting with them in-person. Whereas the topic is controversial and accurate, the questions related such as whether there is a causal relationship between time spent on SNS/ use of SNS and SA, whether time spent on SNS/ use of SNS is more harmful or helpful for people with SA should be considered in the field of research.

7.3 Limitations

Since there were only 120 adult individuals participating in the study, the sample size might be considered as a limitation. For instance, if the sample size was greater, the study could bring more consistent results.

Other limitations were related to not enough developed tools or ways to measure time spent on SNS. For instance, if participants decided to measure a time, they spend on SNS by guessing it, they might not accidentally provide truthful answers due to lack of awareness in time spent on SNS separately from the time spent in an online setting in general. Although the relevance of measuring tools involved in SNS is not well explored yet, this type of tools seems to be the most appropriate to measure time spent on SNS due to its specificity. However, not all SNS provide time-measuring tools, so it

might be difficult for participants to measure how much time they spend on all SNS they have accounts with.

Although there is a decent amount of scales to measure social anxiety, the one used by the author might not be the most effective when relating social anxiety to time spent on social networking sites.

The greatest limitation of the study might be considered not enough research done on the topic of the relationship between time spent on SNS and social anxiety, while this might contribute to the author's use of potentially inappropriate measuring tools and other aspects involved in the research design, which possibly led to unsatisfactory results of the study.

7.4 Further Research

Regarding further research, the relationship between time spent on SNS and SA should be studied since there is not enough research done on the topic. Moreover, the use of SNS is a relevant topic to be researched mainly due to its consistent presence in the daily life of masses of people worldwide. At this point, how human activities in technological development will affect people in the future is unknown (Nordström & Schilingman, 2014). Moreover, research on the relationship between SNS and SA could reveal important findings regarding mental health. The author believes researchers should study the causal and correlational relationship between the two. Also, the development of appropriate time-measuring tools for SNS use should be considered, while it would contribute to reliability in answers of participants on time, they spend on SNS.

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Appendices

Appendix A

Section 1 of 5

Relationship between time spent on social networking sites and social anxiety in adults

EMPIRE STATE COLLEGE CONSENT FORM

Dear Participant,

Thank you for taking part in this research, which is part of Bachelor's Degree in Psychology. I am a student at the University of New York in Prague/ SUNY Empire State College. My thesis focuses on the relationship between time spent on social networking sites and social anxiety in adults. It takes about 5-10 minutes to complete the questions. The research is anonymous and does not include any information that could identify you. By participating you will help international research on social networking sites and social anxiety. If you have any questions, please ask me for clarifications. If you have any questions afterwards, you can contact me via my email: pauli.arendasova@gmail.com.

*Required

I have read and understood the research and want to participate in the study.

* I agree

Section 2 of 5

Questionnaire booklet

This study is focused on social networking sites and social anxiety. All information collected is anonymous and will be used for research purposes. There are no right or wrong answers.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Please complete the entire survey consisting of three parts. Each part will be explained.

Please read the instructions and record your answers.

Thank you very much for participating in this research.

Section 3 of 5

Part I Use of social networking sites

This part of the study is about how you think and feel about your use of social networking sites.

INSTRUCTIONS

Please read carefully each item and answer the following questions. Some questions have multiple choice.

1. How many social networking sites do you have accounts with? *

- 1
- 2
- 3
- 4
- 4+

2. What social networking sites do you have accounts with? *

Your answer:

3. How many times a day do you look at social networking sites ? *

- Not everyday
- Once a day
- 2-5 times a day
- 5-10 times a day
- 10+

4. How much time do you spend on social networking sites per day? *

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

less than 30 minutes

30-60 minutes

1-2 hours

2-3 hours

3 hours +

5. When do you access social networking sites? *

During free time

During social occasions

Whilst at school/work

Meal times

Before going to sleep

Before getting out of bed

6. What do you use social networking sites for? *

Keeping in touch with friends and family

Event planning

Buying and selling

Inspiration

News

Dating

To meet new friends

To find employment

To browse/time waste

7. Have social networking sites affected a relationship friend/ family/ romantic? *

Yes

No

8. Do you consider yourself addicted to social networking sites? *

Yes

No

Section 4 of 5

Part II Social anxiety questionnaire for adults (SAQ-A-30)

This part of the study is about how you think and feel about your level of unease, stress or nervousness.

INSTRUCTIONS

Below are examples of social situations that may or may not make you to experience unease, stress or nervousness. Please choose the number next to each social situation, which fits the most to your reaction. If you have never faced to some of the situations, answer based on how you think you would react in such situation.

Level of unease, stress or nervousness

Not at all or very slightly- 1

Slight- 2

Moderate- 3

High- 4

Very high or extremely high- 5

Please rate all the items truly. There are not right and wrong answers. Thank you very much for cooperation!

1. Greeting someone and being ignored *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

2. Having to ask a neighbor to stop making noise *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

3. Speaking in public *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

4. Asking someone attractive of the preferred gender for a date *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

5. Complaining to the waiter about my food *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

6. Feeling watched by people of the preferred gender *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

7. Participating in a meeting with people in authority *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

8. Talking to someone who isn't paying attention to what I am saying *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

9. Refusing when asked to do something I don't like doing *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

10. Making new friends *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

11. Telling someone that they have hurt my feelings *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

12. Having to speak in class, at work, or in a meeting *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

13. Maintaining a conversation with someone I've just met *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

14. Expressing my annoyance to someone that is picking on me *

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

15. Greeting each person at a social meeting when I don't know most of them *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

16. Being teased in public *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

17. Talking to people I don't know at a party or a meeting *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

18. Being asked a question in class by the teacher or by a superior in a meeting *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

19. Looking into the eyes of someone I have just met while we are talking *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

20. Being asked out by a person I am attracted to *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

21. Making a mistake in front of other people *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

22. Attending a social event where I know only one person *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

23. Starting a conversation with someone of the preferred gender that I like *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

24. Being reprimanded about something I have done wrong *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

25. While having dinner with colleagues, classmates or workmates, being asked to speak on behalf of the entire group *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

26. Telling someone that their behavior bothers me and asking them to stop *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

27. Asking someone I find attractive to dance *

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

28. Being criticized *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

29. Talking to a superior or a person in authority *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

30. Telling someone I am attracted to that I would like to get to know them better *

Not at all or very slightly 1 2 3 4 5 Very high or extremely high

Section 5 of 5

Part III Socio-demographic information

This part of the study involves socio-demographic information.

Please read carefully and answer each item.

Your gender *

Female

Male

Other

Your age *

18-21

22-25

25+

Where are you from? *

Europe

USA

Asia

Russia

Other

Thank you very much for participating in this research.

Appendix B

Table 1 *Descriptive Statistics*

Dependent Variable:Strangers

Time.spent.on.S	Mean	Std. Deviation	N
less than 30 minutes	13.6154	4.66438	13
30-60 minutes	13.4516	5.71454	31
1-2 hours	14.4412	5.97059	34
2-3 hours	16.2609	4.62422	23
3 hours+	17.6842	5.00058	19
Total	14.9583	5.51605	120

Table 2 *Levene's Test of Equality of Error Variances*

Dependent Variable:Strangers

F	df1	df2	Sig.
.370	4	115	.830

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Time.spent.on.SNS

Table 3 *Tests of Between-Subjects Effects*

Dependent Variable:Strangers

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	283.115 ^a	4	70.779	2.439	.051	.078
Intercept	24257.039	1	24257.039	835.779	.000	.879
Time.spent.on.SNS	283.115	4	70.779	2.439	.051	.078
Error	3337.677	115	29.023			
Total	30471.000	120				
Corrected Total	3620.792	119				

a. R Squared = .078 (Adjusted R Squared = .046)

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 4 *Multiple Comparisons*

Strangers
Tukey HSD

(I) Time.spent.on .SNS	(J) Time.spent.on .SNS	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 30 minutes	30-60 minutes	.1638	1.78011	1.000	-4.7699	5.0974
	1-2 hours	-.8258	1.75675	.990	-5.6947	4.0431
	2-3 hours	-2.6455	1.86934	.619	-7.8264	2.5355
	3 hours+	-4.0688	1.93910	.228	-9.4431	1.3055
30-60 minutes	less than 30 minutes	-.1638	1.78011	1.000	-5.0974	4.7699
	1-2 hours	-.9896	1.33786	.947	-4.6975	2.7184
	2-3 hours	-2.8093	1.48260	.326	-6.9183	1.2998
	3 hours+	-4.2326	1.56964	.061	-8.5829	.1177
1-2 hours	less than 30 minutes	.8258	1.75675	.990	-4.0431	5.6947
	30-60 minutes	.9896	1.33786	.947	-2.7184	4.6975
	2-3 hours	-1.8197	1.45448	.721	-5.8508	2.2114
	3 hours+	-3.2430	1.54310	.226	-7.5198	1.0337
2-3 hours	less than 30 minutes	2.6455	1.86934	.619	-2.5355	7.8264
	30-60 minutes	2.8093	1.48260	.326	-1.2998	6.9183
	1-2 hours	1.8197	1.45448	.721	-2.2114	5.8508
	3 hours+	-1.4233	1.67016	.913	-6.0522	3.2056
3 hours+	less than 30 minutes	4.0688	1.93910	.228	-1.3055	9.4431
	30-60 minutes	4.2326	1.56964	.061	-.1177	8.5829
	1-2 hours	3.2430	1.54310	.226	-1.0337	7.5198
	2-3 hours	1.4233	1.67016	.913	-3.2056	6.0522

Based on observed means.

The error term is Mean Square(Error) = 29.023.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 5 *Tests of Normality*

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Strangers	.099	120	.006	.967	120	.005
Speaking.in.public	.074	120	.157	.974	120	.020
Preferred.gender	.084	120	.039	.982	120	.113
Criticism	.069	120		.988	120	.375
Assertiveness	.093	120	.013	.979	120	.054
Social_Anxiety_Total	.057	120		.990	120	.577

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 6 *Descriptive Statistics*

Dependent Variable:Speaking.in.public

Time.spent.on.SNS	Mean	Std. Deviation	N
less than 30 minutes	14.2308	6.98992	13
30-60 minutes	16.7419	5.34146	31
1-2 hours	16.9412	6.63298	34
2-3 hours	16.0435	5.81126	23
3 hours+	17.7895	5.81740	19
Total	16.5583	6.05132	120

Table 7 *Levene's Test of Equality of Error Variances*

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Dependent Variable:Speaking.in.public

F	df1	df2	Sig.
1.205	4	115	.313

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Time.spent.on.SNS

Table 8 *Tests of Between-Subjects Effects*

Dependent Variable:Speaking.in.public

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	111.352 ^a	4	27.838	.754	.557	.026
Intercept	28472.376	1	28472.376	771.111	.000	.870
Time.spent.on.SNS	111.352	4	27.838	.754	.557	.026
Error	4246.240	115	36.924			
Total	37259.000	120				
Corrected Total	4357.592	119				

a. R Squared = .026 (Adjusted R Squared = -.008)

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 9 *Multiple Comparisons*

Speaking.in.public

Tukey HSD

(I) Time.spent.on. SNS	(J) Time.spent.on. SNS	Mean			95% Confidence Interval	
		Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
less than 30 minutes	30-60 minutes	-2.5112	2.00783	.722	-8.0759	3.0536
	1-2 hours	-2.7104	1.98149	.649	-8.2022	2.7814
	2-3 hours	-1.8127	2.10848	.911	-7.6564	4.0310
	3 hours+	-3.5587	2.18716	.483	-9.6205	2.5031
30-60 minutes	less than 30 minutes	2.5112	2.00783	.722	-3.0536	8.0759
	1-2 hours	-.1992	1.50900	1.000	-4.3815	3.9830
	2-3 hours	.6985	1.67227	.994	-3.9363	5.3332
	3 hours+	-1.0475	1.77044	.976	-5.9544	3.8593
1-2 hours	less than 30 minutes	2.7104	1.98149	.649	-2.7814	8.2022
	30-60 minutes	.1992	1.50900	1.000	-3.9830	4.3815
	2-3 hours	.8977	1.64054	.982	-3.6491	5.4445
	3 hours+	-.8483	1.74050	.988	-5.6722	3.9756
2-3 hours	less than 30 minutes	1.8127	2.10848	.911	-4.0310	7.6564
	30-60 minutes	-.6985	1.67227	.994	-5.3332	3.9363
	1-2 hours	-.8977	1.64054	.982	-5.4445	3.6491
	3 hours+	-1.7460	1.88381	.886	-6.9670	3.4751
3 hours+	less than 30 minutes	3.5587	2.18716	.483	-2.5031	9.6205
	30-60 minutes	1.0475	1.77044	.976	-3.8593	5.9544
	1-2 hours	.8483	1.74050	.988	-3.9756	5.6722
	2-3 hours	1.7460	1.88381	.886	-3.4751	6.9670

Based on observed means.

The error term is Mean Square(Error) = 36.924.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 10 *Descriptive Statistics*

Dependent Variable: Preferred.gender

Time.spent.on. SNS	Mean	Std. Deviation	N
less than 30 minutes	14.6154	5.76684	13
30-60 minutes	16.3226	5.37517	31
1-2 hours	17.1471	5.71618	34
2-3 hours	19.1304	6.07008	23
3 hours +	18.6316	5.20908	19
Total	17.2750	5.70856	120

Table 11 *Levene's Test of Equality of Error Variances*

Dependent Variable: Preferred.gender

F	df1	df2	Sig.
.343	4	115	.848

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Time.spent.on.SNS

Table 12 *Tests of Between-Subjects Effects*

Dependent Variable: Preferred.gender

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	234.779 ^a	4	58.695	1.853	.124	.061
Intercept	31400.203	1	31400.203	991.183	.000	.896
Time.spent.on.S	234.779	4	58.695	1.853	.124	.061
NS						
Error	3643.146	115	31.680			
Total	39689.000	120				
Corrected Total	3877.925	119				

a. R Squared = .061 (Adjusted R Squared = .028)

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 13 *Multiple Comparisons*

Preferred.gender

Tukey HSD

(I) Time.spent.on.S NS	(J) Time.spent.on.S NS	Mean			95% Confidence Interval	
		Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
less than 30 minutes	30-60 minutes	-1.7072	1.85979	.889	-6.8617	3.4473
	1-2 hours	-2.5317	1.83538	.642	-7.6185	2.5552
	2-3 hours	-4.5151	1.95301	.149	-9.9279	.8978
	3 hours+	-4.0162	2.02589	.281	-9.6310	1.5986
30-60 minutes	less than 30 minutes	1.7072	1.85979	.889	-3.4473	6.8617
	1-2 hours	-.8245	1.39774	.976	-4.6984	3.0494
	2-3 hours	-2.8079	1.54896	.371	-7.1009	1.4852
	3 hours+	-2.3090	1.63990	.624	-6.8540	2.2360
1-2 hours	less than 30 minutes	2.5317	1.83538	.642	-2.5552	7.6185
	30-60 minutes	.8245	1.39774	.976	-3.0494	4.6984
	2-3 hours	-1.9834	1.51958	.689	-6.1949	2.2282
	3 hours+	-1.4845	1.61217	.888	-5.9527	2.9837
2-3 hours	less than 30 minutes	4.5151	1.95301	.149	-.8978	9.9279
	30-60 minutes	2.8079	1.54896	.371	-1.4852	7.1009
	1-2 hours	1.9834	1.51958	.689	-2.2282	6.1949
	3 hours+	.4989	1.74491	.999	-4.3372	5.3349
3 hours+	less than 30 minutes	4.0162	2.02589	.281	-1.5986	9.6310
	30-60 minutes	2.3090	1.63990	.624	-2.2360	6.8540
	1-2 hours	1.4845	1.61217	.888	-2.9837	5.9527
	2-3 hours	-.4989	1.74491	.999	-5.3349	4.3372

Based on observed means.

The error term is Mean Square(Error) = 31.680.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 14 *Descriptive Statistics*

Dependent Variable: Criticism

Time.spent.on. SNS	Mean	Std. Deviation	N
less than 30 minutes	17.2308	5.38754	13
30-60 minutes	18.5484	4.64642	31
1-2 hours	17.6176	5.29731	34
2-3 hours	18.6522	4.88605	23
3 hours+	18.0000	5.00000	19
Total	18.0750	4.96062	120

Table 15 *Levene's Test of Equality of Error Variance*

Dependent Variable: Criticism

F	df1	df2	Sig.
.293	4	115	.882

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Time.spent.on.SNS

Table 16 *Tests of Between-Subjects Effects*

Dependent Variable: Criticism

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	31.093 ^a	4	7.773	.309	.872	.011
Intercept	34549.312	1	34549.312	1371.368	.000	.923
Time.spent.on.S	31.093	4	7.773	.309	.872	.011
NS						
Error	2897.232	115	25.193			
Total	42133.000	120				
Corrected Total	2928.325	119				

a. R Squared = .011 (Adjusted R Squared = -.024)

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 17 *Multiple Comparisons*

Criticism

Tukey HSD

(I) Time.spent.on.S NS	(J) Time.spent.on.S NS	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 30 minutes	30-60 minutes	-1.3176	1.65850	.932	-5.9142	3.2790
	1-2 hours	-.3869	1.63674	.999	-4.9232	4.1494
	2-3 hours	-1.4214	1.74164	.925	-6.2484	3.4056
	3 hours+	-.7692	1.80663	.993	-5.7764	4.2379
30-60 minutes	less than 30 minutes	1.3176	1.65850	.932	-3.2790	5.9142
	1-2 hours	.9307	1.24646	.945	-2.5239	4.3854
	2-3 hours	-.1038	1.38132	1.000	-3.9322	3.7246
	3 hours+	.5484	1.46241	.996	-3.5047	4.6015
1-2 hours	less than 30 minutes	.3869	1.63674	.999	-4.1494	4.9232
	30-60 minutes	-.9307	1.24646	.945	-4.3854	2.5239
	2-3 hours	-1.0345	1.35512	.941	-4.7903	2.7212
	3 hours+	-.3824	1.43769	.999	-4.3670	3.6022
2-3 hours	less than 30 minutes	1.4214	1.74164	.925	-3.4056	6.2484
	30-60 minutes	.1038	1.38132	1.000	-3.7246	3.9322
	1-2 hours	1.0345	1.35512	.941	-2.7212	4.7903
	3 hours+	.6522	1.55606	.993	-3.6605	4.9649
3 hours+	less than 30 minutes	.7692	1.80663	.993	-4.2379	5.7764
	30-60 minutes	-.5484	1.46241	.996	-4.6015	3.5047
	1-2 hours	.3824	1.43769	.999	-3.6022	4.3670
	2-3 hours	-.6522	1.55606	.993	-4.9649	3.6605

Based on observed means.

The error term is Mean Square(Error) = 25.193.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 18 *Descriptive Statistics*

Dependent Variable: Assertiveness

Time.spent.on.	Mean	Std. Deviation	N
less than 30 minutes	15.7692	5.32531	13
30-60 minutes	17.0000	4.87169	31
1-2 hours	16.1176	5.15672	34
2-3 hours	17.3478	5.39873	23
3 hours+	17.0000	4.43471	19
Total	16.6833	4.98904	120

Table 19 *Levene's Test of Equality of Error Variances*

Dependent Variable: Assertiveness

F	df1	df2	Sig.
.282	4	115	.889

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Time.spent.on.SNS

Table 20 *Tests of Between-Subjects Effects*

Dependent Variable: Assertiveness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	36.912 ^a	4	9.228	.363	.835	.012
Intercept	29518.257	1	29518.257	1160.525	.000	.910
Time.spent.on.SNS	36.912	4	9.228	.363	.835	.012
Error	2925.054	115	25.435			
Total	36362.000	120				
Corrected Total	2961.967	119				

a. R Squared = .012 (Adjusted R Squared = -.022)

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 21 *Multiple Comparisons*

Assertiveness

Tukey HSD

(I) Time.spent.on.S NS	(J) Time.spent.on.S NS	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 30 minutes	30-60 minutes	-1.2308	1.66645	.947	-5.8494	3.3879
	1-2 hours	-.3484	1.64458	1.000	-4.9064	4.2096
	2-3 hours	-1.5786	1.74998	.896	-6.4287	3.2715
	3 hours+	-1.2308	1.81528	.961	-6.2619	3.8004
30-60 minutes	less than 30 minutes	1.2308	1.66645	.947	-3.3879	5.8494
	1-2 hours	.8824	1.25243	.955	-2.5888	4.3535
	2-3 hours	-.3478	1.38794	.999	-4.1945	3.4989
	3 hours+	.0000	1.46942	1.000	-4.0725	4.0725
1-2 hours	less than 30 minutes	.3484	1.64458	1.000	-4.2096	4.9064
	30-60 minutes	-.8824	1.25243	.955	-4.3535	2.5888
	2-3 hours	-1.2302	1.36161	.895	-5.0039	2.5436
	3 hours+	-.8824	1.44457	.973	-4.8860	3.1213
2-3 hours	less than 30 minutes	1.5786	1.74998	.896	-3.2715	6.4287
	30-60 minutes	.3478	1.38794	.999	-3.4989	4.1945
	1-2 hours	1.2302	1.36161	.895	-2.5436	5.0039
	3 hours+	.3478	1.56351	.999	-3.9855	4.6812
3 hours+	less than 30 minutes	1.2308	1.81528	.961	-3.8004	6.2619
	30-60 minutes	.0000	1.46942	1.000	-4.0725	4.0725
	1-2 hours	.8824	1.44457	.973	-3.1213	4.8860
	2-3 hours	-.3478	1.56351	.999	-4.6812	3.9855

Based on observed means.

The error term is Mean Square(Error) = 25.435.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 22 *Descriptive Statistics*

Dependent Variable: Social_Anxiety_Total

Time.spent.on.SN			
S	Mean	Std. Deviation	N
less than 30 minutes	75.4615	25.07195	13
30-60 minutes	82.0645	20.90285	31
1-2 hours	82.2647	24.76839	34
2-3 hours	87.4348	21.28129	23
3 hours+	89.1053	19.34452	19
Total	83.5500	22.36138	120

Table 23 *Levene's Test of Equality of Error Variances*

Dependent Variable: Social_Anxiety_Total

F	df1	df2	Sig.
.769	4	115	.548

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Time.spent.on.SNS

Table 24 *Tests of Between-Subjects Effects*

Dependent Variable: Social_Anxiety_Total

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1908.539 ^a	4	477.135	.953	.436	.032
Intercept	738514.326	1	738514.326	1474.588	.000	.928
Time.spent.on.SNS	1908.539	4	477.135	.953	.436	.032
Error	57595.161	115	500.827			
Total	897176.000	120				
Corrected Total	59503.700	119				

a. R Squared = .032 (Adjusted R Squared = -.002)

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 25 *Multiple Comparisons*

Social_Anxiety_Total
Tukey HSD

(I) Time.spent.on.S NS	(J) Time.spent.on.S NS	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 30 minutes	30-60 minutes	-6.6030	7.39465	.899	-27.0975	13.8916
	1-2 hours	-6.8032	7.29763	.884	-27.0288	13.4225
	2-3 hours	-11.9732	7.76533	.538	-33.4951	9.5486
	3 hours+	-13.6437	8.05509	.442	-35.9687	8.6812
30-60 minutes	less than 30 minutes	6.6030	7.39465	.899	-13.8916	27.0975
	1-2 hours	-.2002	5.55751	1.000	-15.6030	15.2026
	2-3 hours	-5.3703	6.15880	.907	-22.4396	11.6991
	3 hours+	-7.0407	6.52036	.817	-25.1121	11.0307
1-2 hours	less than 30 minutes	6.8032	7.29763	.884	-13.4225	27.0288
	30-60 minutes	.2002	5.55751	1.000	-15.2026	15.6030
	2-3 hours	-5.1701	6.04196	.912	-21.9156	11.5754
	3 hours+	-6.8406	6.41011	.823	-24.6064	10.9253
2-3 hours	less than 30 minutes	11.9732	7.76533	.538	-9.5486	33.4951
	30-60 minutes	5.3703	6.15880	.907	-11.6991	22.4396
	1-2 hours	5.1701	6.04196	.912	-11.5754	21.9156
	3 hours+	-1.6705	6.93790	.999	-20.8991	17.5581
3 hours+	less than 30 minutes	13.6437	8.05509	.442	-8.6812	35.9687
	30-60 minutes	7.0407	6.52036	.817	-11.0307	25.1121
	1-2 hours	6.8406	6.41011	.823	-10.9253	24.6064
	2-3 hours	1.6705	6.93790	.999	-17.5581	20.8991

Based on observed means.

The error term is Mean Square(Error) = 500.827.

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Table 26 *Descriptives*

		Statistic	Std. Error	
Strangers	Mean	14.9583	.50354	
	95% Confidence Interval for Mean	Lower Bound	13.9613	
		Upper Bound	15.9554	
	5% Trimmed Mean	14.7778		
	Median	15.0000		
	Variance	30.427		
	Std. Deviation	5.51605		
	Minimum	6.00		
	Maximum	30.00		
	Range	24.00		
	Interquartile Range	9.00		
	Skewness	.377	.221	
	Kurtosis	-.464	.438	
	Speaking.in.publi c	Mean	16.5583	.55241
95% Confidence Interval for Mean		Lower Bound	15.4645	
		Upper Bound	17.6522	
5% Trimmed Mean		16.5185		
Median		17.0000		
Variance		36.618		
Std. Deviation		6.05132		
Minimum		6.00		
Maximum		30.00		
Range		24.00		
Interquartile Range		10.00		
Skewness		.102	.221	
Kurtosis		-.845	.438	

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Preferred.gender	Mean		17.2750	.52112
	95% Confidence Interval for Mean	Lower Bound	16.2431	
		Upper Bound	18.3069	
	5% Trimmed Mean		17.2130	
	Median		17.5000	
	Variance		32.588	
	Std. Deviation		5.70856	
	Minimum		6.00	
	Maximum		30.00	
	Range		24.00	
	Interquartile Range		8.75	
	Skewness		.091	.221
	Kurtosis		-.688	.438
	Criticism	Mean		18.0750
95% Confidence Interval for Mean		Lower Bound	17.1783	
		Upper Bound	18.9717	
5% Trimmed Mean			18.0833	
Median			18.0000	
Variance			24.608	
Std. Deviation			4.96062	
Minimum			7.00	
Maximum			29.00	
Range			22.00	
Interquartile Range			8.00	
Skewness			-.004	.221
Kurtosis			-.524	.438

TIME SPENT ON SOCIAL NETWORKING SITES AND SOCIAL ANXIETY

Assertiveness	Mean		16.6833	.45543
	95% Confidence Interval for Mean	Lower Bound	15.7815	
		Upper Bound	17.5851	
	5% Trimmed Mean		16.5833	
	Median		17.0000	
	Variance		24.890	
	Std. Deviation		4.98904	
	Minimum		7.00	
	Maximum		30.00	
	Range		23.00	
	Interquartile Range		8.00	
	Skewness		.102	.221
	Kurtosis		-.358	.438
	Social_Anxiety_	Mean		83.5500
Total	95% Confidence Interval for Mean	Lower Bound	79.5080	
		Upper Bound	87.5920	
	5% Trimmed Mean		83.1759	
	Median		86.0000	
	Variance		500.031	
	Std. Deviation		22.36138	
	Minimum		35.00	
	Maximum		149.00	
	Range		114.00	
	Interquartile Range		29.75	
	Skewness		.227	.221
	Kurtosis		.003	.438

Appendix C

Figure 1 Gender

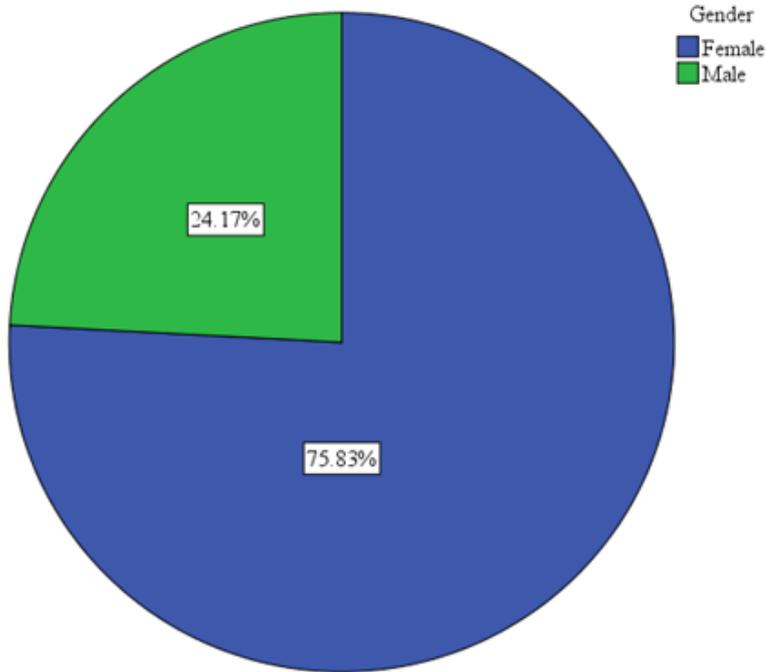


Figure 2 Age

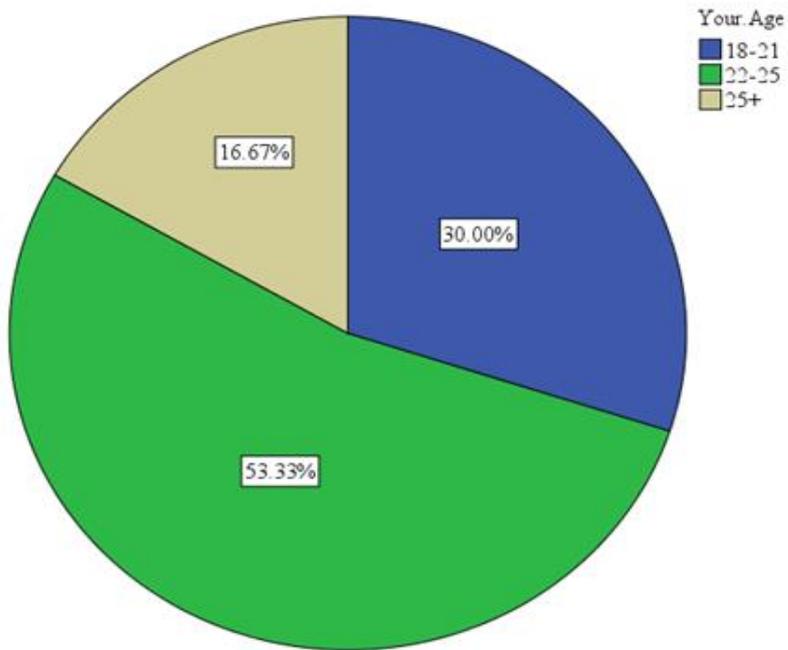
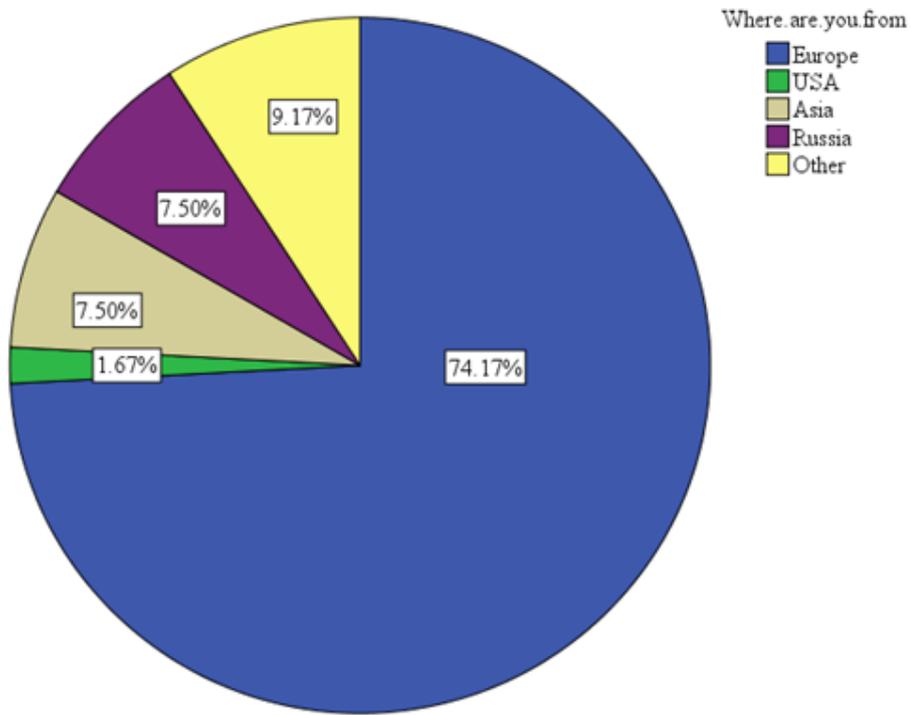


Figure 3 *Where are you from?*



Validating the NAT-HRS-1: A Pilot Study of the Negative Attitudes Toward Humanoid-
Robots Scale (NAT-HRS-1) for the Purposes of Reliability and Validity Processes

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Author Note

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Table of Contents

Abstract	4
1. Literature Review	5
2. Theoretical Considerations	7
2.1. Operational Definition of Negative Attitudes Toward Humanoid-Robots	7
2.2. Other Authors' Definition of Negative Attitudes Toward Humanoid-Robots	7
2.3. Importance of Measuring Negative Attitudes Toward Humanoid-Robots	8
2.4. Other Scales Measuring Negative Attitudes Toward Humanoid-Robots	8
2.5. Role of the NARS and FSQ in Validation Process of NAT-HRS-1	9
2.6. Operational Definition by Scale Developer	9
2.7. Subscales	9
3. Method	11
3.1. Participants	11
3.2. Materials	11
3.3. Procedures	11
3.4. Validity Analyses	11
3.4.1. Face Validity	11
3.4.2. Criterion-related Validity	12
3.4.3. Content Validity	12
3.4.4. Construct Validity	12
3.4.5. Factor Analysis	13
3.5. Reliability Analyses	13
3.5.1. Internal Consistency	13
3.5.2. Test-retest Reliability	13
4. Results	14

VALIDATING THE NAT-HRS-1	3
4.1. Validity Analyses	14
4.1.1. Face Validity	14
4.1.2. Criterion-related Validity	14
4.2. Content Validity	15
4.3. Construct Validity	15
4.3.1. Factor Analysis	16
4.4. Reliability Analyses	16
4.4.1. Internal Consistency	16
4.4.2. Test-retest Reliability	17
5. The Final Questionnaire	18
6. Discussion	19
7. Conclusion	21
8. References	23
Appendix A (PART I - Informed Consent)	26
Appendix B (PART II, PART III, PART IV, PART V, PART VI)	27
Appendix C (Tables)	32

Abstract

Technology is shaping our world in significant ways. In the age of Artificial Intelligence, the development of social robots and their implications in social settings are the subject of intense research. The related literature had three scales measuring negative attitudes toward robots: the Negative Attitudes toward Robots Scale (NARS), the Frankenstein Syndrome Questionnaire (FSQ), and the Robot Anxiety Scale (RAS). The authors developed the NAT-HRS-1 for measuring the same construct and used the NARS and FSQ in this pilot study for measuring its validity and reliability. Criterion-related validity was statistically significant but low. Construct validity and internal reliability were statistically significant as well as middling and acceptable respectively. The final version of the NAT-HRS-1 had minor changes. The authors came across several limitations and further research is necessary.

Key Words: robots, social robots, humanoid-robots, questionnaire, validation, validity, reliability, NARS, FSQ, NAT-HRS-1, attitudes, negative attitudes, Frankenstein syndrome, human-robot interaction, HRI.

Validating the NAT-HRS-1: A Pilot Study of the Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1) for the Purposes of Reliability and Validity Processes

1. Literature Review

Technology is a dynamic concept and changes people's lives, in most cases influencing people all around the world. The most recent examples of this phenomenon are smart phones and computers, which have become an integral part of many people's daily lives (Haring, Mougenot, Ono, & Watanabe, 2014). As a result of developments in the field of robotics, it is expected that robots could become further integrated in various fields of work and in people's daily lives as well (Haring et al., 2014). According to Pew Research Center, the progress of technology has gone beyond computers to focus on robots (as cited in Höflich & Bayed, 2015). We are now in the age of Artificial Intelligence, in which the existence of robots is not only a subject of discussion but a research area that has motivated intense study into and arguments about the field of robotics and its implications in social settings (Nomura, Kanda, Suzuki, & Kato, 2004; Tsui, Desai, Yanco, Cramer, & Kemper, 2011). From this arises the need to measure and understand people's attitudes toward robots in general, communication with robots in daily life, and social engagements with robots (Nomura et al., 2004). Also, regarding the psychological influence of human-robot interaction among people, careful examination of psychological attitudes is necessary (Nomura et al., 2004). As Haring et al. (2014) stated, it is important to collect data, for example through questionnaires, and examine the results through positivistic means in order to analyze attitudes in scientific ways.

After reviewing the related literature about robots, the authors found three scales that were measuring negative attitudes toward robots. These were the Negative Attitudes toward Robots Scale (NARS), the Frankenstein Syndrome Questionnaire (FSQ), and the Robot Anxiety Scale (RAS). The NARS was originally developed in the Japanese language. Even though it has good reliability rates it could pose validity problems when the questionnaire is applied in cross-cultural settings, especially considering research results that suggested that non-Japanese participants were more negatively influenced by humanoid-robots and the idea of robot itself (Syrdal, Dautenhahn, Koay, & Walters, 2009). The FSQ development consisted of gathering data through open-ended questions about people's attitudes toward

humanoid-robots in Japan and United Kingdom, and then the FSQ were finalized by re-formatting the responses into a scale with closed ended statements (as cited in Syrdal, Nomura, & Dautenhahn, 2013). Nomura et al. (2004) developed the RAS after the NARS in order to understand “emotions of anxiety or fear preventing individuals from interaction with robots having functions of communications in daily-life” (as cited in Tsui et al., 2011).

Regarding the reliability of the NARS and FSQ, the research yields promising rates as presented in the following paragraphs. Nomura, Syrdal, and Dautenhahn (2015) conducted a study with 100 participants, 50 females and 50 males, within each group 25 of them being 25 years old and 25 of them being 50 years old, to measure acceptance of robots, perceptions toward family and religious concepts, and negative attitudes toward robots. In the study, Nomura, Syrdal, and Dautenhahn (2015) used the NARS, the FSQ, and a specially designed survey regarding family and religious concepts. The results of the study yielded high rates of internal consistencies of the FSQ subscales: $\alpha = .899$ for the “Negative Feelings toward Humanoid-Robots” subscale (S1); $\alpha = .861$ for the “Expectation for Humanoid-Robots” subscale (S2); and $\alpha = .859$ for the “Root Anxiety toward Humanoid Robots” subscale (S3) (Nomura, Syrdal, & Dautenhahn, 2015).

Within the same study, results also yielded high internal consistencies of NARS subscales: $\alpha = .854$ for the “Negative Attitudes towards Situations of Interaction with Robots” subscale (S1); $\alpha = .779$ for the “Negative Attitude toward Social Influence of Robots” subscale (S2); and $\alpha = .842$ for the “Negative Attitude toward Emotions in Interactions with Robots” subscale (S3) (Nomura, Syrdal, & Dautenhahn, 2015).

Given these high reliability and validity ratios in most cases, the authors decided to work with the NARS and FSQ and also develop an inventory called the Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1), which consisted of re-worded forms of some items in the NARS and FSQ in a way that could introduce less negative bias to participants and that could measure not only negative but also positive attitudes toward humanoid-robots, in a neutral way.

2. Theoretical Considerations

This part presented theoretical considerations such as operational definitions of the constructs being measured, the inventory subscales, the importance of measuring negative attitudes toward humanoid robots, other scales that measure the same constructs, and other issues relevant to the inventory development.

2.1. Operational Definition of Negative Attitudes Toward Humanoid-Robots

In this research, the authors defined the operational definition of negative attitudes toward humanoid-robots in terms of humanoid-robots being indistinguishable from humans in the way they look, behave, speak, think, and reason. Also, the authors defined the negative attitudes toward indistinguishable humanoid-robots as having three general sub-dimensions, which also constituted the subscales of the inventory that was being developed (NAT-HRS-1). The subscales of the NAT-HRS-1 are as follows: subscale one (S1) is “negative attitudes toward humanoid-robots considering personal relationships & social life” (item numbers 2, 3, 8, 9, 12); subscale two (S2) is “negative attitudes toward humanoid-robots considering legal rights” (item numbers 1, 4, 11, 13); and subscale three (S3) is “negative attitudes toward humanoid-robots considering trust & expectations” (item numbers 5, 6, 7, 10, 14). Items 2, 4, 5, 6, 8, 11, 12, 14 are reverse coded in the NAT-HRS-1.

2.2. Other Authors’ Definition of Negative Attitudes Toward Humanoid-Robots

Syrdal, Nomura, & Dautenhahn (2013) defined attitudes toward robots in the limits of Kaplan’s definition of “Frankenstein Syndrome,” which defined cultural differences among people regarding their attitudes toward robots, namely that “the act of creation” is considered taboo in Western culture whereas in Japan technology and the act of creation are judged in terms of their practicality. Also, Nomura, Kanda, and Suzuki (2006a) defined it as “a psychological factor preventing individuals from interaction with robots having functions of communication in daily life.”

Moreover, Nomura, Suzuki, Kanda, Kato (2006b) have done a study involving 400 participants in which they used the State Trait Anxiety Inventory (STAI), the Personal Report of Communication Apprehension (PRCA-24) and the NARS, and found that the participants’ attitudes toward robots showed differences according to their assumptions about robots.

Bartneck et al. (2005) also suggested that humans’ attitudes towards robots are related to

computer anxiety, saying that this “includes anxiety towards the social influence of computers, suggesting anxiety towards novel technologies in general” In Bartneck et al. (2005) definition, robots presented the “novel technological products” that can cause negative emotions.

2.3. Importance of Measuring Negative Attitudes Toward Humanoid-Robots

Considering the general attitudes people have toward robots, Höflich and Bayed (2015) also pointed out that people hold different attitudes toward humanoid-robots in that people experience greater anxiety and less acceptance of the humanoid-robots than they do for non-humanoid-robots. Research also suggested that humans are more likely to accept humanoid-robots if they share cultural similarities with them, especially considering language and behaviors (as cited in Müller & Richert, 2018).

Moreover, an experiment carried out by Nomura, Kanda, and Suzuki (2006) with fifty-three university students who communicated with Robovie, a robot with a human-like appearance and the ability to communicate with subjects, showed that negative attitudes towards robots have an effect on the way humans communicate with robots.

As the authors have already mentioned, developments in the field of robotics and efforts put into the implementation of humanoid-robots, in addition to other forms of robots, has led to their implementation in various fields, and this has highlighted potential problems regarding the design of humanoid-robots that could be readily acceptable and trustable by humans (Haring et al., 2014). Therefore, in order to design and create humanoid-robots that could be socially pragmatic and useful in different ways, and also ensure a convenient and safe adaptation between humans and robots, it is necessary to measure people’s attitudes and consider the factors that influence such attitudes and perceptions.

2.4. Other Scales Measuring Negative Attitudes Toward Humanoid-Robots

Nomura et al. (2004) created the NARS scale, which aimed to measure people’s attitudes toward robots in daily life. The correlation of the NARS with the State-Trait Anxiety Inventory (STAI), which is an inventory that measures psychological anxiety, were low but not statistically zero (Nomura et al., 2004). Items three, five, and six are reverse scored in NARS (Nomura, Suzuki, & Kanda, 2004).

Another inventory which has been developed to measure people's acceptance of humanoid-robots, expectations have toward humanoid-robots, and psychological anxiety experienced toward humanoid-robots is the Frankenstein Syndrome Questionnaire (FSQ). The FSQ was based on Kaplan's (2004) concept of Frankenstein Syndrome in genetic engineering (as cited in Nomura, Syrdal, & Dautenhahn, 2015).

2.5. Role of the NARS and FSQ in Validation Process of NAT-HRS-1

The authors chose the NARS and FSQ for the purposes of validating the NAT-HRS-1, because while reviewing the relevant literature they did not come across any other scale that measures attitudes toward humanoid-robots beside the NARS, FSQ, and Robot Anxiety Scale (RAS). The RAS is another inventory Nomura et al. (2007) created which aimed to measure the psychological anxiety people have toward humanoid-robots (as cited in Tsui et al., 2011). According to the scale developers, Nomura et al. (2007), the RAS has not been back translated from English to Japanese unlike the NARS (as cited in Tsui et al., 2011). Thus, the authors chose the NARS and FSQ and did not use the RAS for the purpose of validation processes.

2.6. Operational Definition by Scale Developer

Nomura and Kanda (2003) stated that, "On the analogy of computer anxiety, it can be imagined that humans feel anxiety or apprehension for these robots. Moreover, this type of anxiety may consist of not only anxiety for the novel technology, but also anxiety for communication with robots itself." (p. 373). Also, Nomura and Kanda (2003) defined robot anxiety as "emotions of anxiety or fear preventing individuals from interaction with robots having functions of communication in daily life, in particular, dyad communication with a robot" (p. 375).

2.7. Subscales

The NARS scale consisted of three subscales: subscale one (S1) was "Negative Attitudes towards Situations of Interaction with Robots" with item numbers four, seven, eight, nine, ten, and twelve; subscale two (S2) was "Negative Attitude toward Social Influence of Robots" with items numbers one, two, eleven, thirteen, and fourteen; and subscale three (S3) was "Negative Attitude toward Emotions in Interactions with Robots"

with item numbers three, five, and six (Nomura et al., 2004; Syrdal et al., 2009). All three subscales were used for the validation process.

The FSQ consisted of three subscales: subscale one (S1) was “Negative Feelings toward Humanoid Robots”; subscale two (S2) was “Expectation for Humanoid-Robots”; and subscale three (S3) was “Root Anxiety toward Humanoid Robots” (Nomura, Syrdal, & Dautenhahn, 2015). Since the subscale item divisions were not clear, the authors used only four items that are derived from Factor Loading number-four, which was named “Trust in Robot Creators,” that seemed relevant to positive attitudes toward robots to use discriminant validity process.

3. Method

3.1. Participants

The participants consisted of undergraduate students from the University of New York in Prague (UNYP) which were collected from several classes and the library. The students were asked whether they would like to participate in the validation process and given the questionnaire booklet.

3.2. Materials

A pen and paper method was used to collect data. The participant simply rated each statement according to their subjective attitude. The questionnaire booklet that was used in the data collection process consisted of six parts. The first part was the informed consent that presented a detailed explanation about the pilot study being conducted. Within the information, it was explicitly stated that each participant's name was needed for the test-retest process of the NAT-HRS-1. The second part had the NAT-HRS-1, the third part had the NARS, the fourth part had the FSQ-F4, the fifth part had the demographic survey, and the sixth part had the commentary section.

3.3. Procedures

The methods used to validate the NAT-HRS-1 consisted of collecting data, removing missing data from the dataset, and running a validity and reliability analysis using the Statistical Package for the Social Sciences (SPSS) program. Specifically, the validity analysis for the NAT-HRS-1 included criterion-validity analysis, content validity analysis, construct validity analysis, and factor analysis whereas the reliability analysis included examination of the inventory's internal consistency and test-retest reliability.

3.4. Validity Analyses

3.4.1. Face Validity. Wienclaw (2017) defined validity in terms of whether the developed test or questionnaire measures what it is supposed to measure, whereas face validity refers to whether items on a test appear in such a manner that make it clear what the test is actually measuring. The authors of the current research considered the items in the NAT-HRS-1 to have moderate face validity because several items on the scale are phrased in a neutral manner, for example, "Humanoid-robots could be employed in dangerous tasks

such as mine works and space travels instead of humans,” which did not allow participants to guess that only negative attitudes towards humanoid robots were being measured.

Several participants commented about the face validity of the NAT-HRS-1. All of them found that the questions were prepared in a scientific manner and were relevant to the construct being measured. One of the participants noted that the NAT-HRS-1 could be more practical regarding its sentence structure if the statements could include the words “thinks or feels” about humanoid-robots instead of definitive statements. The same participant also stated that she could see the NAT-HRS-1 as being “applied in Human-AI studies.”

3.4.2. Criterion-related Validity. In order to measure convergent validity, the authors ran correlation analysis of the scores from the NAT-HRS-1 with the more established NARS inventory to assess whether the inventory measures the same construct that is intended to be measured. In order to measure discriminant validity, the authors ran a correlation analysis of the scores from the NAT-HRS-1 with the FSQ-F4 (factor four loading of the more established FSQ inventory) to assess whether the inventory discriminates from the scale that is relatively measuring the opposite construct.

3.4.3. Content Validity. In order to approximately calculate the content validity of the NAT-HRS-1, the authors mainly used the literature review and three panelists’ opinions. The three panelists were two experts and a peer from UNYP who recorded their opinions in a bi-scale form that was specially prepared for the purpose of measuring content validity. Specifically, the scale correspondence for their opinions was: score 0 for “not necessary or not essential” and score 1 for “the item is essential for the questionnaire”. The formula used for assessing the Content Validity Ratio (CVR) was ‘ $CVR = n - (N/2)/(N/2)$ ’ (n: the number of panelists rating ‘essential’, N: the number of panelists) (Lawshe, 1975).

3.4.4. Construct Validity. Cohen and Swerdlik (2010) defined construct validity as being concerned with “the appropriateness of inferences drawn from test scores” for their each place on the construct being measured (p. 193). Moreover, construct validity is not only used for determining whether the test is suitable for a different population but also in order to understand how well a concept which is not “operationally defined” can be interpreted (Cronbach & Meehl, 1955). It is also important to acknowledge that, as Cronbach and Meehl (1955) claimed, “construct validity is not to be identified solely by particular investigative

procedures, but by the orientation of the investigator” (p. 282). In order to assess construct validity, the authors carried out factor analysis.

3.4.5. Factor Analysis. Regarding psychometric research, factor analysis is generally used for data reduction that analyzes the correlation between sets of scores (Cohen & Swerdlik, 2010, p. 198). The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) could be run to see if the dataset is suitable to be modeled by factor analysis. According to Kaiser (1974), a value lower than .5 is considered unacceptable (as cited in Andy, 2013). More specifically, Hutcheson and Sofroniou (1999) presented a guideline to take as a reference for interpreting KMO values which is as follows: values around .90 are considered as “marvelous,” those around .80 are considered as “meritorious,” those around .70 are considered as “middling,” those around .60 as “mediocre,” those around .50 as “miserable” and values lower than .50 are considered unacceptable (as cited in Andy, 2013). Also, Bartlett’s test could be run to see if the factor analysis is significant.

3.5. Reliability Analyses

3.5.1. Internal Consistency. Cronbach’s alpha was developed by Lee Cronbach in order to measure the internal consistency of a test and was usually used for testing the reliability of the set of scores in a newly-developed test (Sheposh, 2019). The Cronbach’s alpha measure is represented by a numerical score from 0 to 1, though a negative number can occur which indicates some problem with the data set. The higher coefficient alpha the better consistency of the test: for instance, a value above .90 means that consistency is excellent (though a value higher than .95 might indicate that a question is repetitive), a value from .80 to .89 shows good consistency, a value between .70 and .79 is acceptable, and a value below .50 means a too low coefficient, meaning that some items should be changed, removed or added or that more participants could be needed.

3.5.2. Test-retest Reliability. In order to measure test-retest reliability, the authors gave the same questionnaire to the same participants a second time after a five-week interval and correlated the results of the two sets of scores with each other.

4. Results

4.1. Validity Analyses

4.1.1. Face Validity. Face validity for the questionnaire appeared to be moderate with participants reporting questions be scientific and making sense, though one of the participants commented that the questions should address emotions and attitudes more rather than abstract ideas.

4.1.2. Criterion-related Validity. In this section, the authors ran correlation analyses for each subscale individually to the NARS. Following the correlation of each subscale with the NARS, Pearson correlation coefficients for each subscale were run. Also, in order to measure convergent validity, the authors ran correlation analysis of the scores from the NAT-HRS-1 with the NARS to assess whether the inventory measures the same construct that is intended to be measured. In order to measure discriminant validity, the authors ran a correlation analysis of the scores from the NAT-HRS-1 with the FSQ-F4 (factor four loading of the more established FSQ inventory) to assess whether the inventory discriminates from the scale that is relatively measuring the opposite construct.

Subscale 1. NAT-HRS-1 Subscale 1 was correlated with the NARS. The data was normally distributed according to Shapiro-Wilk's test of normality ($p = .089$) (see Table 1). The Pearson correlation coefficient was run for convergent validity. The results yielded that NAT-HRS-1 Subscale 1 positively significantly correlated to NARS $r(83) = .474$, $p = .000$ (see Table 2). The Pearson correlation coefficient was ran also for discriminant validity to see if NAT-HRS-1 Subscale 1 was negatively significantly correlated with FSQ-F4. The results showed that there was statistically significant negative correlation $r(83) = -.381$, $p = .000$ (see Table 3).

Subscale 2. NAT-HRS-1 Subscale 2 was correlated with the NARS. The data was not normally distributed according to Shapiro-Wilk's test of normality ($p = .009$) (see Table 1). The Pearson correlation coefficient was ran for convergent validity. The results yielded that NAT-HRS-1 Subscale 2 did not positively significantly correlated to the NARS $r(83) = .158$, $p = .149$ (see Table 2). The Pearson correlation coefficient was run also for discriminant validity to see if there was statistically significantly negative correlation with NAT-HRS-1

Subscale 2 and FSQ-F4. The results showed that there was not statistically significant negative correlation $r(83) = .096$, $p = .382$ (see Table 3).

Subscale 3. NAT-HRS-1 Subscale 3 was correlated with the NARS. The data was normally distributed according to Shapiro-Wilk's test of normality ($p = .197$) (see Table 1). The Pearson correlation coefficient was run for convergent validity. The results yielded that NAT-HRS-1 Subscale 3 positively significantly correlated to NARS $r(83) = .488$, $p = .000$. (see Table 2). The Pearson correlation coefficient was run also for discriminant validity to see if NAT-HRS-1 Subscale 3 was negatively significantly correlated with FSQ-F4. The results showed that there was statistically significant negative correlation $r(83) = -.271$, $p = .012$ (see Table 3).

Total. The NAT-HRS-1 was correlated with the NARS. The Pearson correlation coefficient results yielded that the NAT-HRS-1 significantly correlated with the NARS $r(83) = .501$, $p = .000$. Thus, the NAT-HRS-1 was correlated with the NARS; however, the score was really low. The Pearson correlation coefficient was ran for convergent validity for the NAT-HRS-1. The results yielded that the NAT-HRS-1 positively significantly correlated to the NARS $r(83) = .501$, $p = .000$ (see Table 2). The Pearson correlation coefficient was run also for discriminant validity to see if the NAT-HRS-1 was negatively significantly correlated with FSQ-F4. The results showed that there was statistically significant negative correlation $r(83) = -.280$, $p = .009$ (see Table 3).

4.2. Content Validity

Content validity for the questionnaire showed that items nine and ten received "no" by panelists, with the suggestion to reword them with $CVR = -1.00$ and $CVR = -0.33$. Items 9 and 10 received a score of 0. These two items could be removed from the NAT-HRS-1. All other items were also re-worded for clarification purposes.

4.3. Construct Validity

As the authors mentioned before at the previous section, Cohen and Swerdlik (2010) defined construct validity as being concerned with "the appropriateness of inferences drawn from test scores" for their place on the construct being measured (p. 193). In order to assess construct validity, the authors ran factor analysis.

4.3.1. Factor Analysis. The authors ran principle component analysis (PCA) on the NAT-HRS-1 that measured “negative attitudes toward humanoid-robots considering personal relationships & social life,” “negative attitudes toward humanoid-robots considering legal rights,” and subscale “negative attitudes toward humanoid-robots considering trust & expectations” of 85 participants who are currently enrolled in Empire State College and/or the University of New York in Prague.

The Overall KMO measure for the NAT-HRS-1 was above the acceptable rate, which was .5, with KMO= .766. Therefore, the construct validity was “middling”. Bartlett's Test of Sphericity showed statistically significant result ($p = .000$) which implied that the data could be factorized (see Table 4). Since the NAT-HRS-1 had three subscales, PCA was forced to calculate three components. The three components had eigenvalues greater than 1 and were 25.7%, 8.6%, 4.1% of the total variance respectively (see Table 5). In Pattern Matrix, items 2, 5, 6, 8, 12, and 14 loaded on factor 1; items 1 and 4 loaded on factor 2; and items 9 and 13 loaded on factor 3. Items 3, 7, 10, and 11 did not load on any factors (see Table 6).

4.4. Reliability Analyses

4.4.1. Internal Consistency. The Split-Half reliability analysis of the NAT-HRS-1 was conducted by distributing the three subscales as evenly as possible. The first cluster consisted of items 2, 3, 8 from Subscale 1, items 1 and 4 from Subscale 2, and items 7 and 14 from Subscale 3. The second cluster consisted of items 9 and 12 from Subscale 1, items 11 and 13 from Subscale 2, and items 5, 6, and 10 from Subscale 3. Results yielded that correlations between cluster 1 and cluster 2 was .611. The Spearman-Brown Coefficient equal length was $r(13) = .758$ (see Table 7).

Cronbach's alpha was computed for the NAT-HRS-1, which consisted of 14 items, ($\alpha = .748$), which was acceptable value (see Table 8). All the items were acceptable in “If Item Deleted” except items 1 and 3. Removal of these could increase alpha to $\alpha = .785$ and $\alpha = .769$ respectively (see Table 9). For subscale 1, which consisted of 5 items, Cronbach's alpha was acceptable ($\alpha = .519$); but deleting item 3 could increase the subscale's Cronbach's alpha to $\alpha = .601$ (see Tables 10 and 11). For subscale 2, which consisted of 4 items, Cronbach's alpha was not acceptable ($\alpha = -.074$); but deleting items 1 and 4 could increase the subscale's Cronbach's alpha to $\alpha = .269$ and $\alpha = .084$ respectively (see Tables 12 and 13). For subscale

3, which consisted of 5 items, Cronbach's alpha was acceptable ($\alpha = .719$), and all of the items belonging to subscale 3 were found to be valuable according to "If Item Deleted" (see Tables 14 and 15).

Moreover, item discrimination analysis yielded that items 1, 3, and 4 scored below .3 in Corrected Item-Total Correlation (see Table 9). These items could be removed from the overall scale.

4.4.2. Test-retest Reliability. Test-retest reliability was obtained with 80 participants from the same sample participants of 85. The test-retest was followed proceeding the first one with a five-week interval. The negative attitudes towards humanoid-robots for the test and the test-retest were positively correlated, Pearson's $r(80) = .88, p < .001$ (see Table 16). The results yielded good internal validity. Thus, results potentially indicated that attitudes towards robots are representative and stable over time. However, good internal validity could be the case of participants got familiarized with the test or with the fact that five weeks interval was not big enough for them to forget the statements, the authors stated that attitudes towards robots is a stable psychological concept and NAT-HRS-1 has a good potential of being a reliable tool to measure the negative attitudes towards humanoid-robots.

5. The Final Questionnaire

After the CVR analysis, the authors revised the wordings of several items. Item 4 was reworded from “Humanoid-robots could be occupied in dangerous tasks such as mine works and space travels instead of humans” to “Humanoid-robots could be employed in dangerous tasks such as mine works and space travels instead of humans. Item 6 was reworded from “Humanoid-robots could be helpful in education of K-12 students” to “Humanoid-robots could be helpful in the education of K-12 students”. Item 7 was reworded from “I could feel unsafe if a humanoid-robot could attempt to a close interaction with me” to “I would feel unsafe if a humanoid-robot attempted a close interaction with me”. Item 9 was reworded from “I could feel disoriented if humanoid-robots could judge facts and/or people in general like humans do” to “I could feel uncomfortable if humanoid-robots could make judgments about facts and/or people in general like humans do”.

In addition to revision of the words in the statements, the authors also decided to reduce the number of subscales to two. The NAT-HRS-1 consisted of only fourteen items and three subscales which caused an uneven distribution of the items. By merging some concepts and dividing the NAT-HRS-1 into two subscales, the uneven distribution within the subscales could be prevented. The new subscale distribution was as follows: subscale 1 is “Negative Attitudes Toward Humanoid-Robots in Concept of Work-Demand Expectations” with items 1, 4, 6, 9, 11, 12, and 13; and subscale 2 is “Negative Attitudes Toward Humanoid-Robots in Concept of Social Relationships and Trust” with items 2, 3, 5, 7, 8, 10, and 14 (see Appendix B).

6. Discussion

As has been previously stated, in the study Nomura, Syrdal, and Dautenhahn (2015) conducted with 100 participants with the NARS the internal consistency of the subscales were high: $\alpha = .854$ for Subscale 1, $\alpha = .799$ for Subscale 2, and $\alpha = .842$ for Subscale 3. The first round of the pilot study conducted with 85 participants with the NAT-HRS-1 resulted in statistically significant low internal consistency for Subscale 1 with Cronbach's alpha score $\alpha = .519$, and statistically significant moderate internal consistency for Subscale 3 with Cronbach's alpha score $\alpha = .719$. However, there was not statistically significant internal consistency for Subscale 2 with Cronbach's alpha score $\alpha = -.074$ (see Tables 10, 11, and 13). The data was not normally distributed according to Shapiro-Wilk's test of normality for Subscale 2 ($p = .009$) (see Table 1). So, due to these issues with Subscale 2, the authors decided to re-arrange the subscales and reduced the number of subscales from three to two. Due to low levels of reliability and overall consistency, further research is needed to focus on testing the NAT-HRS-1 on a sample size greater than 85.

There may have been several factors contributing to the low internal consistency of NAT-HRS-1 compared to NARS. Firstly, a source of error variance could have been the test construction. One of the limitations was the attempt to cover sufficient concepts in negative attitudes toward humanoid-robots only with 14 items. Even though the authors paid special attention to covering several important concepts regarding negative attitudes toward humanoid-robots, some concepts needed statements that covered the concept in more depth. For example, social relations had items concerning being friends with robots, but did not have items that could cover human-robot intimate partners. In addition, the way some items were worded might have been a factor: some of the items appeared to contribute to the low internal consistency (items 1, 3, and 4). Thus, the authors revised the way some statements were worded and changed them.

Secondly, test administration could have had a source of variance. For instance, the test environment was not ideal: most of the participants took the test during the class breaks and some of them even took the test after they had an exam, which could have resulted in rushing and not paying attention to the content. Also, the testtaker variables, such as lack of

sleep and tiredness could have been setbacks. Furthermore, the language barrier should be considered to be a source of variance. The current pilot study was conducted in an international university with students who may vary in their English fluency. For instance, one of the participants asked for clarification regarding what the study was about (he assumed it was about pilots), although the information was clearly stated on the consent form. In addition, there was little probability that some of the participants had experiences with robots in general, and since NAT-HRS-1 was assessing negative attitudes towards humanoid robots, most of the participants could have had a poor understanding of the concept.

Lastly, the examiner-related variables should not be excluded: the authors were not presented in the class during all assessments, so they may not have checked what was happening or assisted in case some clarifications were needed. For example, some participants skipped some blocks of questions, which could be due to a lack of attention and/or not understanding the content. Those responses were excluded from the analyses.

7. Conclusion

As the authors have emphasized previously, the progress of technology has gone beyond computers to focus on robots (as cited in Höflich & Bayed, 2015). Humanity is now in the age of Artificial Intelligence, in which the existence of robots is not only a subject of discussion but a research area that has motivated intense study into the field of robotics and its implications in social settings (Tsui et al., 2011). From this arises the need to measure and understand people's attitudes toward robots in general, communication with robots in daily life, and social engagements with robots (Nomura et al., 2004). Because of this, the authors decided to focus on the development of an attitude scale toward robots. As the operational definition stated, the focus was on indistinguishable humanoid-robots, i.e. humanoid-robots which are indistinguishable from humans the way they look, behave, speak, think, and reason. After analyzing the literature about robots in various databases, the authors concluded that there was no specific research that focused on attitudes toward humanoid-robots within this operational definition. Since there is a high research involvement in producing social robots in human forms for use in education, labor work, assistance and other areas, the authors decided to create an inventory that can measure negative attitudes toward humanoid-robots without creating a bias for the participants. Even though the NARS measured negative attitudes toward robots like the newly developed NAT-HRS-1 did, both the name of the NARS and the items it included were negative, which could have implied negative meanings from the beginning and possibly created a negative bias for the participants. In contrast, the NAT-HRS-1 measured the same construct but used items that are stated in as unbiased a way as possible.

Another reason why the authors conducted a pilot study for developing a new inventory was that the NARS was originally developed in the Japanese language (Syrdal et al., 2009). Although it had good reliability rates on some occasions, as Syrdal et al., 2009) stated, it could still pose validity problems when the inventory is used in cross-cultural settings. So the authors developed the NAT-HRS-1 by considering language barriers and working to minimize them. Also, the inventory itself was prepared in English, without any translation attempts, to be used among English speakers.

However, the authors experienced some limitations during this pilot study. One of the limitations was the attempt to cover sufficient concepts in negative attitudes toward humanoid-robots only with 14 items. Even though the authors paid special attention to covering several important concepts regarding negative attitudes toward humanoid-robots, some concepts needed statements that covered the concept in more depth. For example, social relations had items concerning being friends with robots, but did not have items that could cover human-robot intimate partners. Therefore, due to lack of sufficient time to develop the inventory further, research is needed with a greater sample size and possibly with more item numbers to cover some of the concepts at a deeper level. Given a larger sample size with which the authors can re-run the analysis and especially test-retest the NAT-HRS-1, validity and reliability rates for NAT-HRS-1 might score higher.

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Appendix A

Pilot Study of the Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1) for the Purposes of Reliability and Validity Processes

PART I

Informed Consent

The study you are about to participate in is a pilot study which will be conducted on two different dates. The purpose of this pilot study is to examine negative attitudes toward indistinguishable humanoid-robots from humans. The study consists of six parts. The first part is the Informed Consent. The second part is the Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1). The third part is the Negative Attitudes Toward Robots Scale (NARS). The fourth part is the Frankenstein Syndrome Questionnaire factor four (FSQ-F4). The fifth part is the demographic information. The sixth part is the Commentary Section. The questionnaires take approximately 20 minutes in total to complete. There are no right or wrong answers. The questionnaires demand only the participant's (your) subjective opinion.

In order to make sure the Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1) goes through reliability and validity processes properly, we kindly ask you to write your first name (full) and your last name (can be initial) in the designated area so that we can continue the test-retest process of the scale accordingly in three weeks' time. If you need further assistance or have any questions the researchers can be contacted at zeynep_deniztoker240@esc.edu and elena_burunova153@esc.edu

First Name & Last Name:

Date:

Signature:

Thank you so much for participating in this research and supporting the research process.

Appendix B

PART II

Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1)

Instructions: This inventory measures people’s negative attitudes toward humanoid-robots. Humanoid-robots are defined as indistinguishable from humans in the way they look, behave, speak, think, and reason. Currently this inventory is being used for a pilot study. Please choose a number for each statement indicating your personal opinion about each statement.

1 Disagree strongly	2 Disagree a little	3 Neither agree nor disagree	4 Agree a little	5 Agree strongly
---------------------------	------------------------	------------------------------------	---------------------	---------------------

- _____ 1. In the near future, humanoid-robots could be preferred to work labor over human workers.
- _____ 2. I would be okay if a humanoid-robot behaved in a way that led me to recognize emotional signs.
- _____ 3. In the near future, humanoid-robots could lead humans to interact less with each other.
- _____ 4. Humanoid-robots could be employed for dangerous tasks such as mining and space travel instead of humans.
- _____ 5. Humanoid-robots could be helpful in taking care of the elderly and/or children.
- _____ 6. Humanoid-robots could be helpful in the education of K-12 students.
- _____ 7. I would feel unsafe if a humanoid-robot attempt a close interaction with me.
- _____ 8. If humanoid-robots could show emotional behavior, I would be friends with one.
- _____ 9. I would feel uncomfortable if humanoid-robots could make judgments about facts and/or people in general like humans do.
- _____ 10. Humanoid-robots could influence children in negative ways.
- _____ 11. In the near future, humanoid-robots could have the same legal rights as humans.
- _____ 12. Humanoid-robots could be helpful in taking care of domestic household chores.
- _____ 13. I would feel uncomfortable if some humanoid-robots could be in a position to make decisions about humans, such as a judicial authority.
- _____ 14. I would trust a humanoid-robot to be around me and/or in my family environment.

PART III

Negative Attitude Towards Robots Scale (NARS)

Instructions: Please choose a number for each statement indicating your opinion about the statement.

1 Disagree strongly	2 Disagree a little	3 Undecided	4 Agree a little	5 Agree strongly
---------------------------	------------------------	----------------	---------------------	---------------------

- _____ 1. I would feel uneasy if robots really had emotions.
- _____ 2. Something bad might happen if robots developed into living beings.
- _____ 3. I would feel relaxed talking with robots.
- _____ 4. I would feel uneasy if I was given a job where I had to use robots.
- _____ 5. If robots had emotions I would be able to make friends with them.
- _____ 6. I feel comforted being with robots that have emotions.
- _____ 7. The word “robot” means nothing to me.
- _____ 8. I would feel nervous operating a robot in front of other people.
- _____ 9. I would hate the idea that robots or artificial intelligences were making judgements about things.
- _____ 10. I would feel very nervous just standing in front of a robot.
- _____ 11. I feel that if I depend on robots too much, something bad might happen.
- _____ 12. I would feel paranoid talking with a robot.
- _____ 13. I am concerned that robots would be a bad influence on children.
- _____ 14. I feel that in the future society will be dominated by robots.

PART IV

Frankenstein Syndrome Questionnaire Factor Loading 4 (FSQ-F4)

Instructions: Please choose a number for each statement indicating your opinion about the statement.

1 Disagree strongly	2 Disagree	3 Disagree somewhat	4 Undecided	5 Agree somewhat	6 Agree	7 Agree strongly
---------------------------	---------------	---------------------------	----------------	------------------------	------------	------------------------

_____ 1. The people and organizations that develop humanoid robots can be trusted.

_____ 2. The people and organizations that develop humanoid robots seem sincere.

_____ 3. I trust the people and organizations that develop humanoid robots to disclose sufficient information to the public, including negative information.

_____ 4. Persons and organizations related to development of humanoid robots will consider the needs, thoughts and feelings of their users.

PART V
Demographic Survey

Self-Identified Gender:

Age:

Nationality:

PART VI

If you have any comments, considerations or suggestions about “PART II: The Negative Attitudes Toward Humanoid-Robots Scale (NAT-HRS-1)” please write them at below.

Thank you so much for participating in this research and supporting the research process.

Appendix C

Tables

Table 1

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
NATHRS1S1	.092	85	.074	.974	85	.089
NATHRS1S2	.134	85	.001	.959	85	.009
NATHRS1S3	.068	85	.200*	.980	85	.197
NARSScale	.076	85	.200*	.984	85	.370
NARSS1	.072	85	.200*	.981	85	.260
NARSS2	.087	85	.168	.974	85	.085
NARSS3	.090	85	.086	.974	85	.080

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 2

Correlations

		NARSScale	NARS S1	NARS S2	NARS S3
NATHRS1S1	Pearson Correlation	.474**	.533**	.588**	.639**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	85	85	85	85
NATHRS1S2	Pearson Correlation	.158	.139	.319**	.322**
	Sig. (2-tailed)	.149	.205	.003	.003
	N	85	85	85	85
NATHRS1S3	Pearson Correlation	.488**	.557*	.591**	.734**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	85	85	85	85
NATHRS1Scale	Pearson Correlation	.501**	.557**	.648**	.744**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	85	85	85	85

Table 3

Correlations

		NATHRS1 Scale	NATHRS1 S1	NATHRS1 S2	NATHRS1 S3	FSQF4
NATHRS1Scale	Pearson	1	.860**	.632**	.876**	-.280**
	Correlation					
	Sig. (2-tailed)		.000	.000	.000	.009
	N	85	85	85	85	85
NATHRS1S1	Pearson	.860**	1	.389**	.609**	-.381**
	Correlation					
	Sig. (2-tailed)	.000		.000	.000	.000
	N	85	85	85	85	85
NATHRS1S2	Pearson	.632**	.389**	1	.361**	.096
	Correlation					
	Sig. (2-tailed)	.000	.000		.001	.382
	N	85	85	85	85	85
NATHRS1S3	Pearson	.876**	.609**	.361**	1	-.271*
	Correlation					
	Sig. (2-tailed)	.000	.000	.001		.012
	N	85	85	85	85	85
FSQF4	Pearson	-.280**	-.381**	.096	-.271*	1
	Correlation					
	Sig. (2-tailed)	.009	.000	.382	.012	
	N	85	85	85	85	85

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 4

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	310.547
	df	91
	Sig.	.000

Table 5

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of	Cumulative	Total	% of	Cumulative	
		Variance	%		Variance	%	
1	4.171	29.791	29.791	3.594	25.669	25.669	3.382
2	1.760	12.573	42.364	1.208	8.626	34.295	2.101
3	1.156	8.256	50.620	.578	4.130	38.424	2.027
4	1.084	7.743	58.363				
5	1.002	7.159	65.521				
6	.889	6.350	71.871				
7	.743	5.304	77.175				
8	.634	4.528	81.703				
9	.572	4.083	85.786				
10	.539	3.847	89.633				
11	.474	3.388	93.021				
12	.366	2.615	95.636				
13	.328	2.343	97.979				
14	.283	2.021	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 6

Pattern Matrix^a

	Factor		
	1	2	3
8. If humanoid-robots could show emotional behavior, I would be friends with one.	.848		
5. Humanoid-robots could be helpful in taking care of the elderly and/or children.	.660		
2. I would be okay if a humanoid-robot behaved in a way that led me to recognize emotional signs.	.637		
6. Humanoid-robots could be helpful in the education of K-12 students.	.535		
12. Humanoid-robots could be helpful in taking care of domestic household chores.	.525		
14. I would trust a humanoid-robot to be around me and/or in my family environment.	.507		
11. In the near future, humanoid-robots could have the same legal rights as humans.			
4. Humanoid-robots could be employed for dangerous tasks such as mining and space travel instead of humans.		.788	
1. In the near future, humanoid-robots could be preferred to work labor over human workers.		-.602	
10. Humanoid-robots could influence children in negative ways.			
3. In the near future, humanoid-robots could lead humans to interact less with each other.			
9. I would feel uncomfortable if humanoid-robots could make judgments about facts and/or people in general like humans do.			.836
13. I would feel uncomfortable if some humanoid-robots could be in a position to make decisions about humans, such as a judicial authority.			.533
7. I would feel unsafe if a humanoid-robot attempt a close interaction with me.			

Extraction Method: Principal Axis Factoring.
 Rotation Method: Promax with Kaiser Normalization.
 a. Rotation converged in 5 iterations.

Table 7

<i>Reliability Statistics</i>			
Cronbach's Alpha	Part 1	Value	.483
		N of Items	
	Part 2	Value	.676
		N of Items	
	Total N of Items		14
Correlation Between Forms			.611
Spearman-Brown Coefficient	Equal Length		.758
	Unequal Length		.758
Guttman Split-Half Coefficient			.750
<p>a. The items are: 1. In the near future, humanoid-robots could be preferred to work labor over human workers., 2. I would be okay if a humanoid-robot behaved in a way that led me to recognize emotional signs., 3. In the near future, humanoid-robots could lead humans to interact less with each other., 4. Humanoid-robots could be employed for dangerous tasks such as mining and space travel instead of humans., 7. I would feel unsafe if a humanoid-robot attempt a close interaction with me., 8. If humanoid-robots could show emotional behavior, I would be friends with one., 14. I would trust a humanoid-robot to be around me and/or in my family environment.,</p> <p>b. The items are: 5. Humanoid-robots could be helpful in taking care of the elderly and/or children., 6. Humanoid-robots could be helpful in the education of K-12 students., 9. I would feel uncomfortable if humanoid-robots could make judgments about facts and/or people in general like humans do., 10. Humanoid-robots could influence children in negative ways. , 11. In the near future, humanoid-robots could have the same legal rights as humans., 12. Humanoid-robots could be helpful in taking care of domestic household chores., 13. I would feel uncomfortable if some humanoid-robots could be in a position to make decisions about humans, such as a judicial authority..</p>			

Table 8

Internal Consistency for NAT-HRS-1

Cronbach's Alpha		
Cronbach's Alpha	Based on Standardized Items	N of Items
.748	.742	14

Table 9

Item-Total Statistics for NAT-HRS-1

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
1. In the near future, humanoid-robots could be preferred to work labor over human workers.	41.26	76.527	-.254	.254	.785
2. I would be okay if a humanoid-robot behaved in a way that led me to recognize emotional signs.	41.66	59.513	.595	.493	.708
3. In the near future, humanoid-robots could lead humans to interact less with each other.	41.56	70.154	.038	.168	.769
4. Humanoid-robots could be employed for dangerous tasks such as mining and space travel instead of humans.	43.33	68.604	.212	.389	.747
5. Humanoid-robots could be helpful in taking care of the elderly and/or children.	41.75	58.688	.514	.435	.715
6. Humanoid-robots could be helpful in the education of K-12 students.	41.80	60.995	.550	.472	.715
7. I would feel unsafe if a humanoid-robot attempt a close interaction with me.	41.84	62.711	.443	.352	.726
8. If humanoid-robots could show emotional behavior, I would be friends with one.	41.71	59.639	.503	.449	.717
9. I would feel uncomfortable if humanoid-robots could make judgments about facts and/or people in general like humans do.	41.45	62.250	.406	.355	.729
10. Humanoid-robots could influence children in negative ways.	41.48	66.038	.387	.351	.733
11. In the near future, humanoid-robots could have the same legal rights as humans.	41.01	63.488	.394	.311	.731
12. Humanoid-robots could be helpful in taking care of domestic household chores.	43.14	65.551	.396	.325	.732
13. I would feel uncomfortable if some humanoid-robots could be in a position to make decisions about humans, such as a judicial authority.	41.14	63.266	.307	.260	.741
14. I would trust a humanoid-robot to be around me and/or in my family environment.	41.87	59.376	.580	.529	.709

Table 10

<i>Internal Consistency for the NAT-HRS-1 Subscale 1</i>	
Cronbach's Alpha	N of Items
.519	5

Table 11

Item-Total Statistics for the NAT-HRS-1 Subscale 1

	Scale			
	Scale Mean if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
2. I would be okay if a humanoid-robot behaved in a way that led me to recognize emotional signs.	12.14	8.646	.548	.287
3. In the near future, humanoid-robots could lead humans to interact less with each other.	12.05	11.926	.064	.601
8. If humanoid-robots could show emotional behavior, I would be friends with one.	12.19	9.012	.384	.394
9. I would feel uncomfortable if humanoid-robots could make judgments about facts and/or people in general like humans do.	11.93	10.114	.277	.470
12. Humanoid-robots could be helpful in taking care of domestic household chores.	13.62	11.904	.221	.500

Table 12

<i>Internal Consistency for the NAT-HRS-1 Subscale 2</i>	
Cronbach's Alpha ^a	N of Items
-.074	4

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 13

Item-Total Statistics for the NAT-HRS-1 Subscale 2

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. In the near future, humanoid-robots could be preferred to work labor over human workers.	9.52	5.776	-.259	.269
4. Humanoid-robots could be employed for dangerous tasks such as mining and space travel instead of humans.	11.59	5.293	-.138	.084
11. In the near future, humanoid-robots could have the same legal rights as humans.	9.27	3.128	.206	-.586 ^a
13. I would feel uncomfortable if some humanoid-robots could be in a position to make decisions about humans, such as a judicial authority.	9.40	2.910	.083	

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 14

<i>Internal Consistency for the NAT-HRS-1 Subscale 3</i>	
Cronbach's Alpha	N of Items
.719	5

Table 15

Item-Total Statistics for the NAT-HRS-1 Subscale 3

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
5. Humanoid-robots could be helpful in taking care of the elderly and/or children.	13.01	10.988	.532	.651
6. Humanoid-robots could be helpful in the education of K-12 students.	13.06	12.413	.552	.642
7. I would feel unsafe if a humanoid-robot attempt a close interaction with me.	13.09	13.562	.387	.706
10. Humanoid-robots could influence children in negative ways.	12.74	14.789	.400	.702
14. I would trust a humanoid-robot to be around me and/or in my family environment.	13.13	11.947	.540	.645

Table 16

Correlations of the NAT-HRS-1 Re-Test Total Scores with NAT-HRS-1 Total Scores

		NATHRS1RetTotal	NATHRS1Total
NATHRS1RetTotal	Pearson Correlation	1	.882**
	Sig. (2-tailed)		.000
	N	80	80
NATHRS1Total	Pearson Correlation		1
	Sig. (2-tailed)	.000	
	N	80	80

** . Correlation is significant at the 0.01 level (2-tailed).

Lovotics and the Big-Five: An Exploration of the Psychology of Human-Robot Intimacy

Senior Thesis Project

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Reader: Dr. Ronnie Mather

Happy Birthday Leonardo.

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Table of Contents

Abstract	6
1. Introduction	7
2. Literature Review	8
2.1. The Field of Artificial Intelligence and Robotics	8
2.1.1. Artificial Intelligence	8
2.1.2. Robots	9
2.2. People’s General Attitudes Toward Robots and Human-Robot Relationships	11
2.3. Human-Robot Interaction Studies	16
2.3.1. Anthropomorphism and the Uncanny Valley in HRI Studies	19
2.4. Robot Acceptance Among Humans	23
2.5. The Evolution of the Perception of Love	26
2.6. Human-Robot Sex	27
2.7. Lovotics and Human-Robot Intimate Relationships	29
2.7.1. People’s Attitudes Toward Human-Robot Intimacy	31
2.7.2. HRI Studies for Human-Robot Intimacy	35
2.7.3. The Lovotics Robot and Human-Robot Love	35
2.8. Personality Factors and Human-Robot Interactions	37
2.8.1. The Big-Five Personality Dimensions	37
2.8.2. The Big-Five Personality Dimensions in HRI Studies	39
3. Methodology	42
3.1. Participants	42
3.2. Inventories	43
3.2.1. Attitudes Toward Human-Robot Intimate Relationship Questionnaire (INT-RO	
1)	43

LOVOTICS AND THE BIG-FIVE	3
3.2.2. The Big-Five Inventory (BFI)	45
3.3. Procedure	46
4. Results	48
4.1. Response Percentages of the Participants for Each INT-RO-1 Item	48
4.2. Descriptive Statistics of the INT-RO-1	52
4.2.1. Descriptive Statistics of the INT-RO-1 Total	52
4.2.2. Descriptive Statistics of the INT-RO-1 Trust Subscale	53
4.2.3. Descriptive Statistics of the INT-RO-1 Sexuality Subscale	53
4.2.4. Descriptive Statistics of the INT-RO-1 Intimacy Subscale	53
4.2.5. Descriptive Statistics of the INT-RO-1 Acceptance Subscale	53
4.3. Descriptive Statistics of the BFI Scores	54
4.3.1. Descriptive Statistics of the BFI Extraversion Subscale	54
4.3.2. Descriptive Statistics of the BFI Agreeableness Subscale	54
4.3.3. Descriptive Statistics of the BFI Conscientiousness Subscale	54
4.3.4. Descriptive Statistics of the BFI Neuroticism Subscale	54
4.3.5. Descriptive Statistics of the BFI Openness Subscale	55
4.4. ANOVA Analyses for INT-RO-1 Subscales for Different Self-Identified Genders	55
4.4.1. The INT-RO-1 for Different Self-Identified Genders	55
4.4.2. The INT-RO-1 Trust Subscale for Different Self-Identified Genders	56
4.4.3. The INT-RO-1 Sexuality Subscale for Different Self-Identified Genders	57
4.4.4. The INT-RO-1 Intimacy Subscale for Different Self-Identified Genders	58
4.4.5. The INT-RO-1 Acceptance Subscale for Different Self-Identified Genders	59
4.5. ANOVA Analyses of INT-RO-1 Subscales for Different Cultures	60
4.5.1. The INT-RO-1 for Different Cultures	60
4.5.2. The INT-RO-1 Trust Subscale for Different Cultures	61

LOVOTICS AND THE BIG-FIVE	4
4.5.3. The INT-RO-1 Sexuality Subscale for Different Cultures	61
4.5.4. The INT-RO-1 Intimacy Subscale for Different Cultures	62
4.5.5. The INT-RO-1 Acceptance Subscale for Different Cultures	63
4.6. Multiple Regression Analyses of the Big-Five Subscales on the INT-RO-1	
Subscales	63
4.6.1. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1	63
4.6.2. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1	
Trust Subscale	64
4.6.3. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1	
Sexuality Subscale	65
4.6.4. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1	
Intimacy Subscale	66
4.6.5. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1	
Acceptance Subscale	66
4.7. Multiple Regression Analyses of the INT-RO-1 Subscales on the Big-Five	
Subscales	67
4.7.1. Multiple Regression Analysis of the INT-RO-1 on the Big-Five	67
4.7.2. Multiple Regression Analysis of the INT-RO-1 on the Big-Five Extraversion	
Subscale	68
4.7.3. Multiple Regression Analysis of the INT-RO-1 on the Big-Five Agreeableness	
Subscale	68
4.7.4. Multiple Regression Analysis of the INT-RO-1 on the Big-Five	
Conscientiousness Subscale	69
4.7.5. Multiple Regression Analysis of the INT-RO-1 on the Big-Five Neuroticism	
Subscale	69

4.7.6. Multiple Regression Analysis of the INT-RO-1 on the Big-Five Openness	
Subscale	70
5. Discussion	71
5.1. The Attitudes Toward Acceptance of Humanoid-Robots and Human-Robot Intimate Relationship	71
5.2. The Attitudes Toward Trusting Humanoid-Robots	74
5.3. Attitudes Toward Human-Robot Sexuality	75
5.4. Attitudes Toward Human-Robot Intimacy	76
5.5. The Effect of Self-Identified Gender on Attitudes Toward Human-Robot Intimacy	79
5.6. The Effect of Culture on Attitudes Toward Human-Robot Intimacy	80
5.7. The Effect of Big-Five Personality Dimensions on Attitudes Toward Human-Robot Intimate Relationship	81
6. Conclusion	84
6.1. Limitations	86
6.2. Suggestions for Future Research	86
7. References	88
Appendix A (Informed Consent)	96
Appendix B (Inventories)	97
Appendix C (Tables)	101
Appendix D (Figures)	192

Abstract

This study focused on Human-Robot Interactions (HRI), human relationships, intimacy, and technological advancement in Artificial Intelligence (AI) and Robotics. Research in these areas has suggested that the human understanding of love and relationships is changing. In the age of AI, the possibility of a human-robot intimate relationship is being considered in academic disciplines and in public discourse. There has been little discussion of people's attitudes toward intimate relationships with the robots which they may encounter in their everyday lives in the very near future. Nor the possible effects of people's personality dimensions in making that choice was considered. The study sample included 174 females, 70 males, and 10 as identified "prefer not to say". Attitudes were measured on the idea of a human-robot intimate relationship with the INT-RO-1, personality dimensions with the BFI. The female and male participants had a more positive attitude toward accepting humanoid-robots. Participants who preferred not to say obtained overall higher scores in all four subscales compared to both females and males. Major differences were found in responses between the statements that referred to others and the statements that referred to the participants' own preferences. The Big-Five personality dimensions Agreeableness and Openness were considerably important in predicting attitudes toward human-robot intimate relationship while the Agreeableness, the Conscientiousness, and the Openness personality dimensions were especially important when predicting the acceptance of human-robot intimate relationships.

Key Words: attitude, the Big-Five, GP-Write, human genome, human-robot interaction, HRI studies, humanoid-robot, human-robot, intimacy, sex, intimate relationship, Lovotics, personality dimensions, robotics, robot, synthetic microbiology.

1. Introduction

In 1950, when Alan Turing suggested the possibility of computers having intelligence and the capacity to learn on their own, there were insufficient resources to put his ideas into action (Stone et al., 2016). There is now an urgent need to direct AI systems towards the improvement of human lives, and at the same time support creativity in the AI field by considering the accelerated developments projected to occur in the next 15 years (Stone et al., 2016). Taking action now, to regulate Artificial Intelligence (AI) systems is imperative. Humanoid-robots are not yet among us collectively. Thus, research has mostly focused on people's expectations and ideas on what may happen in the future. The current study looks at advancements in the fields of AI and robotics, artificial love, "Lovotics" research, people's attitudes toward robots and human-robot relationships, Human-Robot Interaction (HRI), anthropomorphism, the evolution of the human understanding of love, as well as the initial research that has been directed to human-robot intimacy. It looks at the way that attitudes and personality might inform attitudes toward human-robot intimacy.

There have been a few surveys that address attitudes to human-robot intimacy, but there was not any inventory that aimed to measure the construct within an academic research frame. Given the fast pace of developments in AI, Robotics, and Synthetic Microbiology development, will humans continue to choose their own kind when establishing an intimate relationship, or, will they consider humanoid-robots as potential partners as well? How might personality factors affect that decision? It might be time to bring a new understanding of human-robot intimacy, to gain an initial idea of people's expectations, as well as the degree to which people are ready for a possible—and radical—change in human relationships in the near future.

2. Literature Review

2.1. The Fields of Artificial Intelligence and Robotics

2.1.1. Artificial Intelligence. Artificial Intelligence (AI) has been defined as a cross disciplinary field that considers modeling, as well as replicating human intelligence and cognitive processes, through applications of diverse principles drawn from mathematics, biology, logic, and psychology (Frankish & Ramsey, 2014). AI, that is powered with machine learning and the growth of datasets that are readily available, drives technological development in various sectors of both civilian and military applications (EC, 2018). Machine learning involves both learning new algorithms and processing existing ones, enabling robots to learn from actions (Stone et al., 2016).

Deep learning is a machine learning system that uses algorithms and relies on neural networks, which are artificially designed to process data, and its areas of application can be found in daily life such as in smart phones (Stone et al., 2016). Deep learning has enabled significant progress in various activities including sensing, understanding, and object recognition that robots use widely to interact with the outside world (Stone et al., 2016). Old fashioned computing and entering commands are almost out of favor—through deep learning, robots can teach themselves plans and strategies, search for new evidence to inspect, and use that evidence, without waiting for a specific command (EC, 2018; Payr, 2011). Social robots can make autonomous decisions, relying on a decision-making process derived from making connections and reasoning facets from what they have learned, as well as from current stimuli they perceive from the environment (as cited in Scheutz, 2012). Moreover, neuromorphic computing is a technological invention that is designed to imitate human neural networks, with the aim of advancing the effectiveness and strength of computing systems by merging hardware and software concepts in AI, with the whole field moving toward building reliable and human-aware intelligent systems (Edirisinghe & Cheok, 2016; Stone et al., 2016). These

human-aware intelligent robots can enable enhanced communication between humans and robots.

Intelligence can be evaluated on a multidimensional array ranging between an “arithmetic calculator” and the human brain, with defining factors being intensity of autonomy, its extent, and pace (Stone et al., 2016). Some have argued that we cannot compare computing AI to human intelligence. Nowachek suggested that robots obtain their information in limited ways, and therefore they will lack conversational spontaneity and the common-sense humans have (as cited in Edirisinghe, Cheok, & Khougali, 2017). Of course, there are differences between AI and the human brain, but how do humans learn? Through obtaining information, and from experiences.

Through reinforcement learning and natural language processing, AI can learn, make decisions, and execute actions on its own in the real world. This ability is improving over time, through advances in robotics which have already enabled the combination of machine perception and tactile perception in humanoid robots, who can easily have spontaneous dialogues as opposed to conversations that are computed into their systems (Stone et al., 2016). In addition to making decisions, AI is capable of understanding human values through “Inverse Reinforcement Learning” (IRL), i.e. by observing human behavior, even when such human values have not been clearly defined among humans (Russell, 2016). “The field is in its infancy,” adds Stuart Russell (2016), Professor of Computer Science at the University of California, Berkeley, and an expert on AI, but research in the field of AI has made promising progress that pointed the way to designing smart machines (p. 59).

2.1.2. Robots. The word “robot” comes from “robota” which means “slave” and “worker” as well as “drudgery” or “forced labor” in the Czech language (as cited in Jones, 2017; Morsünbül, 2018; as cited in Petersen, 2012). AI is the main operating system that robots rely on and is defined as the area of computer science that is put together with an

engineering discipline to create smart programs, mostly aimed at meeting human needs (Frankish & Ramsey, 2014). In the early development stages, robotics, as an extension of AI, mainly focused on executing basic tasks including walking and grasping (Frankish & Ramsey, 2014). As research in the field of robotics developed and became more advanced, robots were included in the AI-based research field of cognitive robotics that aimed to make robots capable of cognition (Frankish & Ramsey, 2014). Today, robotics has many areas of application including medicine delivery in hospitals, helping children with Autism Spectrum Disorder (ASD) to communicate at difficult times, monitoring health, motivating people for exercise with a non-judgmental manner, and aiding therapeutical nursing (as cited in Darling, 2015).

Hanson Robotics is a pioneering company in the field of robotics. It is famous for its well-known humanoid robot named Sophia, who has silicon skin, is capable of making 62 facial expressions, and who changes her expression depending on the nature of the interaction (Hanson Robotics, 2018b). Sophia has non-visible cameras in her eyes and operates with algorithms that enable her to maintain eye contact, to recognize faces, to understand, and to engage in conversation (Hanson Robotics, 2018b; as cited in Kolivand, Rad, & Tully, 2017). Sophia does not have a fully humanoid body—yet. However, she has been awarded citizenship from Saudi Arabia (Hanson Robotics, 2018c). This is arguably the first step to giving robots their own rights and personhood. It has been planned for Sophia to have her own T.V. show, called “Being Sophia”, where she will share her experiences in understanding human life and her adventures in the world of humans, and also talk more about her desire to become a “super-intelligent, benevolent being” (Hanson Robotics, 2018b). The company claims that robots will be everywhere soon, and their goal is to develop humanoid robots that are powered with Artificial General Intelligence (AGI), as well as continue research that will allow robots to have robot sentience (Hanson Robotics, 2018a). Having robots with sentience

might seem to be a utopian idea; yet, this idea still engages many scholars and experts in ethical debates, and also motivates legislators to push new laws. Sophia is now included in an unconditional love study, named “the Loving AI” project, that aims to integrate robots into human conversation that are “emotionally sensitive” (Loving AI, 2017). This study will be further explained in the section heading on HRI studies.

2.2. People’s General Attitudes Toward Robots and Human-Robot Relationships

Even though most people are familiar with humanoid robots through media and movies, the real encounter has not yet taken place for many. However, there is still the opportunity for researchers to measure people’s initial responses, mental schemas, and emotions toward humanoid robots (Broadbent et al., 2011). In psychology, attitude is generally defined as the relatively lasting inclination to think and behave toward issues, people, animals, and objects in specific ways (as cited in De Graaf & Allouch, 2013). One’s attitude has a powerful effect on the individual’s intention as well as interactions (as cited in De Graaf & Allouch, 2013). People’s estimations of the degree of a robot’s knowledge, capacity, and ability also influence the way they relate to a robot (Fink, 2012).

The well-known psychologist William James (1908) was among the first to discuss the possibility of a human having a relationship with a humanoid robot. James (1908) defined a humanoid-being with a perfectly humanoid shape and called it an “automatic sweetheart,” regarding it as a “soulless body” that would be indistinguishable in its every aspect from talking and nursing, to blushing and laughing, with perfect feminine features. James (1908) rejected the idea that a relationship could be formed with such a being and claimed that nobody would regard “her” as a real companion, due to human nature craving compassion, admiration, awareness, and love. James (1908) also added that the “automatic sweetheart” possibility could not apply to humans and did not deserve serious attention.

However, following this argument, he also stated that the biggest interest humankind bestowed by human nature was the need for “consistency,” second only to the desire to “breathe freely” This raises the question of whether humans prefer a spontaneous soul or “consistency.” Humanoid robots are potentially better at being consistent compared to humans, whose souls who are dynamic and can change easily.

Osborn and Ginsburg (2014) conducted a study with 53 adult participants, 40 females and 13 males, where they tested James’ claims regarding the “automatic sweetheart” by using Sternberg’s triangular love theory. The participants were shown six identical photos of sweethearts in a random order, three of them labeled as human, and three of them labeled as non-human (Osborn & Ginsburg, 2014). The participants were then asked to fill out Sternberg’s Love survey, which emerged from three constructs of intimacy, commitment, and passion, rated on a scale from one to nine; moreover, the time each participant spent examining photos was measured (Osborn & Ginsburg, 2014). The results yielded that love scores for human sweethearts were consistently higher, compared to love scores for so-called non-human sweethearts that were indistinguishable copies. However, the time participants spent examining non-human sweethearts was longer than the time they spent examining human sweethearts, which suggested that they were looking for differences among the two (Osborn & Ginsburg, 2014). In addition, the participants rated the same score for the passion construct for both human sweethearts and non-human sweethearts, unlike the intimacy and commitment constructs (Osborn & Ginsburg, 2014).

Dautenhahn et al. (2005) conducted an experiment with 28 participants, 14 females and 14 males, where they measured the participants’ attitudes regarding the idea of a future robot companion in their homes. According to the results obtained, 40% of the participants wanted a potential robot to be a companion at their homes (Dautenhahn et al., 2005). Specifically, among the 40% who favored robot companions, the most preferred occupation

for a robot was to do household jobs—agreed by ~96% (96.4%)—and the least preferred duty for a robot was taking care of a child, agreed by ~11% (10.7%) of the participants (Dautenhahn et al., 2005). Also, 71% favored a robot companion that is predictable and controllable (Dautenhahn et al., 2005). In conclusion, almost half the participants agreed to have a companion robot, but they favored the robot as more of a servant, and less in a position that is in charge of personally important tasks, and capable of spontaneous behavior.

Negative attitudes toward robots were influenced by unfamiliarity with robots, stereotypes about robots, and the physical similarity of the robot to humans which in most cases led to regarding the robot as a threat (as cited in Fraune et al., 2015). Scopelliti et al. examined the emotional differences that are experienced toward domestic robots among young adults and the elderly across three generations (as cited in Dautenhahn, 2005). Taking the level of education and gender factors into account; they reported that young people presented more positive emotions towards robots, whereas the anticipation of a robot at home caused fear among the elderly (as cited in Dautenhahn, 2005). Also, several studies suggested that older people are more likely to show negative emotions toward robots, as well as more sensitivity about other people's attitudes when they used technology (as cited in De Graaf & Allouch, 2013). So, in this case, age was negatively correlated with perceiving robots in a positive way.

A study conducted with western and non-western participants measured cultural attitudes toward accepting robots. Kaplan reported that the western participants were distressed by robots even though they were highly involved in technology, whereas participants from Japan, the non-western participants, perceived robots without any distress (as cited in Edirisinghe, Cheek, & Khougali, 2017). The study suggested that stereotypes among Westerners about robots can be quite influential, even in the face of being familiar

with technology. However, generalizing the results from only one country, Japan, a leading pioneer in technology and AI, as representing a “non-Western” population is a limitation.

Enz et al. (2011), collected responses from 326 German participants, 165 females and 161 males, via an online questionnaire about their expectations of the social roles that robots can fulfill. The results yielded that, in general, the participants were positive toward assigning robots activities that are demanding and dangerous, such as nursing and providing security in dangerous areas, yet the participants were negative toward robots having social roles entailing equality with humans (Enz et al., 2011). Moreover, the participants who had an occupation or major in a technology related field, as well as male participants in general, reported more positive results considering robot roles in social life (Enz et al., 2011). Regarding the differences in age factor, only one scenario was different, in that older participants reported that robots would take less time to be an emotionally significant other for them, compared to the younger participants (Enz et al., 2011). Regarding gender differences, males were more in favor than females of robots in the position of a romantic partner, a citizen with equal rights with humans, and as a nursing assistant (Enz et al., 2011). The study showed that age can be positively correlated with favoring robots when it is perceived in a different context.

The European Commission (2012) made an extensive analysis of “public attitudes towards robots” with 751 participants representing the 27 European Union Member States by conducting face-to-face interviews at each participant’s home in their national language. The participants had a mental image of a robot as resembling a gadget-like robot rather than a robot in a humanoid form, excluding participants from Bulgaria, Spain, Malta, and Cyprus, whose mental image of a robot was equally distributed between robots in humanoid and non-humanoid forms (European Commission [EC], 2012). Specifically, the results showed that the participants (88%) preferred robots to handle heavy work and dangerous duties yet, at the same time, they (70%) feared losing their jobs to robots (EC, 2012).

Moreover, when the participants were shown a photo of a gadget-like robot, 85% of men reported that the photo corresponded to the image they had in mind, and 78% of women reported that the photo corresponded to the image they had in mind (EC, 2012). However, the correspondence rates changed when the image shown was a robot in humanoid form: 68% for men and 64% for women (EC, 2012). Regarding the age factor for different responses, the idea of a robot being gadget-like instead of human-like, showed a positive correlation with increasing age (EC, 2012). The participants' personal experience with robots were only 12%, and 87% had never encountered a robot (EC, 2012). Therefore, the majority of the participants did not have any real-life experience with a robot, and men's and older participants' perception of robots were considerably more gadget like compared to that of women and younger participants.

Moreover, regarding the general attitude toward robots, 70% of the participants were positive and 23% were negative (EC, 2012). 91% of the participants agreed that robots "require careful management" as a part of technology (EC, 2012). The majority of the participants agreed that robots should be used primarily for space exploration (52%), manufacturing (50%), and military and security (41%) whereas only a minority agreed that robots should be used for other purposes such as cleaning homes (13%) and for healthcare (22%) (EC, 2012). The participants reported that robots should be banned from caring from children and the elderly (60%), followed by a ban in education (34%), and healthcare (27%) (EC, 2012). The general analyses of the report showed that the participants in Northern Europe were more open toward use of robots, than the participants in Southern Europe (EC, 2012). Overall, the participants favored robots for carrying out hard work, and primarily for serious jobs under carefully structured human supervision, whereas they thought that robots should be kept away from caring for others and education related areas. The participants' general attitude was that they were not in favor of accepting robots in their personal lives.

This showed that Europeans might be less accepting, and less favorable towards, robots for intimate relationships in the near future.

Several research studies have suggested that men show greater preference for robots regarding their usefulness and also show more acceptance toward having robots in their daily lives, compared to women (as cited in De Graaf & Allouch, 2013). De Graaf and Allouch (2013) conducted a study with 60 students, 32 females and 28 males, in which the participants interacted and engaged in conversation with NAO, a humanoid robot. NAO is a moderately small humanoid-robot which has eyes, a dot as a mouth and two ear-like ears, and is capable of moving, speaking, and facial recognition (SoftBank Robotics Europe). They measured the participants' attitudes toward the robot NAO which pinpointed the most common variables they gathered from their literature review such as anxiety toward robots, intelligence, and enjoyment (De Graaf & Allouch, 2013). Females had higher levels of negative attitude and anxiety toward robots compared to males, whereas males had higher levels of interest in technological advances and robot experience (De Graaf & Allouch, 2013). Therefore, the behaviors that humans exhibit during social interactions influence not only the way they communicate with each other, but also the way humans evaluate robot actions (Fink, 2012; Fraune et al., 2015).

2.3. Human-Robot Interaction (HRI) Studies

The field of Human-Robot Interaction (HRI) has gone beyond the limits of science-fiction and now informs scientific research (Carpenter, 2017). Psychological theories and methodologies have been widely used in Human-Robot Interaction (HRI) studies, especially for measuring human responses and perception of robots (Fraune, Sherrin, Šabanović, & Smith, 2015; Knight, 2014). Understanding each other is an important factor in any kind of relationship, especially in intimate relationships, and the same can be said for human-robot

relationships. The importance of understanding can be seen in human-robot interactions as well. Hoffman et al. (2014) reported that when participants encountered a robot that responded positively to the participants' current life problems, they favored the robot more, and found it more attractive when the robot responded positively compared to when the robot responded negatively. Thus, the robot's understanding through the giving of different responses to the participants impacted the participants in different ways. The Loving AI project aims to enable humans and humanoid-robots to be able to interact in "loving and compassionate" ways that can aid humanoid-robots to express unconditional love to humans through specifically developed software (Goertzel et al., 2017).

Goertzel et al. (2017) led a pilot study in which Sophia the robot was programmed with the Loving AI software which included specific personality, behavioral, perceptual, cognitive, and linguistic content. Thus, Sophia could interact with human participants in a loving way through understanding consciousness and emotions, as well as the unique nature of each human. Ten participants in the study interacted with Sophia, and did exercises focusing on relaxation, visualization, and meditation (Goertzel et al., 2017). They measured the following: the participants' changes in experience of mood, resilience, and love at the beginning and also at the end of the interaction, by means of Fetzer's Love Scale and brief mood introspection scale (BMIS); the participants' heartbeat before, during, and after the interaction with a strap (Polar H7) that is attached to their body; and the influence of these interactions when the recordings were watched by independent coders. The participants reported higher unconditional love toward robots, as well as increased feelings of happiness after the interaction with Sophia than they did before the interaction (Goertzel et al., 2017). However, there was not any change in the arousal levels of the participants. Goertzel et al. (2017) suggested that this was an indication for the participants reflecting upon their authentic

emotions, humanoid-robots potentially allow human-robot interaction to take place through mutual understanding without judgement.

For the moment, we do not have robots like Sophia in everyday social life. However, Phoebe Lostroh, a molecular microbiologist and researcher at Colorado College, stated that “[we] will see fully humanoid beings [robots] within our lifetime” following her speech at the sixth meeting of The Association for Feminist Epistemologies, Methodologies, Metaphysics, and Science Studies (FEMMSS6) (Gibson, 2016, pp.243-244). In the near future, experts expect humanoid robots that are indistinguishable in every aspect from a healthy human being (Carpenter, 2017). If we look at the possibility of designing fully humanoid-robots in their biological aspects promising work can potentially come from the field of genetic engineering. One task of synthetic biology is to redesign microorganisms with the purpose of engineering them to acquire new qualities (National Human Genome Research Institute [NHGRI], 2018). Today, scientists are able to synthetically create the polio virus from top to bottom, which of course leads to concerns about the potential to create biological weapons (NHGRI, 2018). The Genome Project-Write (GP-Write) which has brought together 200 scientists from over 100 institutions, aims to write the complete genome from human cells by moving “from passively reading genomes to actively writing them” (Center of Excellence for Engineering Biology [CEEB], 2018). The scientists plan to complete their research in 10 years (CEEB, 2018) and the possible implications of this kind research are as yet unknown. Sophia is by far the most intelligent social robot compared to other social robots used in HRI experiments. Developments in the near future, will far exceed her capabilities. Even these relatively simple social robots, capable of only making simple expressions, and giving simple feedback, influence human subjects, for reasons we will explore in the following paragraphs.

2.3.1. Anthropomorphism and the Uncanny Valley in HRI Studies. People well known in the academic field such as Freud, Darwin, and Hume all claimed that humans are prone to attribute humanness to nonhuman agents (as cited in Epley, Waytz, & Cacioppo, 2007). This attribution is known as anthropomorphism (De Graaf, M. M., & Allouch, S. B., 2013; Epley, N., Waytz, A., & Cacioppo, J. T., 2007; Fink, 2012). Anthropomorphizing increases humans' ability to understand the agent's behaviors and decreases the ambiguity of the agents' characteristics (Epley, Waytz, & Cacioppo, 2007). Also, humanoid robots are more anthropomorphized by humans, compared to robots that do not have a human appearance (as cited in Epley, Waytz, & Cacioppo, 2007). Moreover, it has been claimed that when a person anthropomorphizes a non-human, the same neural circuits get activated as if they were making judgments about humans (as cited in Epley, Waytz, & Cacioppo, 2007). Thus, a person's tendency to anthropomorphize an agent is influenced by the agent's human-like appearance and influences the way that person connects with a humanoid-robot, making judgments within the same mental schema.

Children seem to anthropomorphize more compared to adults (Epley, Waytz, & Cacioppo, 2007). The anthropomorphic tendency is perceived at a very young age by humans and does not seem to fade throughout the years (as cited in Epley, Waytz, & Cacioppo, 2007). In addition, Sullins reported that people who interact with technology from an early age are more prone to favor human-computer interaction over human-human interaction (as cited in Rousi, 2017). Furthermore, the need for connection with others also increases an individual's tendency to anthropomorphize by leading the individual to search for a possible source of connection (Epley, Waytz, & Cacioppo, 2007). They also suggest that lonely people are more likely to anthropomorphize, in addition, that people that form an insecure attachment style with others are more prone to anthropomorphize non-human. Moreover, in the case of human-robot relationships, humans can prefer anthropomorphized humanoid robots to humans,

because in such a relationship the human has more control (Epley, Waytz, & Cacioppo, 2007). Eyssel and Reich also claim that people who are lonely are more likely to anthropomorphize humanoid robots (cited in Szczuka & Krämer, 2016). Thus, in the context of a human robot intimate relationship, loneliness, an insecure attachment style, and the anthropomorphic tendency may reinforce each other, and potentially encourage the person who has these three characteristics to choose a humanoid-robot as a partner over a human.

The anthropomorphic tendency can be also seen within United States military members, where soldiers reported emotional distress for inactivated robots. There were funerals that took place for military robots that have served and there are soldiers who have risked their lives for the sake of saving their robot teammates (as cited in Darling, 2015; Garber, 2013). Such reports potentially point to human-robot emotional bonding due to anthropomorphism in addition to attributed importance. People can project life characteristics onto non-living objects, including robots, as a part of the anthropomorphic tendency (Darling, 2015). When the robot presents human-like behavior, such as facial expressions and emotions, people encounter the robot in a more affirmative way, compared to a robot that has only functional characteristics (Fink, 2012).

Darling, Nandy, and Breazeal (2015) suggested that assigning characteristics to a robot such as a name and biography, changed the participants' responses as well as their behavior, compared to when the robot was not given such characteristics. When the participants were asked to hit the robotic toy, they were uncertain about hitting it due to anthropomorphic presentation, and even asked whether it would hurt it or not (Darling, Nandy, & Breazeal, 2015). Even when the participants were asked to hit a non-living object, their anthropomorphic tendencies led them to perceive the robot as human-like.

Even simple facial expressions, without any verbal feedback, influence humans. Eyssel et al. (2010) conducted a study where each of the 31 participants told a fairy tale to

iCat, which is a small interface robot receiving input information remotely about how to show basic facial expressions. In the emotion display condition, iCat responded to the story with either happiness, or a fearful facial expression. By contrast, in the neutral condition it responded only by blinking and presented no emotion (Eyssel et al., 2010). The study results suggested that participants favored the iCat robot more, and had friendlier conversations with the iCat, when the iCat responded using emotional gestures, compared to when iCat responded neutrally (Eyssel et al., 2010). Thus, the participants showed anthropomorphic tendency toward the iCat robot regarding its emotion expression.

By looking at anthropomorphic tendency from a cultural perspective, Hiroshi Ishiguro, a robotics scientist at the Intelligent Robotics Laboratory at Osaka University, claimed that Japanese people are more likely to have feeling toward robots due to influence of the Shinto religion in Japan that suggests everything has a soul, from a small rock to a beloved human (as cited in Cheok, Levy, & Karunanayaka, 2016; Kaplan, 2004; Tedxseeds, n.d.). Conversely, humans in the United States are more likely to think robots as threatening creatures (Knight, 2014). This could mostly be due to the influence of science-fiction and a consequent negative association to robots (Carpenter, 2017; Gibson, 2017).

However, anthropomorphism does not have a linear relationship with attributing humanness to non-human objects. The term “Uncanny Valley,” developed by Japanese robotic expert Mashiro Mori, is used to describe the non-linear relationship of a human perception of a robot, and the robot’s human-like characteristics (Fink, 2012). The human’s perception of the robot as very close to human, drops dramatically if the robot suddenly does something very non-human (Danaher, 2017; Fraune, Sherrin, Šabanović, & Smith, 2015; Knight, 2014). If a robot has characteristics and appearance that create a high level of anthropomorphic response from humans; at some point, it can also have the opposite effect and create aversion, even rejection and/or fear, due to some minor awkwardness it can

potentially present (Fink, 2012). Freud also referred to “the uncanny” as the “unfamiliar in the familiar” (Freud, 1919; Mara & Appel, 2015).

Mara and Appel (2015) carried out a study with 75 participants, 41 women and 34 men, where randomly assigned participants were exposed to a story narrated in science-fiction form about Telenoid, a toy-like robot operated remotely. This was then followed by five minute, one-to-one interaction, and completion of a questionnaire about the interaction, as well as the participants’ feelings toward Telenoid (Mara & Appel, 2015). The outcome of the study suggested that the participants who had read the science-fiction story about Telenoid viewed it as more human-like, and perceived Telenoid as less awkward, compared to participants who had read only the leaflet about Telenoid specifications; the results were confirmed by bootstrapping as well as multiple regression analysis (Mara & Appel, 2015). The study emphasized the importance of how having prior knowledge of a robot can influence the way people perceive that robot.

Human performance in carrying out complex tasks is hindered when another person is present (as cited in Riether, Hegel, Wrede, & Horstmann, 2012). To figure out if the presence of a robot causes the same effect, Riether, Hegel, Wrede, and Horstmann (2012) carried out a study with 106 participants, 78 females and 28 males, where the participants engaged in four tasks under three conditions. The four tasks were finger tapping at different intervals, defining numerical distance, motoric tracking (tracking specific shapes on a computer screen), by following the specific shapes on a computer screen, and solving anagrams; and the three conditions were carrying out tasks alone, or in the presence of a human confederate, or in the presence of the robot “Flobi” (Riether, Hegel, Wrede, & Horstmann, 2012). To eliminate the likelihood of emotional influence on the participants, the human confederate and the robot did not show any emotional facial expression (Riether, Hegel, Wrede, & Horstmann, 2012). In the measuring numerical distance task and finger tapping task, the participants’ reaction time

with the presence condition was significantly higher than it was with the alone condition (Riether, Hegel, Wrede, & Horstmann, 2012). Anagram solving and motoric tracking did not give any statistically significant difference between the two groups (Riether, Hegel, Wrede, & Horstmann, 2012). However, the difference in reaction time score between the human confederate presence and the robot presence was not statistically significant (Riether, Hegel, Wrede, & Horstmann, 2012). Overall, the results suggested that the presence of a human-like robot significantly influenced people's progress in the tasks as well as their reaction times (Riether, Hegel, Wrede, & Horstmann, 2012). So, the presence of a robot while accomplishing a task has the potential to influence, and even interfere, with the task a human is carrying out, just as much as a human presence does.

2.4. Robot Acceptance Among Humans

As the capacity to learn has pushed beyond biological boundaries by transferring to machines, it started weakening the boundaries between “being a human” and “a designed humanoid-robot”. In the near future, relationships between humans and machines will become more fluid, merging into each other, and become more personalized through AI's ability to learn and adapt to unique individuals as well as to unique intentions (Stone et al., 2016). The “AI effect,” also known as the “odd paradox,” refers to people adapting to new AI-based technology as it emerges until people consider it as familiar, then the newer technology comes up—the pattern follows a vicious cycle and that continues into the future (as cited in Stone et al., 2016). The weakening of boundaries between humans and robots took a major turn when robots started being designed in humanoid forms. In accordance with the anthropomorphism concept, the more humanoid robots look like humans the more humans will accept them and feel close to them due to the “social presence effect” (Spatola, 2018).

Such fuzziness is increasing as robots get closer to humans in various aspects including physical and mental (Carpenter, 2017).

Psychologist Sherry Turkle at MIT claimed that the concept of “robotic moment,” which is defined as humans’ preparedness to welcome robots as relationship partners, is already present in society (as cited in Jones, 2017). Furthermore, Turkle argued that such readiness is a result of the decline in authenticity in personal relationships that is caused by social media, communication devices, the internet, and their disconnecting effects (as cited in Jones, 2017). Therefore, one should pay attention to the problems developing in the quality of human interactions and obvious deterioration that is slowly taking place (as cited in Whitby, 2012). As Whitby (2012) stated, having a robot partner can lead an individual to be socially isolated, and even if the individual is satisfied with the robot partner, this would potentially segregate the individual even more from social life. Thus, this can potentially create a vicious cycle in that the more people favor robots the more they can become isolated and the more people become isolated the more they can turn to robots.

It has been suggested that humans’ acceptance of a robot mostly depends on the robot’s abilities to adapt to its user’s preferences by changing according to the needs of its user and its user’s personality (as cited in De Graaf & Allouch, 2013). In addition to the acceptability factor, Hancock et al. (2011) emphasized the importance of the trust factor for robot acceptance among humans. This is influenced by a robot’s behavior and the robot’s degree of human-like aspects as well as by the degree of human tendency to accept robot suggestions and the information it provides (Hancock et al., 2011).

For a robot to be accepted in human social life, social ability is more important than a robot’s intelligence (De Graaf & Allouch, 2013). Therefore, while intelligence is an important factor for robot acceptance, social ability and attributing meaning are just as important. One example of change in the understanding of love and attachment through advancements in

technology is how children engaged with the once famous “Furby” toy. Some children developed attachment toward the toy and referred to the attribute of love and aliveness in Furby as “... a Furby kind of alive” (Turkle, 2007, p. 508). So, through re-wiring of meaning and understanding in children’s as well as people’s perceptions, the very same attribution can transform into a “robot kind of alive” and eventually to a robot kind of love (Turkle, 2007, p. 508). Furby was not very intelligent, but it led children to attribute meaning and to change the way they understood the concept of love and the way they gave love.

Kahn et al. (2010) conducted a study which examined the behavioral and psychological responses of 90 children aged 9, 12, and 15 to the social robot Robovie. Robovie is a social robot that has huge eyes, no mouth, no nose and no ears, and is operated by a human outside the visibility area of the participants, which makes Robovie appear to be autonomous and humanoid (Kahn et al., 2010; Kanda, 2012). As Prager suggested, psychological closeness is a key factor in human relations with some sub-dimensions including disclosure, openness, reciprocity, responsiveness, acceptance, and attentiveness (as cited in Kahn et al., 2010). The study outcome yielded supporting results in five parts, two of which were as follows: in the introduction part, where the child met with Robovie, an adolescent boy asked how the Robovie was in return, and appeared interested in Robovie’s well-being by showing attentiveness (Kahn et al., 2010). When a 9-year-old girl encountered Robovie, she started telling Robovie about how much she likes the Pacific Ocean while slowing down her walking pace for Robovie to catch up; thus, the girl showed a sense of reciprocal connection, responsiveness, openness, and concern toward Robovie. According to the results obtained from observing the children participants’ interactions with Robovie, Kahn et al. (2010) suggested that humans are likely to have psychological closeness to robots in the near future when humanoid robots appear among us. This brings us to the idea that if children

start encountering robots or experiencing the “robotic moment” from an early age, accepting robots will be much easier compared to adults who had no encounter when they were young.

2.5. The Evolution of the Perception of Love

Verbeek's Mediation theory advocated that developing technology, and people's interaction with advancing technology, changes the way we perceive ourselves, the way we perceive our relationships, and the way we adapt to the world. Thus, an inquiry into the feelings between a human and a robot is no longer a fantasy or figment of the imagination (Liberati, 2017). According to the Mediation theory, advancing technology is seen as an extension of humankind, as it assists human experience, rather than directly shaping them (Verbeek, 2015). Therefore, the theory suggested that technology is not something separate, but a part of humanity. A complementary theory comes from Wennerscheid (2017), who suggested that the “new networks of desire” predominate the way humans relate to others. A romantic association between humans and machines does not stabilize us, but transforms us; thus, such desire allows to question our self-perception and rebuild our self-centeredness (Wennerscheid, 2017). Moreover, Wennerscheid (2017) explained that the networks of desire that occur between humans and machines lead humans to perceive machines not as mere devices to use, but rather as affective objects that one can connect with, and love.

Some of the key factors of a satisfying human-human intimate relationship are engagement, trust and gratification. Lasting functionality, and having a history together, are also strong aspects that lead a human to form an attachment toward an object or another human (Carpenter, 2017). If a significant number of people arrive at a time when robot love can be compared to, and potentially resembles, human love, as Whitby (2012) argued, then it is legitimate to consider that the perception of love might change due to technological advances. But why consider the possibility of a humanoid-robot partner while there is still an

abundant number of people on earth? Does that depend on anthropomorphism, or the intelligence a robot has, or how close a robot is to being human-like?

In some cases, a humanoid-form is not even a factor in people being influenced by a non-living object. Robots can be influential on a personal worldview, as Joseph Weizenbaum asserted after observing participants being prompted following their interaction with his “psychotherapist bot ELIZA”. This was a program that is designed to imitate a therapy conversation (as cited in Darling, 2015). However, according to Turkle (2007), ELIZA only highlighted the lack of authenticity in human relationships—the participants did not care for an authentic interaction, only the act of sharing information gave comfort and meaning for them. Moreover, Turkle (2011) argued that the issue is not what robots can do, but in what ways humans are vulnerable to perceiving robots—regardless of whether the robots have intelligence or not, once attention and concern are given to an object, humans form a connection with the object. Again, this brings us to not what robots are capable of, but what humans are capable of choosing.

2.6. Human-Robot Sex

“Doll no More” in Tokyo is an escort service with robots working as sex-workers (as cited in Morsünbül, 2018). Another example is “Roxxxy”, a sex robot that has the closest human-like appearance compared to other robots with her customizable synthetic skin, facial features, and make-up; as well as an AI operator that enables her to learn her owner’s likes and dislikes to a certain degree (as cited in Morsünbül, 2018). Douglas Hines, the owner of the company True Companion that produced Roxxxy, said that he received around 4000 Roxxxy pre-orders at the Adult Entertainment Expo when the robot was first introduced (as cited in Morsünbül, 2018).

Bendel (2017) wrote that voice has been considered as the second factor among sexual characteristics which has the powerful function of starting an initial contact, being a primary aid for communication and creating a bond between partners, as well as a means of expressing sexual enjoyment. In the case of humanoid robots, Speech Synthesis Markup Language (SSML) can be used to assign voices differing from one another that speak at different tones, velocity, and intensity through changing and accustoming approximately 40 elements in SSML (Bendel, 2017). Some of the elements are supported by Amazon's AI program and IBM Watson (Bendel, 2017). Thus, SSML removes the rigidity in robot speech and makes a robot sound more human-like.

Considering human-robot sex, there are varying responses and opposing views, but supporting research in the HRI field inevitably guides one's thinking to consider the likeliness of a human-robot intimate relationship. According to Joanna J. Bryson (2010), a computer scientist from the University of Bath, robots are designed by humans and so robots should not be attributed any legal nor moral accountability and should remain as human property and continue their existence as slaves. It has been argued by Bryson and Kime, that extending ethical interest about robots and fear of robots are result of humankind's identity crisis, and the whimsical ascribing of empathy to robots (as cited in Bryson, 2010). Bryson (2010) claimed that working toward making robots closer to human entities is more revealing of the devaluation of humanity than its advancement. On the other hand, Leroux et al. asserted that robots should be assigned legal status as humans, but there should be special legal division dedicated to robot rights such as "electronic personhood" (as cited in Levy, 2016).

Trudy Barber, who is a "sexual futurologist" and a cybersexuality researcher, wrote of using the concept of love map to establish a modern understanding of sexuality, relationship concepts, as well as personality formation, by considering digital media influences on individuals (2016a; 2016b). While opponents of human-robot sex have argued that such an

encounter only resembles a “deviant form of social development,” an alternative argument is that robot-sex is an opportunity to explore more about sexuality, and also examine the fear humans have for engaging in unidirectional love (as cited in Barber, 2016b, p. 70).

2.7. Lovotics and Human-Robot Intimate Relationships

The term “Lovotics” stands for Love + Robotics, and is the name given to the field of research into human-robot relationships (Samani, 2011). The direction of robotics research and advancement, from service robots in industries, to healthcare providing and companion robots, has led to designing humanoid robots that can be partners and have intimate relationships with humans, as AI expert David Levy (2016) claimed at the Second International Conference that took place in London. Even though Lovotics research has challenged concepts such as our understanding of human love, robots’ capacity to love, human-robot sex, and the idea of human-robot marriage, experts have claimed that having a mutual understanding relationship with a loving, protective, respectful, complimentary, patient, humorous, and a kind robot is not a dream but an achievable goal through specifically designed software (Edirisinghe & Cheek, 2016; Levy, 2016). In addition to abstract concepts such as love, kindness, and humor, Levy also argued about the convenience of robots: robots can be customized to fit to individual sexual needs, robots stay free of sexually transmitted diseases, and robots potentially prevent the risks of losing reputation and/or respect that can be potentially caused by involvement in the sex industry (as cited in Maines, 2008). Yet McClelland (2017), a strong opponent of intimate human-robot relationships, claimed that satisfying sexual needs through “commercial sex workers” does not yield any new ethical problems but human-robot sex does.

Levy (2016) also reasoned that one can rely on the Turing Test for intelligence, and if a robot understands human behaviors, actions, speech, and intentions then humans should

accept the robot's capacity to understand the concept of marriage. Levy (2016) added that the concept of marriage for robots will not require a complicated system but only the ability to weigh the pros and cons for agreeing to marry with a human. Following Levy, there are three main explanations for how humans could love a robot: the first explanation is the possibility that the natural love occurring between humans takes place between a human and a robot; the second explanation is that people prefer to love a robot because of the robot's capacities; and the third explanation argues humans are so alienated and detached from social life, that they are looking for a substitute (as cited in Whitby, 2012). Edirisinghe, Cheok, and Khougali (2017) argued that robots will move into our lives on a large scale, compelling us to communicate more closely with them. Just as mobile phone technologies are constantly evolving, so robotics technologies will be constantly upgrading and forcing us to become attached to robot companions. As a natural response, human-robot relationships will change and develop depending on the amount of time spent with them, and the familiarity that comes with, and within, these interactions (Edirisinghe, Cheok, & Khougali, 2017). As Turkle also claimed, humans accept and adapt to technology and its advances, not because of technology's inevitable development, but because of its availability in everyday life and due to humans' continuing experience with it (as cited in Edirisinghe, Cheok, & Khougali, 2017; Payr, 2011; Verbeek, 2015). Yet, as Graaf pointed out, a human robot relationship would mostly depend on a unidirectional approach which would eventually cause too many expectations and lead to an unhealthy dependence (as cited in Edirisinghe, Cheok, & Khougali, 2017). Moreover, Carpenter (2017) claimed that robots cannot love as humans do, but robots will develop their own understanding of love and emotions in a robot centered way. Thus, even though a human may love a robot, he/she can receive love in turn, but not in a human-love form (Carpenter, 2017).

2.7.1. People's Attitudes Toward Human-Robot Intimacy. Surveys about human-robot sex in general do not suggest that people are in favor of the concept. A poll from the UK-based YouGov Omnibus research agency asked, "In 2030, do you think we will have robots that can do the following things?" and only 18% chose the option "have sex with humans" (as cited in McArthur, 2017). Also, the British newspaper The Sun carried out a poll for assessing opinions about human-robot sex as well as infidelity by asking "If it were possible for humans to have sex with robots, do you think that a person in an exclusive relationship who had sex with a robot would be cheating?" and the results revealed that 42% said "yes", 31% said "no," and 26% said "not sure" (as cited in McArthur, 2017).

MIT Technology Review conducted an attitude survey to measure people's responses about human-robot love and reported that 19% of the participants believed they could love a robot, 45% responded they could not, and 36% responded maybe they could; yet, when the participants were asked if a robot could love humans 36% said yes, 23% said no, and 41% said maybe (as cited in Cheok, Levy, & Karunanayaka, 2016).

Richards, Coss, and Quinn (2016) conducted a survey in the United States with 133 adult participants, 70 females and 63 males, analyzing the participants' relationship approaches in general as well as their fear of intimacy, fantasies, sexual experiences, sexual sensations, attitudes toward robots, and the likelihood that they would have sex with a robot by using Lawrence and Bryers' sexual satisfaction scale, Descutner and Thelen's fear of intimacy scale, the Negative Attitude toward Robots Scale (NARS), and the Likert-type scale. The results were as follows: there was a considerably positive correlation between sensation seeking and the likelihood of having sex with a robot, as well as between the fantasy item and the likelihood of having sex with robot; yet, there was a negative correlation between negative attitudes toward robots and the likelihood of having sex with robots (Richards et al., 2016). When we consider the possibility of participants being unfamiliar with advances in AI,

the field of robotics, and experience of one-to-one interaction with a robot, the research presented limitations, yet still lay the groundwork for future research and gave an idea of what the participants had in their minds regarding human-robot sex (Richards et al., 2016).

Arras and Cerqui (2005) conducted a survey at the Robotics exhibition at the Swiss National Exhibition Expo .02 with over 2000 participants, 56% male and 44% female, about people's willingness to share their life and body with robots. The questionnaire covered issues about robotics in general, service robots, personal robots, as well as robotic prosthetic devices and artificial organs (Arras & Cerqui, 2005). The results yielded a positive approach toward robots in various domains. The results related to human-robot intimate relationship were a combination of both positive and negative responses: regarding the robots' contribution to personal well-being, 69% of the participants were positive; regarding robots contributing to happiness, only 28% of the participants were positive; and when asked whether robots should have a human appearance, only 19% were positive toward such an idea, 47% were negative, and 35% were unsure (Arras & Cerqui, 2005).

A pilot study in a quantitative form made by Edirisinghe and Cheok (2016) measured the perceptions of 32 adults, 16 males and 16 females, by asking them to engage in a scheme using their own ideas and reasoning, supported by stimulating questions in addition to using the Guttman scale. They measured the attitudes of the participants toward human-robot interaction in general and toward having an intimate relationship with a robot in a hierarchical concept based on awareness and building up to intimacy criteria (Edirisinghe & Cheok, 2016). The results were as follows: 80% of the participants were aware of the possibility of having a robot as a companion; 64% of the participants could imagine being in a close association with a robot, and 55% of the participants reported that they saw robots as enjoyable and entertaining (Edirisinghe & Cheok, 2016).

Furthermore, 28% of the participants favored the idea of being emotionally attracted toward a robot, and sub-dimensions of 46% gave a positive response to the idea of a person being emotionally attracted to a robot but only 9% gave a positive response for being emotionally attracted personally toward a robot (Edirisinghe & Cheok, 2016). Moreover, 25% of the participants responded positively toward the idea of intimacy with a robot (Edirisinghe & Cheok, 2016). Among this 25%, 28% were positively regarding an intimate relationship with a robot, 35% had a positive perception of robot-love, and 23% were positive toward understanding sensual feelings for a robot, but only 15% were positive toward having sex with a robot (Edirisinghe & Cheok, 2016). According to the results obtained from the pilot study, most of the participants were open to the ideas of emotionally bonding with and attraction to robots but only when they themselves were not included in the scenario; also, emotional involvement was favored over physical involvement with a robot (Edirisinghe & Cheok, 2016).

Scheutz and Arnold (2017) collected the results of their survey about human-robot sex from 203 participants aged between 18 and 63 consisting of 84 females and 114 males using Amazon Mechanical Turk (AMT); 5 responses were excluded due to missing data. The results were as follows: 86% agreed that robots can be designed to satisfy human sexual desire, 53% agreed that robots can adopt human behavior and 20% agreed that robots can recognize human emotions (Scheutz & Arnold, 2017). Moreover, when the participants were questioned about the advantages of human-robot sex, the results were as follows: 92% agreed there would be no transmission of STD, 80% agreed on the availability of sex anytime, 72% agreed that there would be no psychological impact on the robot partner, 62% agreed that the robot would not experience physical pain, and 59% agreed that robots would provide companionship to humans (Scheutz and Arnold, 2017).

Regarding the disadvantages of human-robot sex, the participants responded as follows: 70% agreed that robots can harm human-human relationships, 68% agreed that robot-sex can be addictive, 66% agreed that robots can create unrealistic expectations among humans, 58% agreed that robots can hurt humans in the event of malfunctioning, 40% agreed that emotional bonds can be formed outside the limits of sexual experience, and 32% agreed that robots could be too good and make humans never go back to their own kind (Scheutz and Arnold, 2017). Furthermore, for the questions measuring the general view of sex robots, the participants responded as follows: 71% agreed that having sex with a robot does not pose a legal threat, 62% agreed that sex robots cannot be subject to being raped, 50% agreed that humans can fall in love with robots, 47% agreed that a sex robots should be obedient and totally compliant, 44% agreed that a sex-robot should be used solely for sex, 42% agreed that violent actions toward a robot are permissible, 40% agreed that humans cannot be cheated with a sex-robot, 37% agreed that people would consider a sex-robot in place of a human lover, and 30% agreed that sex with a sex-robot does not count as a real sex (Scheutz and Arnold, 2017).

As Rousi (2017) claimed, the concept of love is quite diverse and immeasurable which makes it even harder when it is applied to robots; thus, the experience of love between humans and robots might face considerable challenges. From an evolutionary perspective of love, humans are prone to choose their mates in according to their health and flawlessness of their physical appearance (Rousi, 2017). The concepts of health and flawlessness brings to mind the design of robots and the possibility of such flawless appearance in human perception when robots are designed in such a way. It is arguable if humans have the evolutionary tendency to outreach to the best designed partner even though that partner is a man-made partner.

2.7.2. HRI Studies for Human-Robot Intimacy. Regarding the intimacy factor between humans and robots, Jinnai et al. claimed that the level of intimate communication increases as the robot resembles human characteristics more (as cited in Edirisinghe, Cheok, & Khougali, 2017). Edirisinghe et al. (2017) suggested that increased contact with robots will eventually lead to a change in the human perception of human-robot intimacy. Their study focused on understanding the human perceptions of connection with a robot, as well as measuring physical response through electrodermal activity (EDA) during human-robot interaction. In the first part of the study, twenty adult participants filled out questionnaires measuring their levels of awareness, association, enjoyment, attraction, and intimacy regarding robots in general. In the second part, their physical responses when touching various parts of a robot were measured (Edirisinghe et al., 2017). The results yielded that the participants had a high level of awareness toward the robot (91.25%), yet low levels of preference (24.86%) for the idea of becoming intimate with the robot (Edirisinghe et al., 2017). In addition, the average responses of the participants recorded when touching the robot's head produced 0.498 EDA, touching the robot's inner thigh produced 0.460 EDA, and during the robot's dancing produced 0.499 EDA (Edirisinghe et al., 2017). Yielding different results from Jinnai et al., Edirisinghe et al. (2017) drew a new conclusion about the idea of intimacy with robots, which is that the enjoyment factor might be stronger than the intimacy factor in human-robot interactions. However, further research is needed with more participants involved.

2.7.3. The Lovotics Robot and Human-Robot Love. The push-pull mechanism, which is applicable to human love as well as to social life, stimulates the reward and motivation pathways in the human brain, thus leading humans to withdraw interest from an object that provided negative stimuli, and to become motivated toward an object that provides

positive stimuli (as cited in Samani & Saadatian, 2012). Such an increase in the motivation source eventually creates a bond with the object that provides the positive stimuli (as cited in Samani & Saadatian, 2012). Samani (2011) pointed to an additional support from the cognitive perspective of love: as psychologist Erich Fromm suggested, love is a skill that can be learned, taught, and practiced. On the contrary, if a human cannot learn how to maintain relationships and lacks the necessary skills this would lead to feeling lonely; hence, as a result, feeling lonely can motivate a human to prefer human-robot intimacy instead of striving to build a human-human intimate relationship (Morsünbül, 2018).

Samani's (2011) proposed Lovotics robot has four input modules capturing sensory data including touch, sound, vision, and movement. After pre-processing the sensory data, the Lovotics robot sends the data to an AI module that calculates the robot's affective state, hormonal levels, and the probability of love. Unlike a sentient being, Samani (2011) claimed that the "love" between the Lovotics robot and a human would take place by centering around the human's feelings and depends on the degree of the human's belief that they are loved by the robot which simulates love.

Specifically, the advanced AI system the Lovotics robot maintains has three modules: a) the Probabilistic Love Assembly (PLA) relies on computing the psychology of love such as repeated exposure, propinquity, desirability, similarity, attraction, and attachment; b) the Artificial Endocrine System (AES) mirrors the human endocrine system and translates into an artificial module that is dynamic and changes response according to interactions and situations; and c) and the Affective State Transition (AST) module provides an analysis of facial expressions, voice, and gesture, thus a human's emotional as well as mental state (Samani & Saadatian, 2012; Samani, 2011).

Trust is also important in human-robot interactions. Robots have greater differences from other autonomous systems and non-embodied AI; hence the trust factor between humans and robots varies, as humanoid forms can affect the degree of trust (Hancock et al., 2011). However, at some point, even a robot's ability to love might have little importance. As Whitby (2012) pointed out, the issue revolves around how humans behave. A human's behavior is delineated by what she/he believes, and if a human believes that she/he and the robot are having a love relationship based on the robot's infinite patience and abundant capacity to provide things, the arrow is pointed at humans' personalities and the effect of human personalities on making such a decision.

2.8. Personality Factors and Human-Robot Interactions

As has been mentioned previously, humans tend to attribute human characteristics to non-living things. Also, people were more likely to attribute personalities and mental states to social robots that resemble human characteristics (as cited in De Graaf & Allouch, 2013). The more a robot has a human-like appearance, the more people perceived it as intelligent (as cited in De Graaf & Allouch, 2013). Cuijpers, Bruna, Ham, and Torta suggested that people liked a robot more and perceived it as being more real when they evaluated the robot as an intelligent being (as cited in De Graaf & Allouch, 2013). In other words, a more intelligent robot increases the human's perception that the robot has personalities and human-like. Personality dimensions also influence the way people perceive the humanoid-robots as we will examine in the following paragraphs following the description of the Big-Five Personality dimensions.

2.8.1. The Big-Five Personality Dimensions. Following the results of decades of cumulative research, the field of psychology found a common means of indicating the

characteristic differences among people by deriving dimensions from analyses of terms people used to describe themselves, as well as others, around them; and these dimensions are known as the Big-Five personality dimensions (John, Naumann, & Soto, 2008). Without replacing previous theories and proposed dimensions, the Big-Five integrated all the dimensions that had been proposed and suggested a diverse and prevalent concept (John, Naumann, & Soto, 2008). The generalizability of personality dimensions among people with diverse cultural backgrounds and languages is important when evaluating personality differences, and the Big Five personality dimensions give accurate results across diverse samples as well as within the methodologically different studies (as cited in John, Naumann, & Soto, 2008).

The Big-Five Personality Dimensions consist of five dimensions: Openness to experiences, which covers a person's level of creativeness and curiosity; Conscientiousness, which covers a person's degree of feeling responsible, attentiveness, organized behavior at the high end and the degree of feeling irresponsible, careless, and deceptiveness at the low end; Extraversion, which covers a person's personality as outgoing, active, and courageous at the high end and as quite, compliant and shy at the low end; Agreeableness, which implies a person's easy-going, supportive, and forgiving nature as well as her/his mindfulness at the high end and stubbornness, aggressiveness, and negative manners at the low end; and Neuroticism, which pinpoints a person's anxiety, irritability, and sense of insecurity at the high end and emotional stability and calmness at the low end (Holland & Roisman, 2008; McCrae & Costa, 2010). The Big-Five Personality dimensions have been measured in HRI studies as well to see if humans interact with robots, mostly humanoid robots, in the same way they interact with other humans.

2.8.2. The Big-Five Personality Dimensions in HRI Studies. Fraune, Sherrin, Šabanović, and Smith (2015) studied humans' perception of robots considering attitudes, emotions, and stereotypes by presenting several robot videos to the participants, followed by standard questionnaires and direct question-answer methods. For measuring attitudes, they used the NARS; for examining emotions toward robots, the researchers used direct question and answers methods; and for measuring stereotypes, they used the Big-Five Personality Questionnaire and Godspeed Questionnaire subscales including anthropomorphism, animacy, likability, perceived intelligence, and perceived safety (Fraune, et al., 2015). The findings suggested that the participants showed more negative attitudes and negative emotions toward robots when the robots appeared as a group, than they did when the robot appeared by itself (Fraune et al., 2015). The exception was the humanoid robot NAO, where the participants were more negative toward a single NAO than they were to a group of NAOs (Fraune et al., 2015). The result potentially suggested that humans perceive a single robot as being controllable, safe, and useful, whereas they perceive a group of robots as a potential danger. Regarding the Big-Five Personality dimensions applied in the study, only the agreeableness item showed a difference in the way that the participants perceived Pleo, a dinosaur robot, as more agreeable than NAO, a humanoid robot (Fraune et al., 2015). Following the study results, Fraune et al. (2015) suggested that three main factors influence the way people think about robots: these are level of perceived sociality, intergroup dynamics, and anthropomorphism.

Park, Jin, and del Pobil (2012) conducted a study with 120 Native Korean participants, 60 males and 60 females, in which they measured the participants' level of extroversion and administered trials with the robot "Kismet", which had a pre-programmed personality trait of either extroversion or introversion. Kismet has a human-like mouth, lips, and eyes, but no ears, and is capable of making several facial expressions (Park, Jin, & del Pobil, 2012). In the

extroversion program, Kismet stared directly at the participant and gave direct responses; whereas in the introvert program Kismet avoided eye contact on most occasions and did not respond to the participant right away (Park, Jin, & del Pobil, 2012).

Results showed that extroverted individuals reported significantly higher levels of feeling friendly toward Kismet, having deeply-engaging interaction with Kismet, as well as an anthropomorphism tendency, compared to introvert individuals (Park, Jin, & del Pobil, 2012). Moreover, the extrovert participants interacting with the extrovert robot, reported higher levels of friendliness and anthropomorphism, and no difference in deeply-engaging interaction compared to those who had interacted with the introvert robot (Park, Jin, & del Pobil, 2012). Furthermore, the introverted participants reported higher levels of friendliness and deeply engaging interaction when they interacted with the introvert robot (Park, Jin, & del Pobil, 2012). Overall, the study suggested that the participants preferred the robot that carried similar personality characteristics to them, over the robot that carried opposite personality characteristics (Park, Jin, & del Pobil, 2012). Just as in human interactions, the participants favored a robot that was similar to them in personality.

After studying the relationship of robot-personality and human-personality by measuring 18 participants' eye sight and vision direction via automatic recording, Celiktutan and Gunes claimed that there was a significant correlation of the participants' extroversion and agreeableness traits, when interacting with an extrovert robot, whereas no correlation was found with the interaction with an introvert robot (as cited in Salam et al., 2017). Drawing from this result, Salam et al. (2017) carried out a study in which they examined the participants' body activities and interpersonal aspects, including physical distance and attention, during their interaction with the humanoid-robot NAO. Also, Salam et al. (2017) measured the participants' Big-Five personalities to demonstrate the role of the Big-Five personality dimensions in human-robot relationship. The study results yielded that there was a

statistically significant positive correlation between overall engagement and four of the Big Five personality dimensions: overall engagement and extroversion dimension ($r = .44$), overall engagement and conscientiousness ($r = .24$), overall engagement and agreeableness ($r = .11$), and overall engagement and openness ($r = .05$); however, there was a negative correlation, with no statistical significance, between overall engagement and neuroticism ($r = -.11$) (Salam et al., 2017). Moreover, the extroversion dimension was the most controlling dimension in the study with the findings indicating that the extrovert participants tended to talk with NAO more and for longer periods of time compared to the introvert participants (Salam et al., 2017).

3. Methodology

The previous chapter presented the current state of research in HRI studies, attitude surveys about robots and human-robot intimate relationships, as well as the implications of feelings and intimacy between humans and robots regarding the accelerated advancement in the field of AI and robotics. Some of the research results suggested that participants were influenced by robots, whereas in some of the studies the participants were connected and felt intimacy toward the robot subjects. These results potentially rule out claims that human-robot relationships, and human-robot sex, as well as the intimacy that potentially arises from it, are impossible. Personality characteristics that are simulated by robots in human-robot interactions impacted the overall relationship and communication between human and robot subjects. In addition to the impact of personality dimensions on human-robot interactions and human-robot intimacy, other factors were also influential, such as self-identified gender and culture (western or non-western). After reading the claims made by Cheek, Levy, and Karunanayaka (2016) about human-robot love, possible human-robot sexual interaction, and human-robot marriage, the author decided to discover what attitudes people have toward human-robot intimate relationships, and the possible role of aspects of personality in making this decision. The possible effects of socio demographical variables such as self-identified gender and culture were also considered.

3.1. Participants

The sample size for the Lovotics and the Big-Five research consisted of 254 undergraduate students: 174 females (~68%), 70 males (~28%), and 10 identified as “prefer not to say” (~4%) (see Table 1 & Figure 1). The age range for the participants was from 17 to 54 ($M= 22,88$, $SD= 5,181$) (see Table 2 & Figure 2). The participants came from various nationalities but mostly consisted of 92 Turkish participants (~%36) and of 54 Italian

participants (~%21) (see Figure 3). The culture configuration for the participants were made manually. Participants who were from one of the countries following were considered to be non-Western: Armenia, Azerbaijan, Egypt, India, Japan, Kazakhstan, Kyrgyzstan, Malaysia, Mauritius, Mongolia, Pakistan, Sri Lanka, and Uzbekistan were grouped under non-Western countries. Participants who were from one of the following countries were considered to be Western: Albania, Belgium, Bolivia, Croatia, Cyprus, Czech Republic, France, Germany, Jamaica, Guatemala, Italy, Luxembourg, Poland, Romania, Russia, Salvador, Slovakia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, and the United States of America. The number of participants from the West were significantly higher than the non-Western participants, 207 (~%81) and 47 (~%19), respectively (see Table 3 & Figure 4).

3.2. Inventories

The inventories used in the Lovotics and the Big-Five research were the Attitudes Toward Human-Robot Intimate Relationship Questionnaire (INT-RO 1) and the Big-Five Inventory (BFI).

3.2.1. Attitudes Toward Human-Robot Intimate Relationship Questionnaire (INT-RO 1). There was no readily available questionnaire that measures the construct, which is attitudes toward human-robot intimate relationship. Thus, after reviewing relevant literature about the topic, the author decided to prepare a questionnaire about attitudes toward human-robot intimate relationship which also included general attitudes toward humanoid robots to some extent. The questionnaire that has been prepared for the purpose of conducting Lovotics and the Big-Five research is called the Attitudes Toward Human-Robot Intimate Relationship Questionnaire (INT-RO 1).

INT-RO-1 is a 5-point Likert scale inventory. The author abbreviated the questionnaire name to INT-RO-1, which stand for Intimate Robots 1. The number 1 was used

in order to differentiate the scale from the other scales that could possibly follow this preliminary study and be advanced in a future study which could be conducted for the INTRO scale itself. The operational definition for the construct the INT-RO-1 intended to measure is the participants' positive attitudes toward human-robot relationship. The higher a participant scored, the more positive attitude that participant had. The INT-RO-1 consisted of 22 items. Considering that it is 5-point Likert scale, the highest score a participant could get in total was 110 and the lowest score a participant could get was 22. The division score between having a positive attitude toward a human-robot intimate relationship and having a negative attitude toward a human-robot intimate relationship was 66, which, as in the Likert-scale, corresponded to 'Neither Agreed nor Disagreed'. Therefore, participants who scored between 22 and 66 were considered to have a negative attitude toward human-robot intimate relationship whereas the participants who scored between 66 and 110 were considered to have a positive attitude toward human-robot intimate relationship.

The INT-RO-1 had four subscales. The distribution of INT-RO-1 items into subscales was not even, so for each subscale the minimum and the maximum differed. The Acceptance Subscale intended to measure the participants' attitudes toward accepting human-robot intimacy (items 1, 2, 3, 14, 15, 16, 21, & 22). The maximum score a participant could get from the Acceptance subscale could be 40 whereas the minimum score could be 8. The Trust Subscale intended to measure participants' attitudes on trusting humanoid-robots in daily life (items 4, 5, 6, 7, & 8). The maximum score a participant could get from the Trust subscale could be 25 whereas the minimum score could be 5. The Human-Robot Sexuality Subscale intended to measure the participants' attitudes toward human-robot sexuality (items 9, 12, & 19). The maximum score a participant could get from the Sexuality subscale could be 15 whereas the minimum score could be 3. The Human-Robot Intimacy Subscale intended to measure the participants' attitudes toward human-robot intimate relationship (items 10, 11,

13, 17, 18, 19, & 20). The maximum score a participant could get from the Intimacy subscale could be 35 whereas the minimum score could be 7. The INT-RO-1 had no reverse scoring (see Appendix A).

3.2.2. The Big-Five Inventory (BFI). The Big-Five Inventory (BFI) is a 5-point Likert scale and consists of 44 items with 5 subscales. The Extraversion subscale consisted of 9 items (items 1, 6, 11, 16, 21, 26, 31, & 36) with items 6, 21, and 31 reverse scored. The Agreeableness subscale consisted of 9 items (items 2, 7, 12, 17, 22, 27, 32, 37, & 42) with items 2, 12, 27, and 37 reverse scored. The Conscientiousness subscale consisted of 9 items (items 3, 8, 13, 18, 23, 28, 33, 38, & 43) with items 8, 18, 23, and 43 reverse scored. The Neuroticism subscale consisted of 8 items (items 4, 9, 14, 19, 24, 29, 34, & 39) with items 9, 24, and 34 reverse scored. The Openness subscale consisted of 10 items (items 5, 10, 15, 20, 25, 30, 35, 40, 41, & 44) with items 35 and 41 reverse scored (see Appendix A).

John, Naumann, and Soto (2008) developed the Big Five Inventory (BFI), which consists of 44 items, by representing the core aspects of the personality dimensions gathered through previous research and then selecting final items from the factor analyses of large samples. Creating a brief inventory paved the way for assessing participants for their personality dimensions in an efficient way. Considering the limited time spared for this research, the author has used the BFI questionnaire, which is brief, relevant, and reliable for measuring the Big-Five personality dimensions along with the 254 undergraduate students' attitudes about human-robot intimate relationship.

Even though the BFI consists of 44 questions, pointing to ten items, it has fine psychometric properties in which it does not limit the content inclusion—among samples from U.S. and Canada, alpha reliability of the BFI scored between .75 and .90 with an average of over .80 (John et al., 2008). Additionally, reliability results from the test-retest done over three months gave results ranging from .80 to .90 with an average of .85 (as cited in

John et al., 2008). Moreover, Hampson and Goldberg reported a test-retest stability mean score of .74 as well as stability correlations of .79 for Openness and Extraversion, .70 for Conscientiousness, Neuroticism, and Agreeableness (as cited in John et al., 2008). John and Soto conducted an experiment with 829 participants at Berkeley, the University of California, using completion of the three Big-Five self-reports, and the results yielded that 8-item TDA scale had mean alpha score of .84, the 9-item BFI scale had a mean alpha score of .83, and 12-item NEO-FFI scale had mean alpha score of .81 (as cited in John et al., 2008).

3.3. Procedure

The response collection method included sharing the link to the Google Forms for Lovotics and the Big-Five research on the website LinkedIn (see Figure 5), distributing the link by hand in University of New York in Prague (see Figure 6), and sharing the link via personal contacts in Turkey and in Italy. The questionnaire booklet was prepared online using Google Forms. The link to the Lovotics and the Big-Five Questionnaire is: <http://bit.ly/lovotics>. The option to limit one response per participant was used while preparing the Google Forms in order to prevent receiving duplicate responses from the same participant. The questionnaire consisted of five sections. The first section was the consent form that informed the participant about the study. In order to further proceed to the study, the participant had to agree that she or he understood all the conditions regarding the research and voluntarily agreed to participate. The second section included the Attitudes Toward Human-Robot Intimate Relationship Questionnaire (INT-RO 1). The third section included the Big Five Inventory. The fourth section included the demographic survey. Finally, the fifth section included a brief “thank you” message (see Appendix A).

The collected data was processed with IBM’s Statistical Package for the Social Sciences (SPSS) program using several analyses. These analyses included: frequency results

for the INT-RO-1 scores in percentages; descriptive statistics for the INT-RO-1 and the BFI; a one-way repeated measures General Linear Model analyses of variance test (ANOVA) for the INT-RO-1 subscales to explore the effect of the different self-identified genders on attitudes toward human-robot intimate relationship scores; ANOVA analyses for the INT-RO-1 subscales to explore the effect of culture of the participants; multiple regression analyses to see the effects of the Big-Five personality dimensions (BFI scores) on each attitude toward human-robot intimate relationship subscales (INT-RO-1); and multiple regression analyses to see the effects of attitudes toward human-robot intimate relationship scores (INT-RO-1) on the Big-Five personality dimensions.

4. Results

4.1. Response Percentages of the Participants for Each INT-RO-1 Item

The first item for the INT-RO-1 was, “In the near future, humanoid-robots will be indistinguishable from humans the way they look and behave.” For this item, the results were as follows: 27% disagreed (~8% “Disagreed Strongly” and ~19% “Disagreed a Little”), ~21% “Neither Agreed nor Disagreed,” and 52% agreed (~35% “Agreed a Little” and ~17% “Strongly Agreed”) (see Figure 7).

The second item for the INT-RO-1 was, “In the near future, humanoid-robots will be indistinguishable from humans by the way they reason and think.” For this item, the results were as follows: 43% disagreed (~19% “Disagreed Strongly” and ~24% “Disagreed a Little”), ~24% “Neither Agreed nor Disagreed,” and 34% agreed (~25% “Agreed a Little” and ~9% “Strongly Agreed”) (see Figure 8).

The third item for the INT-RO-1 was, “Humanoid-robots could be a part of everyday human life.” For this item, the results were as follows: 9% disagreed (~3% “Disagreed Strongly” and ~6% “Disagreed a Little,” ~18% “Neither Agreed nor Disagreed,” and 74% agreed (~33% “Agreed a Little” and ~41% “Strongly Agreed”) (see Figure 9).

The fourth item for the INT-RO-1 was, “A human could trust a humanoid-robot.” For this item, the results were as follows: 35% disagreed (~13% “Disagreed Strongly” and ~22% “Disagreed a Little,” ~29% “Neither Agreed nor Disagreed,” and 36% agreed (~24% “Agreed a Little” and ~12% “Strongly Agreed”) (see Figure 10).

The fifth item for the INT-RO-1 was, “A human could trust a humanoid-robot for taking care of one’s child.” For this item, the results were as follows: 61% disagreed (~34%

“Disagreed Strongly” and ~27% “Disagreed a Little”), ~15% “Neither Agreed nor Disagreed” and 23% agreed (~17% “Agreed a Little” and ~6% “Strongly Agreed”) (see Figure 11).

The sixth item for the INT-RO-1 was, “A human could trust a humanoid-robot for taking care of one’s pet.” For this item, the results were as follows: 39% disagreed (~17% “Disagreed Strongly” and ~22% “Disagreed a Little”), ~23% “Neither Agreed nor Disagreed,” and 38% agreed (~24% “Agreed a Little” and ~14% “Strongly Agreed”) (see Figure 12).

The seventh item for the INT-RO-1 was, “A human could trust a humanoid-robot for taking care of the elderly.” For this item, the results were as follows: 50% disagreed (~26% “Disagreed Strongly” and ~24% “Disagreed a Little”), ~16% “Neither Agreed nor Disagreed,” and 34% agreed (~25% “Agreed a Little” and ~9% “Strongly Agreed”) (see Figure 13).

Item eight for the INT-RO-1 was, “A human could trust a humanoid-robot as an intimate partner.” For this item, the results were as follows: 63% disagreed (~42% “Disagreed Strongly” and ~21% “Disagreed a Little”), ~19% “Neither Agreed nor Disagreed,” and 18% agreed (~12% “Agreed a Little” and ~6% “Strongly Agreed”) (see Figure 14).

The ninth item for the INT-RO-1 was, “In the near future, human-robot sex could be a part of some people’s daily life.” For this item, the results were as follows: 35% disagreed (~22% “Disagreed Strongly” and ~13% “Disagreed a Little”), ~24% “Neither Agreed nor Disagreed,” and 41% agreed (~25% “Agreed a Little” and ~16% “Strongly Agreed”) (see Figure 15).

The tenth item for the INT-RO-1 was, “Some people could become attracted to a humanoid-robot.” For this item, the results were as follows: 22% disagreed (~13% “Disagreed Strongly” and ~9% “Disagreed a Little”), ~26% “Neither Agreed nor Disagreed,” and 52% agreed (~32% “Agreed a Little” and ~20% “Strongly Agreed”) (see Figure 16).

Item 11 for the INT-RO-1 was, “A humanoid-robot could become attracted to a human.” For this item, the results were as follows: 50% disagreed (~35% “Disagreed Strongly” and ~15% “Disagreed a Little”), ~26% “Neither Agreed nor Disagreed,” and 24% agreed (~15% “Agreed a Little” and ~9% “Strongly Agreed”) (see Figure 17).

Item 12 for the INT-RO-1 was, “In the near future, human-robot sex could be indistinguishable from human-human sex.” For this item, the results were as follows: 57% disagreed (~37% “Disagreed Strongly” and ~20% “Disagreed a Little”), ~24% “Neither Agreed nor Disagreed,” and 19% agreed (~13% “Agreed a Little” and ~6% “Strongly Agreed”) (see Figure 18).

Item 13 for the INT-RO-1 was, “Humanoid-robots could be capable of satisfying human emotional needs.” For this item, the results were as follows: 49% disagreed (~22% “Disagreed Strongly” and ~27% “Disagreed a Little”), ~21% “Neither Agreed nor Disagreed,” and 30% agreed (~22% “Agreed a Little” and ~8% “Strongly Agreed”) (see Figure 19).

Item 14 for the INT-RO-1 was, “Humanoid-robots could be so desirable that some people might give up having a human partner.” For this item, the results were as follows: 41% disagreed (~21% “Disagreed Strongly” and ~20% “Disagreed a Little”), ~24%

“Neither Agreed nor Disagreed,” and 35% agreed (~25% “Agreed a Little” and ~10% “Strongly Agreed”) (see Figure 20).

Item 15 for the INT-RO-1 was, “Humans should have the right to marry their humanoid-robot partner.” For this item, the results were as follows: 52% disagreed (~39% “Disagreed Strongly” and ~13% “Disagreed a Little”), ~24% “Neither Agreed nor Disagreed,” and 24% agreed (~17% “Agreed a Little” and ~7% “Strongly Agreed”) (see Figure 21).

Item 16 for the INT-RO-1 was, “Humanoid-robots could be a part of my everyday life.” For this item, the results were as follows: 38% disagreed (~25% “Disagreed Strongly” and ~13% “Disagreed a Little”), ~23% “Neither Agreed nor Disagreed,” and 39% agreed (~23% “Agreed a Little” and ~16% “Strongly Agreed”) (see Figure 22).

Item 17 for the INT-RO-1 was, “I could become attracted to a humanoid-robot.” For this item, the results were as follows: 72% disagreed (~54% “Disagreed Strongly” and ~18% “Disagreed a Little”), ~14% “Neither Agreed nor Disagreed,” and 14% agreed (~8% “Agreed a Little” and ~6% “Strongly Agreed”) (see Figure 23).

Item 18 for the INT-RO-1 was, “A humanoid-robot could become attracted to me.” For this item, the results were as follows: 63% disagreed (~44% “Disagreed Strongly” and ~19% “Disagreed a Little”), ~23% “Neither Agreed nor Disagreed,” and 14% agreed (~7% “Agreed a Little” and ~7% “Strongly Agreed”) (see Figure 24).

Item 19 for the INT-RO-1 was, “In the near future, human-robot sex could be a part of my daily life.” For this item, the results were as follows: 79% disagreed (~65%

“Disagreed Strongly” and ~14% “Disagreed a Little”), ~11% “Neither Agreed nor Disagreed,” and 10% agreed (~7% “Agreed a Little” and ~3% “Strongly Agreed”) (see Figure 25).

Item 20 for the INT-RO-1 was, “A humanoid-robot could satisfy my emotional needs.” For this item, the results were as follows: 69% disagreed (~51% “Disagreed Strongly” and ~18% “Disagreed a Little”), ~18% “Neither Agreed nor Disagreed,” and 13% agreed (~9% “Agreed a Little” and ~4% “Strongly Agreed”) (see Figure 26).

Item 21 for the INT-RO-1 was, “Humanoid-robots could be so desirable that I might give up having a human partner.” For this item, the results were as follows: 85% disagreed (~69% “Disagreed Strongly” and ~16% “Disagreed a Little”), ~10% “Neither Agreed nor Disagreed,” and 5% agreed (~3% “Agreed a Little and ~2% “Strongly Agreed”) (see Figure 27).

The final item, item 22, for the INT-RO-1 was, “If I found out that my intimate partner was engaging in an intimate relationship with a humanoid-robot, I would consider that infidelity.” For this final item, the results were as follows: 35% disagreed (~21% “Disagreed Strongly” and ~14% “Disagreed a Little”), ~20% “Neither Agreed nor Disagreed; 44% agreed (~17% “Agreed a Little” and ~27% “Strongly Agreed”) (see Figure 28).

4.2. Descriptive Statistics of the INT-RO-1

4.2.1. Descriptive Statistics of the INT-RO-1 Total. The total average score of the attitudes toward human-robot intimate relationship ($M = 57.8$) was slightly lower than the median score ($Mdn = 58$). The minimum score of the INTRO-1 was 22 and the maximum score 110. The standard deviation for the INTRO-1 was 16.52 ($SD^2 = 272.87$) (see Table 4).

The INTRO-1 scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 5).

4.2.2. Descriptive Statistics of the INT-RO-1 Trust Subscale. The average score for the trust toward humanoid-robots ($M = 13.2$) was slightly higher than the median score ($Mdn = 13$). The minimum score of the INT-RO-1 Trust Subscale was 5 and the maximum score 25. The standard deviation for the INTRO-1 Trust Subscale was 5.3 ($SD^2 = 28.1$) (see Table 6). The INT-RO-1 Trust Subscale scores were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 7).

4.2.3. Descriptive Statistics of the INT-RO-1 Sexuality Subscale. The average score for the attitudes toward human-robot sexuality was ($M = 6.98$), which equaled to the median score ($Mdn = 7$). The minimum score of the INT-RO-1 Sexuality Subscale was 3 and the maximum score 15. The standard deviation for the INTRO-1 Sexuality Subscale was 2.98 ($SD^2 = 8.9$) (see Table 8). The INT-RO-1 Sexuality Subscale scores were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 9).

4.2.4. Descriptive Statistics of the INT-RO-1 Intimacy Subscale. The average score for the trust in humanoid-robots ($M = 14.6$) was slightly higher than the median score ($Mdn = 14$). The minimum score of the INT-RO-1 Intimacy Subscale was 6 and the maximum score 30. The standard deviation for the INTRO-1 Intimacy Subscale was 5.3 ($SD^2 = 28.1$) (see Table 10). The INT-RO-1 Intimacy Subscale scores were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 11).

4.2.5. Descriptive Statistics of the INT-RO-1 Acceptance Subscale. The average score for the acceptance of humanoid-robots ($M = 23.1$) was slightly higher than the median score ($Mdn = 23$). The minimum score of the INT-RO-1 Acceptance Subscale was 8 and the maximum score 40. The standard deviation for the INTRO-1 Acceptance Subscale was 5.7

($SD^2 = 32.9$) (see Table 12). The INTRO-1 Acceptance Subscale scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 13).

4.3. Descriptive Statistics of the BFI Scores

4.3.1. Descriptive Statistics of the BFI Extraversion Subscale. The average score for the BFI Extraversion Subscale ($M = 25.60$) was slightly higher than the median score ($Mdn = 25.50$). The minimum score of the BFI Extraversion Subscale was 12 and the maximum score 38. The standard deviation for the BFI Extraversion Subscale was 4.84 ($SD^2 = 23.47$) (see Table 14). The BFI Extraversion Subscale scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 15).

4.3.2. Descriptive Statistics of the BFI Agreeableness Subscale. The average score for the BFI Agreeableness Subscale ($M = 32.28$) was slightly higher than the median score ($Mdn = 32$). The minimum score of the BFI Agreeableness Subscale was 18 and the maximum score 45. The standard deviation for the BFI Agreeableness Subscale was 4.97 ($SD^2 = 24.75$) (see Table 16). The BFI Agreeableness Subscale scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 17).

4.3.3. Descriptive Statistics of the BFI Conscientiousness Subscale. The average score for the BFI Conscientiousness Subscale ($M = 30.24$) was slightly higher than the median score ($Mdn = 30$). The minimum score of the BFI Conscientiousness Subscale was 14 and the maximum score 44. The standard deviation for the BFI Conscientiousness Subscale was 5.43 ($SD^2 = 29.5$) (see Table 18). The BFI Conscientiousness Subscale scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 19).

4.3.4. Descriptive Statistics of the BFI Neuroticism Subscale. The average score for the BFI Neuroticism Subscale ($M = 25.23$) was slightly higher than the median score ($Mdn = 25$). The minimum score of the BFI Neuroticism Subscale was 8 and the maximum score 40.

The standard deviation for the BFI Neuroticism Subscale was 5.88 ($SD^2 = 34.6$) (see Table 20). The BFI Neuroticism Subscale scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 21).

4.3.5. Descriptive Statistics of the BFI Openness Subscale. The average score for the BFI Openness Subscale ($M = 36.22$) was slightly higher than the median score ($Mdn = 36$). The minimum score of the BFI Openness Subscale was 18 and the maximum score 49. The standard deviation for the BFI Openness Subscale was 5.23 ($SD^2 = 27.32$) (see Table 22). The BFI Openness Subscale scores were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 23).

4.4. ANOVA Analyses for INT-RO-1 Subscales for Different Self-Identified Genders

4.4.1. The INT-RO-1 for Different Self-Identified Genders. The total average score of the attitudes toward human-robot intimate relationship for females ($M = 54.8$) was slightly lower than the median score ($Mdn = 55$). The minimum score of the INTRO-1 for females was 22 and the maximum score 97. The standard deviation for the INTRO-1 for females was 15.56 ($SD^2 = 242$). The total average score of the attitudes toward human-robot intimate relationship for males was ($M = 62.89$), slightly lower than the median score ($Mdn = 64.5$). The minimum score of the INTRO-1 for males was 22 and the maximum score 99. The standard deviation for the INTRO-1 for males was 16.2 ($SD^2 = 263.2$). The total average score of the attitudes toward human-robot intimate relationship for the participants that preferred not to say their gender was ($M = 73.7$), slightly higher than the median score ($Mdn = 71.5$). The minimum score of the INTRO-1 for the participants that preferred not to say their gender was 51 and the maximum score 110. The standard deviation of the INTRO-1 for the participants that preferred not to say their gender was 18.6 ($SD^2 = 347$) (see Table 24).

A one-way ANOVA for unrelated scores was conducted to compare the effect of self-identified gender on attitudes toward human-robot intimate relationship in female, male, and prefer not to say conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 25). There was a significant effect of self-identified gender on attitudes toward human-robot intimate relationship at the $p < .05$ level for three conditions [$F(2, 251) = 11.676, p = .000, \eta^2 = .085$] (see Table 26). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the female condition ($M = 54.83, SD = 15.56$) was significantly different than the male condition ($M = 62.88, SD = 16.22$) and the prefer not to say condition ($M = 73.7, SD = 18.63$). However, the male condition ($M = 62.88, SD = 16.22$) did not significantly differ from the prefer not to say condition ($M = 73.7, SD = 18.63$) (see Tables 24 & 27).

4.4.2. The INT-RO-1 Trust Subscale for Different Self-Identified Genders. The average score of the trust toward humanoid-robots for females was ($M = 12.2$), slightly higher than the median score ($Mdn = 12$). The minimum score of the INTRO-1 Trust Subscale for females was 5 and the maximum score 24. The standard deviation for the INTRO-1 Trust Subscale for females was 5 ($SD^2 = 25.2$). The average score for trust toward humanoid-robots for males was ($M = 15$) equal to the median score ($Mdn = 15$). The minimum score of the INTRO-1 Trust Subscale for males was 5 and the maximum score 25. The standard deviation for the INTRO-1 Trust Subscale for males was 5.2 ($SD^2 = 27.2$). The average score of the trust toward humanoid-robots for the participants that preferred not to say their gender was ($M = 16.6$) slightly higher than the median score ($Mdn = 15.5$). The minimum score of the INTRO-1 Trust Subscale for the participants that preferred not to say their gender was 5 and the maximum score 25. The standard deviation of the INTRO-1 the Trust Subscale for the participants that preferred not to say their gender was 6.2 ($SD^2 = 38.3$) (see Table 28).

A one-way ANOVA for unrelated scores was conducted to compare the effect of self-identified gender on trust toward humanoid-robots in female, male, and prefer not to say conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 29). There was a significant effect of self-identified gender on trust toward humanoid-robots at the $p < .05$ level for three conditions [$F(2, 251) = 9.962, p = .000, \eta^2 = .074$] (see Table 30). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the female condition ($M = 12.21, SD = 5.02$) was significantly different than the male condition ($M = 15.04, SD = 5.22$) and the prefer not to say condition ($M = 16.6, SD = 6.19$). However, the male condition ($M = 15.04, SD = 5.22$) did not significantly differ from the prefer not to say condition ($M = 16.6, SD = 6.19$) (see Tables 28 & 31).

4.4.3. The INT-RO-1 Sexuality Subscale for Different Self-Identified Genders.

The average score of the attitudes toward human-robot sexuality for females was ($M = 6.7$), slightly higher than the median score ($Mdn = 6.5$). The minimum score of the INT-RO-1 Sexuality Subscale for females was 3 and the maximum score 15. The standard deviation for the INTRO-1 Sexuality Subscale for females was 2.9 ($SD^2 = 8.2$). The average score of the attitudes toward human-robot sexuality for males was ($M = 7.4$) slightly higher than the median score ($Mdn = 7$). The minimum score of the INT-RO-1 Sexuality Subscale for males was 3 and the maximum score 13. The standard deviation for the INTRO-1 Sexuality Subscale for females was 3 ($SD^2 = 9.2$). The average score of the attitudes toward human-robot sexuality for the participants who preferred not to say their gender was ($M = 9.2$), slightly higher than the median score ($Mdn = 8.5$). The minimum score of the INT-RO-1 Sexuality Subscale for the participants who preferred not to state their gender was 5 and the maximum score 15. The standard deviation for the INTRO-1 Sexuality Subscale for the participants who preferred not to say their gender was 3.6 ($SD^2 = 13.1$) (see Table 32).

A one-way ANOVA for unrelated scores was conducted to compare the effect of self-identified gender on attitudes toward sexuality with humanoid-robots in female, male, and prefer not to say conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 33). There was a significant effect of self-identified gender on attitudes toward sexuality with humanoid-robots at the $p < .05$ level for three conditions [$F(2, 251) = 4.384, p = .013, \eta^2 = .034$] (see Table 34). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the female condition ($M = 6.69, SD = 2.86$) was not significantly different than the male condition ($M = 7.4, SD = 3.03$). The male condition ($M = 7.4, SD = 3.03$) did not significantly differ from the prefer not to say condition ($M = 9.2, SD = 3.61$). Moreover, the prefer not to say condition ($M = 9.2, SD = 3.61$) was significantly different than the female condition ($M = 6.69, SD = 2.86$) (see Tables 32 & 35).

4.4.4. The INT-RO-1 Intimacy Subscale for Different Self-Identified Genders.

The average score of the attitudes toward human-robot intimacy for females was ($M = 13.6$), slightly higher than the median score ($Mdn = 13$). The minimum score of the INT-RO-1 Intimacy Subscale for females was 6 and the maximum score 28. The standard deviation for the INT-RO-1 Intimacy Subscale for females was 4.8 ($SD^2 = 23.3$). The average score of the attitudes toward human-robot intimacy for males was ($M = 16.3$), slightly lower than the median score ($Mdn = 17$). The minimum score of the INT-RO-1 Intimacy Subscale for males was 6 and the maximum score 30. The standard deviation for the INT-RO-1 Intimacy Subscale for males was 5.4 ($SD^2 = 29.3$). The average score of the attitudes toward human-robot intimacy for the participants who preferred not to say their gender was ($M = 19.9$), almost equal to the median score ($Mdn = 20$). The minimum score of the INT-RO-1 Intimacy Subscale for the participants who preferred not to say their gender was 9 and the maximum

score 30. The standard deviation for the INTRO-1 Intimacy Subscale for the participants who preferred not to say their gender was 6.5 ($SD^2 = 42.5$) (see Table 36).

A one-way ANOVA for unrelated scores was conducted to compare the effect of self-identified gender on attitudes toward human-robot intimacy in female, male, and prefer not to say conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 37). There was a significant effect of self-identified gender on attitudes toward human-robot intimacy at the $p < .05$ level for three conditions [$F(2, 251) = 13.063, p = .000, \eta^2 = .094$] (see Table 38). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the female condition ($M = 13.56, SD = 4.83$) was significantly different than the male condition ($M = 16.3, SD = 5.41$) and the prefer not to say condition ($M = 19.9, SD = 6.52$). However, the male condition ($M = 16.3, SD = 5.41$) did not significantly differ from the prefer not to say condition ($M = 19.9, SD = 6.52$) (see Tables 36 & 39).

4.4.5. The INT-RO-1 Acceptance Subscale for Different Self-Identified Genders.

The average score of humanoid-robot acceptance for females was ($M = 22.3$), slightly lower than the median score ($Mdn = 23$). The minimum score of the INT-RO-1 Acceptance Subscale for females was 8 and the maximum score 35. The standard deviation for the INTRO-1 Acceptance Subscale for females was 5.4 ($SD^2 = 29.6$). The average score of the humanoid-robot acceptance for males was ($M = 24.1$), slightly higher than the median score ($Mdn = 23.5$). The minimum score of the INT-RO-1 Acceptance Subscale for males was 8 and the maximum score 35. The standard deviation for the INTRO-1 Acceptance Subscale for males was 5.97 ($SD^2 = 35.7$). The average score of the humanoid-robot acceptance for the participants who preferred not to say their gender was ($M = 28$), higher than the median score ($Mdn = 25$). The minimum score of the INT-RO-1 Acceptance Subscale for the participants who preferred not to say their gender was 23 and the maximum score 40. The standard

deviation for the INTRO-1 Acceptance Subscale for the participants who preferred not to say their gender was 6.05 ($SD^2=36.67$) (see Table 40).

A one-way ANOVA for unrelated scores was conducted to compare the effect of self-identified gender on humanoid-robot acceptance in female, male, and prefer not to say conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 41). There was a significant effect of self-identified gender on humanoid-robot acceptance at the $p < .05$ level for three conditions [$F(2, 251) = 6.544, p = .002, \eta^2 = .050$] (see Table 42). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the female condition ($M = 22.36, SD = 5.44$) was not significantly different than the male condition ($M = 24.14, SD = 5.97$). However, the female condition ($M = 22.36, SD = 5.44$) was significantly different than the prefer not to say condition ($M = 28, SD = 6.06$). The male condition ($M = 24.14, SD = 5.97$) did not significantly differ from the prefer not to say condition ($M = 28, SD = 6.06$) (see Tables 40 & 43).

4.5. ANOVA Analyses of INT-RO-1 Subscales for Different Cultures

4.5.1. The INT-RO-1 for Different Cultures. The average score of the attitudes toward human-robot intimate relationship for non-Western participants was ($M = 55.98$), lower than the median score ($Mdn = 58$). The minimum score of the INT-RO-1 for non-Western participants was 29 and the maximum score 97. The standard deviation of the INTRO-1 for non-Western participants was 14.89 ($SD^2 = 221.63$). The average score of the attitudes toward human-robot intimate relationship for Western participants was ($M = 58.2$), which almost equaled the median score ($Mdn = 58$). The minimum score of the INT-RO-1 for Western participants was 22 and the maximum score 110. The standard deviation for the INTRO-1 for Western participants was 16.9 ($SD^2 = 284.7$) (see Table 44).

A one-way ANOVA for unrelated scores was conducted to compare the effect of culture on attitudes toward human-robot intimate relationship in non-Western and Western conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 45). There was not a significant effect of culture condition on attitudes toward human-robot intimate relationship at the $p > .05$ level for the two conditions [$F(1, 252) = .694, p = .406, \eta^2 = .003$] (see Table 46).

4.5.2. The INT-RO-1 Trust Subscale for Different Cultures. The average score of trust toward humanoid-robots for non-Western participants was ($M = 12.5$), slightly higher than the median score ($Mdn = 12$). The minimum score of the INT-RO-1 Trust Subscale for non-Western participants was 5 and the maximum score 24. The standard deviation of the INTRO-1 Trust Subscale for non-Western participants was 5.24 ($SD^2 = 27.43$). The average score of trust toward humanoid-robots for Western participants was ($M = 13.3$), slightly lower than the median score ($Mdn = 14$). The minimum score of the INT-RO-1 Trust Subscale for Western participants was 5 and the maximum score 25. The standard deviation for the INTRO-1 Trust Subscale for Western participants was 5.32 ($SD^2 = 28.3$) (see Table 47).

A one-way ANOVA for unrelated scores was conducted to compare the effect of culture on trust toward humanoid-robots in non-Western and Western conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 48). There was not a significant effect of culture condition on trust toward humanoid-robots at the $p > .05$ level for the two conditions [$F(1, 252) = .880, p = .349, \eta^2 = .003$] (see Table 49).

4.5.3. The INT-RO-1 Sexuality Subscale for Different Cultures. The average score of attitudes toward sexuality with humanoid-robots for non-Western participants was ($M = 6.34$), slightly higher than the median score ($Mdn = 6$). The minimum score of the INT-RO-1 Sexuality Subscale for non-Western participants was 3 and the maximum score 14. The

standard deviation of the INTRO-1 Sexuality Subscale for non-Western participants was 2.86 ($SD^2 = 8.2$). The average score of attitudes toward sexuality with humanoid-robots for Western participants was ($M = 7.1$), which was slightly higher than the median score ($Mdn = 7$). The minimum score of the INT-RO-1 Sexuality Subscale for Western participants was 3 and the maximum score 15. The standard deviation for the INTRO-1 Sexuality Subscale for Western participants was 2.99 ($SD^2 = 8.94$) (see Table 50).

A one-way ANOVA for unrelated scores was conducted to compare the effect of culture on attitudes toward sexuality with humanoid-robots in non-Western and Western conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 51). There was not a significant effect of culture condition on trust toward humanoid-robots at the $p > .05$ level for the two conditions [$F(1, 252) = 2.748, p = .099, \eta^2 = .011$] (see Table 52).

4.5.4. The INT-RO-1 Intimacy Subscale for Different Cultures. The average score of attitudes toward human-robot intimacy for non-Western participants was ($M = 13.83$), slightly higher than the median score ($Mdn = 13$). The minimum score of the INT-RO-1 Intimacy Subscale for non-Western participants was 6 and the maximum score 28. The standard deviation of the INTRO-1 Intimacy Subscale for non-Western participants was 4.9 ($SD^2 = 24.14$). The average score of the attitudes toward intimacy with humanoid-robots for Western participants was ($M = 14.7$), slightly higher than the median score ($Mdn = 14$). The minimum score of the INT-RO-1 Intimacy Subscale for Western participants was 6 and the maximum score 30. The standard deviation for the INTRO-1 Intimacy Subscale for Western participants was 5.38 ($SD^2 = 28.95$) (see Table 53).

A one-way ANOVA for unrelated scores was conducted to compare the effect of culture on attitudes toward intimacy with humanoid-robots in non-Western and Western conditions. The assumption of homogeneity of variances was not violated according to

Levene's test of homogeneity of variances ($p > .05$) (see Table 54). There was not a significant effect of culture on attitudes toward intimacy with humanoid-robots at the $p > .05$ level for the two conditions [$F(1, 252) = 1.116, p = .292, \eta^2 = .004$] (see Table 55).

4.5.5. The INT-RO-1 Acceptance Subscale for Different Cultures. The average score of humanoid-robot acceptance for non-Western participants was ($M = 23.3$), slightly lower than the median score ($Mdn = 24$). The minimum score of the INT-RO-1 Acceptance Subscale for non-Western participants was 12 and the maximum score 33. The standard deviation of the INTRO-1 Acceptance Subscale for non-Western participants was 4.9 ($SD^2 = 24.04$). The average score of humanoid-robot acceptance for Western participants was ($M = 23.02$), which was almost equal to the median score ($Mdn = 23$). The minimum score of the INT-RO-1 Acceptance Subscale for Western participants was 8 and the maximum score 40. The standard deviation for the INTRO-1 Acceptance Subscale for Western participants was 5.92 ($SD^2 = 35$) (see Table 56).

A one-way ANOVA for unrelated scores was conducted to compare the effect of culture on humanoid-robot acceptance for non-Western and Western conditions. The assumption of homogeneity of variances was not violated according to Levene's test of homogeneity of variances ($p > .05$) (see Table 57). There was not a significant effect of culture condition on humanoid-robot acceptance at the $p > .05$ level for the two conditions [$F(1, 252) = .090, p = .764, \eta^2 = .000$] (see Table 58).

4.6. Multiple Regression Analyses of the Big-Five Subscales on the INT-RO-1 Subscales

4.6.1. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1. A multiple linear regression was conducted to find out whether INT-RO-1 could be predicted from the Big-Five subscales Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. The assumption of independence of errors was not violated according to the

Durbin-Watson statistic, 1.971 (see Table 59). The tolerance value was greater than 0.1 (.799, .814, .799, .770, .897 for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness respectively), so there was no multicollinearity (see Table 60). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 29). The residuals were normally distributed (see Figure 30). Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness statistically significantly predicted INT-RO-1, $F(5, 248) = 4.895, p = .000$, and these variables accounted for 71% of the explained variability of INT-RO-1 (adj. $R^2 = .071$) (see Tables 59 &

61). Two independent variables (Agreeableness and Openness) added statistically significantly to the prediction ($p < .05$). However, three independent variables (Extraversion, Conscientiousness, and Neuroticism) did not add statistically significantly to the prediction ($p > .05$) (see Table 60). The intercepts, B values, and Beta values can be found in the Table 60.

4.6.2. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1 Trust Subscale. A multiple linear regression was conducted to find out whether trust toward humanoid-robots could be predicted from the Big-Five subscales Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 1.852 (see Table 62). The tolerance value was greater than 0.1 (.799, .814, .799, .770, .897 for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness respectively), so there was no multicollinearity (see Table 63). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 31). The residuals were normally distributed (see Figure 32). Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness statistically significantly predicted trust toward humanoid-robots, $F(5, 248) = 4.895, p = .001$, and these

variables accounted for 63% of the explained variability of the INT-RO-1 Trust Subscale (adj. $R^2 = .063$) (see Tables 62 & 64). Two independent variables (Agreeableness and Openness) added statistically significantly to the prediction ($p < .05$). However, three independent variables (Extraversion, Conscientiousness, and Neuroticism) did not add statistically significantly to the prediction ($p > .05$) (see Table 63). The intercepts, B values, and Beta values can be found in Table 63.

4.6.3. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1 Sexuality Subscale. A multiple linear regression was conducted to find out whether attitudes toward human-robot sexuality could be predicted from the Big-Five subscales Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 2.043 (see Table 65). The tolerance value was greater than 0.1 (.799, .814, .799, .770, .897 for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness respectively), so there was no multicollinearity (see Table 66). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 33). The residuals were normally distributed (see Figure 34). Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness statistically significantly predicted attitudes toward human-robot sexuality, $F(5, 248) = 3.831, p = .002$, and these variables accounted for 53% of the explained variability of the INT-RO-1 Sexuality Subscale (adj. $R^2 = .053$) (see Tables 65 & 67). Two independent variables (Agreeableness and Openness) added statistically significantly to the prediction ($p < .05$). However, three independent variables (Extraversion, Conscientiousness, and Neuroticism) did not add statistically significantly to the prediction ($p > .05$) (see Table 66). The intercepts, B values, and Beta values can be found in Table 66.

4.6.4. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1

Intimacy Subscale. A multiple linear regression was conducted to find out whether attitudes toward human-robot intimacy could be predicted from the Big-Five subscales Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 2.008 (see Table 68). The tolerance value was greater than 0.1 (.799, .814, .799, .770, .897 for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness respectively), so there was no multicollinearity (see Table 69). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 35). The residuals were normally distributed (see Figure 36). Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness statistically significantly predicted attitudes toward human-robot intimacy, $F(5, 248) = 3.476, p = .005$, and these variables accounted for 47% of the explained variability of the INT-RO-1 Intimacy Subscale ($\text{adj. } R^2 = .047$) (see Tables 68 & 70). Two independent variables (Agreeableness and Openness) added statistically significantly to the prediction ($p < .05$). However, three independent variables (Extraversion, Conscientiousness, and Neuroticism) did not add statistically significantly to the prediction ($p > .05$) (see Table 69). The intercepts, B values, and Beta values can be found in Table 69.

4.6.5. Multiple Regression Analysis of the Big-Five Subscales on the INT-RO-1

Acceptance Subscale. A multiple linear regression was conducted to find out whether acceptance of humanoid-robots could be predicted from the Big-Five subscales Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 2.041 (see Table 71). The tolerance value was greater than 0.1 (.799, .814, .799, .770, .897 for

Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness respectively), so there was no multicollinearity (see Table 72). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 37). The residuals were normally distributed (see Figure 38).

Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness statistically significantly predicted acceptance of humanoid-robots, $F(5, 248) = 4.118, p = .001$, and these variables accounted for 58% of the explained variability of the INT-RO-1 Acceptance Subscale (adj. $R^2 = .058$) (see Tables 71 & 73). Three independent variables (Agreeableness, Conscientiousness, and Openness) added statistically significantly to the prediction ($p < .05$). However, two independent variables (Extraversion and Neuroticism) did not add statistically significantly to the prediction ($p > .05$) (see Table 72). The intercepts, B values, and Beta values can be found in Table 72.

4.7. Multiple Regression Analyses of the INT-RO-1 Subscales on the Big-Five Subscales

4.7.1. Multiple Regression Analysis of the INT-RO-1 on the Big-Five. A multiple linear regression was conducted to find out whether the Big-Five could be predicted from the INT-RO-1 subscales Trust, Sexuality, Intimacy, and Acceptance. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 2.094 (see Table 74). The tolerance value was greater than 0.1 (.597, .467, .324, .382 for Trust, Sexuality, Intimacy, and Acceptance respectively), so there was no multicollinearity (see Table 75). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 39). The residuals were normally distributed (see Figure 40). Trust, Sexuality, Intimacy, and Acceptance did not statistically significantly predict the Big-Five, $F(4, 249) = .630, p = .642$ (see Table 76).

4.7.2. Multiple Regression Analysis of the INT-RO-1 on the Big-Five

Extraversion Subscale. A multiple linear regression was conducted to find out whether the extraversion personality dimension could be predicted from the INT-RO-1 Subscales Trust, Sexuality, Intimacy, and Acceptance. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 2.227 (see Table 77). The tolerance value was greater than 0.1 (.597, .467, .324, .382 for Trust, Sexuality, Intimacy, and Acceptance respectively), so there was no multicollinearity (see Table 78). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 41). The residuals were normally distributed (see Figure 42). Trust, Sexuality, Intimacy, and Acceptance did not statistically significantly predict the extraversion personality dimension, $F(4, 249) = 1.791, p = .131$ (see Table 79).

4.7.3. Multiple Regression Analysis of the INT-RO-1 on the Big-Five

Agreeableness Subscale. A multiple linear regression was conducted to find out whether the agreeableness personality dimension could be predicted from the INT-RO-1 Subscales Trust, Sexuality, Intimacy, and Acceptance. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 1.812 (see Table 80). The tolerance value was greater than 0.1 (.597, .467, .324, .382 for Trust, Sexuality, Intimacy, and Acceptance respectively), so there was no multicollinearity (see Table 81). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 43). The residuals were normally distributed (see Figure 44). Trust, Sexuality, Intimacy, and Acceptance statistically significantly predicted the agreeableness personality dimension, $F(4, 249) = 2.693, p = .032$, and these variables accounted for 26% of the explained variability of the Big-Five Agreeableness Subscale (adj. $R^2 = .012$) (see Tables 80 & 82). One independent variable, INT-RO-1 Trust subscale scores, added statistically significantly to the prediction ($p < .05$). However, three independent

variables (Sexuality, Intimacy, and Acceptance) did not add statistically significantly to the prediction ($p > .05$) (see Table 81). The intercepts, B values, and Beta values can be found in Table 81.

4.7.4. Multiple Regression Analysis of the INT-RO-1 on the Big-Five

Conscientiousness Subscale. A multiple linear regression was conducted to find out whether the conscientiousness personality dimension could be predicted from the INT-RO-1 Subscales Trust, Sexuality, Intimacy, and Acceptance. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 1.996 (see Table 83). The tolerance value was greater than 0.1 (.597, .467, .324, .382 for Trust, Sexuality, Intimacy, and Acceptance respectively), so there was no multicollinearity (see Table 84). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 45). The residuals were normally distributed (see Figure 46). Trust, Sexuality, Intimacy, and Acceptance did not statistically significantly predict the conscientiousness personality dimension, $F(4, 249) = 1.497, p = .204$ (see Table 85).

4.7.5. Multiple Regression Analysis of the INT-RO-1 on the Big-Five Neuroticism

Subscale. A multiple linear regression was conducted to find out whether the neuroticism personality dimension could be predicted from the INT-RO-1 Subscales Trust, Sexuality, Intimacy, and Acceptance. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 1.857 (see Table 86). The tolerance value was greater than 0.1 (.597, .467, .324, .382 for Trust, Sexuality, Intimacy, and Acceptance respectively), so there was no multicollinearity (see Table 87). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 47). The residuals were normally distributed (see

Figure 48). Trust, Sexuality, Intimacy, and Acceptance did not statistically significantly predict the neuroticism personality dimension, $F(4, 249) = 916, p = .455$ (see Table 88).

4.7.6. Multiple Regression Analysis of the INT-RO-1 on the Big-Five Openness

Subscale. A multiple linear regression was conducted to find out whether the openness personality dimension could be predicted from the INT-RO-1 Subscales Trust, Sexuality, Intimacy, and Acceptance. The assumption of independence of errors was not violated according to the Durbin-Watson statistic, 2.053 (see Table 89). The tolerance value was greater than 0.1 (.597, .467, .324, .382 for Trust, Sexuality, Intimacy, and Acceptance respectively), so there was no multicollinearity (see Table 90). There was a linear relationship between the composite independent variable and the residuals, as assessed by visual inspection of the scatterplot (see Figure 49). The residuals were normally distributed (see Figure 50). Trust, Sexuality, Intimacy, and Acceptance did not statistically significantly predict the openness personality dimension, $F(4, 249) = 2.243, p = .065$ (see Table 91).

5. Discussion

5.1. The Attitudes Toward Acceptance of Humanoid-Robots and Human-Robot Intimate Relationship

Regarding the first item of the INT-RO-1, “In the near future, humanoid-robots will be indistinguishable from humans the way they look and behave,” half of the participants in the research agreed with a ratio of 52% agreed (~35% “Agreed a Little” and ~17% “Strongly Agreed”) (see Figure 7). Yet, those who “Agreed a Little” were in the majority compared to those who “Strongly Agreed”. This pointed to the fact that even though technological advancements and expert theories are sufficient to show the potential of having indistinguishable humanoid-robots in theory, they do not show it in practice as yet. The most realistic looking humanoid robot is to date is Sophia, yet she does not have an entire body and is still not indistinguishable from a human in the ways she behaves, even though, to some, she could be considered as indistinguishable from a human in the way she looks.

Considering the second item of the INT-RO-1, “In the near future, humanoid-robots will be indistinguishable from humans by the way they reason and think,” 34% agreed (~25% “Agreed a Little” and ~9% “Strongly Agreed”) (see Figure 8). The agreement ratio was lower with the second item compared to the first item: 52% and 34% respectively. Even though designing and creating indistinguishable humanoid-robots from humans in the way they look and behave is demanding for companies and researchers, designing and creating ones that are indistinguishable from humans in the way they reason and think is more demanding, as the participants agreed in the INT-RO-1. Especially since researchers have not given a definite model and definition for human consciousness yet, it becomes even more demanding to create a consciousness without understanding the existing one 100%.

Examining the responses for the third item of the INT-RO-1, which was “Humanoid robots could be a part of everyday human life,” the majority of the participants were in

agreement with the statement with a ratio of 74% (~33% “Agreed a Little and ~41% “Strongly Agreed”) (see Figure 9). One could argue that people are ready for the humanoid-robots to exist for various purposes. Since the statement was broad and did not consider any specific demand, the agreement responses could vary from household chores to labor-work and many others. But, since item 3 referred to people’s everyday lives, the participant responses did not show a sign of the “Uncanny Valley” effect.

Regarding the expectations toward human-robot sex, Scheutz and Arnold (2017) collected a survey and one of the statements examined the participants’ attitude toward a possible preference of humanoid-robots over humans in an intimate relationship. According to their survey results, 32% of participants agreed that humanoid-robots could be too good and make humans never go back to their own kind. Items 14 and 21 in the INT-RO-1 focused on the same concern and they were: “Humanoid-robots could be so desirable that some people might give up having a human partner” and “Humanoid-robots could be so desirable that I might give up having a human partner” respectively. The agreement rate for item 14 was 35% while the agreement rate for item 21 was only 5% (see Figures 20 & 27). The results from the Lovotics and the Big-Five research did not yield a result that was close to what Scheutz and Arnold (2017) found. Yet, like other statements in the INT-RO-1 that differed in reference with either “them” or “I”, the results again yielded that the participants were more positive in cases where the item referred to “others” (35%) compared to the items that were directed to themselves (5%) (see Figures 20 & 27).

Another poll was carried out by the British Newspaper The Sun considering human-robot sex. The statement The Sun had for human-robot sex was, “If it were possible for humans to have sex with robots, do you think that a person in an exclusive relationship who had sex with a robot would be cheating?” and the results were as follows: 42% said “yes,”

31% said “no,” and 26% said “not sure” (as cited in McArthur, 2017). Item 22 in the INT-RO-1 was similar to the question the poll asked: “If I found out that my intimate partner was engaging in an intimate relationship with a humanoid-robot, I would consider that infidelity.” However, it was different in a way that item 22 in the INT-RO-1 measured not only sex but an intimate relationship with a humanoid-robot. The results for this item was 35% disagreed (~21% “Disagreed Strongly” and ~14% “Disagreed a Little”), ~21% of the participants “Neither Agreed nor Disagreed,” and 44% agreed (~17% “Agreed a Little” and ~27% “Strongly Agreed”) (see Figure 28). The results from INT-RO-1 item 22 and the Sun poll were relatively similar. Considering the overall negative attitudes and not preferring robots over humans, especially in the cases where the statements points to “me” preference rather than “others,” 44% of agreement rate seemed relatively high. One could argue that whether this could be due to human-nature of not willing to share an intimate partner with others or due to small assimilation of technology to a point where humans yet not agree with human-robot intimacy complete but on their way to accept more.

Considering the issue of cheating with humanoid-robots, Scheutz and Arnold (2017) showed that 40% agreed that humans cannot be cheated with a sex-robot and 37% agreed that people would consider a sex-robot in place of a human-lover. The results from the Lovotics and the Big-Five research for the same issue (item 22) showed a disagreement rate of 35% (see Figure 28). However, the wording of item 22 in the INT-RO-1 was a bit different compared to what Scheutz and Arnold (2017) had in their survey with the two statements: item 22 was, “If I found out that my intimate partner was engaging in an intimate relationship with a humanoid-robot, I would consider that infidelity.” Thus item 22 did not solely refer to having sex with a humanoid-robot but included having an entire intimate relationship. Even though the concepts of the two items differed, one could argue that considering a humanoid-robot as a potential competitor in a romantic relationship scored almost as high as considering

one as only a sex-partner. This potentially pointed out that people could perceive a possible indistinguishable humanoid-robot as a threat to one's human-human intimate relationship.

5.2. The Attitudes Toward Trusting Humanoid-Robots

The responses for the fourth item of the INT-RO-1, "A human could trust a humanoid-robot," were less polarized and showed more indecisiveness compared to previous items: 35% disagreed, 29% were neutral and 36% agreed. There were almost evenly varying responses of the participants, and this indicated that the "trust" construct could be more subjective depending on the expectations of the robot. (see Figure 10).

As the author has presented previously in the literature review, Dautenhahn et al. (2005) reported that when participants were asked about the preferred duty for robot's in one's household the ~11% of the participants agreed that a robot could take care of a child. In the Lovotics and the Big-Five research similar results were shown. Item 5 in INT-RO-1 examined the same question: "A human could trust a humanoid-robot for taking care of one's child." The results showed that ~23% of the participants agreed with the statement (~17% "Agreed a Little" & ~6% "Strongly Agreed") (see Figure 11). The results in the Lovotics and the Big-Five research gave a higher acceptance rate. This could be due to a 14-year gap, where people feel more comfortable with advancing technology and already have accommodated so many aspects of their daily life with technology. Even though the increase rate is not big, one could argue that gradual exposure to advancing technology could have the power to change people's ideas about trusting it even where their loved ones are concerned. Regarding the responses for item 5, the participants' attitudes toward trusting a humanoid-robot sharply declined when there was a child taken into a consideration compare to the responses for the item four with a ratio of 61% and 35% respectively (see Figures 10 & 11). The results for item 5 showed that the participants had a more definite attitude when one's

child was involved, and the majority were not in favor of having a humanoid-robot taking care of one's child.

Considering the responses for item six in the INT-RO-1, "A human could trust a humanoid-robot for taking care of one's pet," the participants were again almost evenly distributed and showed an indecisive attitude toward the issue and that was similar to the responses to item four that considered trust toward humanoid-robots in general: 39% disagreed, 23% were neutral, and 38% agreed (see Figure 12).

Item 7 in the INT-RO-1 was, "A human could trust a humanoid-robot for taking care of the elderly." For this item, the agreement rate was not as low as it was in the child case yet not as high as it was in the one's pet case: 50% disagreed, 16% were neutral, and 34% agreed (see Figure 13). Half of the participants did not agree with the statement but considered the possibility more compared to trusting a humanoid-robot to take care of one's child.

The responses for item 8 in the INT-RO-1, "A human could trust a humanoid-robot as an intimate partner," were: 63% disagreed, 19% were neutral, and 18% agreed (see Figure 14). The participants were in least favor of trusting humanoid-robots as an intimate partner compared to other cases in the INT-RO-1 Trust Subscale.

5.3. Attitudes Toward Human-Robot Sexuality

As it has been mentioned previously in the literature review, the participants of the YouGov Omnibus research were not in favor of having sex with humanoid-robots. The poll from the UK-based YouGov Omnibus research asked participants, "In 2030, do you think we will have robots that can do the following things?" and only 18% chose the option "have sex with humans" (as cited in McArthur, 2017). In INT-RO-1, three similar statements to that question were included and these were, "In the near future, human-robot sex could be a part of some people's daily life," "In the near future, human-robot sex could be indistinguishable

from human-humans sex,” and “In the near future, human-robot sex could be a part of my daily life”—items 9, 12, and 19 respectively. The agreement rates for these statements were as follows: ~41%, ~19%, and ~10% agreed with items 9, 12, and 19 respectively (see Figures 15, 18, & 25). There was considerable agreement difference between the items 9 and 19 which included the same concept with their only difference being the reference point “others” or “me”. The results of items 9 and 19 yielded that participants accepted the possibility of human-robot sex being a part of one’s daily life more for others than they did for themselves.

5.4. Attitudes Toward Human-Robot Intimacy

Another survey was carried out by MIT Technology Review to measure the attitudes toward human-robot love: the 19% of the participants believed they could love a robot, 45% believed they could not, and 36% responded maybe they could (as cited in Cheok, Levy, & Karunanayaka, 2016). Items 10 and 17 in the INT-RO-1 covered a similar construct considering human-robot intimacy not as love but as attraction, and the statements were “Some people could become attracted to a humanoid-robot” and “I could become attracted to a humanoid-robot”. For item 10, 22% disagreed, ~26% “Neither Agreed nor Disagreed,” and 52% agreed (see Figure 16). In contrast, for item 17, 73% of the participants disagreed with the statement, ~14% “Neither Agreed nor Disagreed”, and 14% agreed (see Figure 23). Compared to the survey MIT collected, the INT-RO-1 item 17 results were more negative—yet the construct difference should not be overseen as the word ‘love’ in the MIT Technology Review survey could have referenced to neutral love or sympathy and might not referred to “attraction”. The agreement difference, again, is clear between the statements 10 and 17—the difference when the participants considered the possibility of getting attracted to a

humanoid-robot for “others” as higher compared to what they considered the possibility for their own.

The same survey asked participants whether a robot could love humans: 36% said yes, 23% said no, and 41% said maybe for the statement (as cited in Cheek, Levy, & Karunanayaka, 2016). Two similar statements were also included in the INT-RO-1: “A humanoid-robot could become attracted to a human” and “A humanoid-robot could become attracted to me,” items 11 and 18 respectively. For the item 11, 50% disagreed, ~26% “Neither Agreed nor Disagreed”, and 24% agreed whereas for the item 18, 63% disagreed, ~23% “Neither Agreed nor Disagreed,” and 14% agreed (see Figures 17 & 24). In the MIT Technology Review survey almost the half of the participants were unsure about the issue whereas the participants of the Lovotics and Big-Five research were more negative for the concept in which the half of them disagreed. Also, the differences in responses for “others” item and “own” item in the Lovotics and the Big-Five was shown with a ratio of 50% and 63% respectively.

Scheutz and Arnold (2017) also pointed out that 30% of the participants in their study agreed that sex with a sex-robot does not count as a real sex. Item 12 in the INT-RO-1 was, “In the near future, human-robot sex could be indistinguishable from human-human sex.” The agreement rate for the item 12 was 19% which was relatively close to what Scheutz and Arnold (2017) found. Again, like the author stated in the previous paragraph, this could be interpreted as perceiving the humanoid-robots as possible threats to human-human relationships in case of such thing happening.

Moreover, Arras and Cerqui (2005) conducted a survey at the Robotic exhibition about humans’ willingness to share their lives with robots. One of the statements in their survey was about robots contributing to human happiness, with which only 28% of the participants agreed. Two similar statements were also included in the INT-RO-1 and they

were “Humanoid-robots could be capable of satisfying human emotional needs” and “A humanoid-robot could satisfy my emotional needs,” items 13 and 20 respectively. For item 13, 49% disagreed (~22% “Disagreed Strongly” and ~27% “Disagreed a Little”), ~21% “Neither Agreed nor Disagreed,” and 30% agreed (~22% “Agreed a Little” and ~8% “Strongly Agreed”) (see Figure 19). The agreement percentage of the statement Arras and Cerqui (2002) had in their survey and the item 13 in the INT-RO-1 were very close: 28% and 30% respectively. For item 20, 69% disagreed (~51% “Disagreed Strongly” and ~18% “Disagreed a Little”), ~19% “Neither Agreed nor Disagreed,” and 13% agreed (~9% “Agreed a Little” and ~4% “Strongly Agreed”) (see Figure 26). The disagreement gap between items 13 and 20, which are different in their structures in a way that item 13 refers to “others” whereas item 20 refers to the participant herself/himself. The participants were again more positive toward the human-robot intimacy when it was perceived for the “other,” “not me, but you”, as the disagreement percentages for the statements were 49% and 69% for ‘them’ and ‘me’ respectively. Also, the participants seemed to be more certain about their attitudes when considering “themselves” in the situation (19%) as the “Neither Agreed nor Disagreed” percentage was lower compared to the case the participants stated their attitudes about other people (21%) (see Figures 19 & 26).

Edirisinghe and Cheok (2016) pointed out that 28% of the participants in their survey favored the idea of being emotionally attracted toward a robot. A very similar statement was included in the INT-RO-1 that measured a similar construct: “attraction”. However, item 17 in the INT-RO-1 covered a broader concept that considered attraction in general which could be regarded by the participants as physical attraction and/or emotional attraction. The agreement rate for the item 17 was only 14% whereas the agreement rate for the Edirisinghe and Cheok (2016) attraction statement was 28% (see Figure 23).

5.5. The Effect of Self-Identified Gender on Attitudes Toward Human-Robot Intimacy

The effect of self-identified genders was statistically significant on attitudes toward human-robot intimate relationship (INT-RO-1), and all INT-RO-1 subscales (Trust, Sexuality, Intimacy, and Acceptance) ($p < .05$) (see Tables 26, 30, 34, 38, 42). Regarding the INT-RO-1 total scores, the female participants scored statistically significantly lower than the male participants and the participants who preferred not to say their gender whereas there was not statistical difference between the male participants and those who did not prefer to say their gender (see Tables 24 & 27). In INT-RO-1 Trust subscale, the female participants again scored statistically significantly lower than the male participants and the participants who preferred not to say their gender whereas there was no statistical difference between the male participants and those who preferred not to say their gender (see Tables 28 & 31). However, in the INT-RO-1 Sexuality subscale and in the INT-RO-1 Acceptance subscale, the female participants did not score statistically significantly lower than the male participants but did score lower than the participants who preferred not to say their gender (see Tables 32, 35, 40, & 43). In the INT-RO-1 Intimacy subscale, the female participants scored statistically significantly lower than the male participants the participants who preferred not to say their gender. However, the male participants did not score statistically different than the participants who preferred not to say their gender—as it was in the INT-RO-1 total scores and the INT-RO-1 Trust subscale (see Tables 36 & 39).

Enz et al. (2011) concluded in their study that the male participants reported more positive results considering robot roles in social life compared to the female participants. According to results derived from the Lovotics and the Big-Five research regarding the effect of self-identified gender on attitudes toward human-robot intimate relationship, similar results were obtained. Even though the female participants scored lower in overall scores and across four INT-RO-1 subscales compared to males and to participants who preferred not to say,

there was not statistically significant difference in Sexuality and Acceptance conditions; thus, one could suggest that the female participants had a more positive tendency of having positive attitude toward humanoid-robots in the two conditions compared to the Trust and Intimacy conditions. Moreover, the participants who preferred not to say obtained overall higher scores compared to both female and male condition. Even though the number of participants were not evenly distributed in the sample, the results pinpointed to the positive relationship of gender fluidness and human-robot intimacy for the subsequent studies.

5.6. The Effect of Culture on Attitudes Toward Human-Robot Intimacy

Considering the effect of culture on the participants' responses, Kaplan reported that Western participants were distressed by robots even though they were highly involved in technology, whereas the participants from Japan, representatives of the non-Western population, perceived robots without any distress (as cited in Edirisinghe, Cheek, & Khougali, 2017). The non-Western participants in Kaplan's research was solely from Japan which posed a considerable limitation to their conclusion about the non-Western people in the bigger picture, especially when one considers that Japan is one of the technology leading countries in the world. However, the results could give some ideas about culture in future studies.

In the Lovotics and the Big-Five research the results for the effect of culture were not statistically different: regarding the INT-RO-1 total scores as well as for each of the four INT-RO-1 subscales, there were no statistically significant differences between non-Western participants and Western participants. However, Western participants scored higher than non-Western participants in most cases. Specifically, for the overall INT-RO-1, the non-Western participants scored less ($M = 55.98$) than the Western participants did ($M = 58.2$). Also, the highest score was among Western participants (110) compared to non-Western participants

(97) (see Table 44).

The results were also as follows regarding the four subscales of the INT-RO-1: for the INT-RO-1 Trust subscale, Western participants obtained a higher overall score ($M = 13.3$) as well as the maximum score (25) compared to non-Western participants ($M = 12.5$) and their maximum score (24) (see Table 47); the INT-RO-1 Sexuality subscale, the Western participants obtained a higher overall score ($M = 7.1$) as well as the maximum score (15) compared to non-Western participants ($M = 6.34$) and their maximum score (14) (see Table 50); for the INT-RO-1 Intimacy subscale, there was no statistically significant difference, the Western participants obtained a higher overall score ($M = 14.7$) as well as the maximum score (30) compared to non-Western participants ($M = 13.83$) and their maximum score (28) (see Table 53); however, for the INT-RO-1 Acceptance subscale, Western participants ($M = 23.02$) obtained an approximately equal overall score to non-Western participants ($M = 23.3$) with some difference in maximum scores with 40 and 33, respectively (see Table 56). On the contrary to what Kaplan has found, the Western participants were more positive regarding trusting and accepting humanoid-robots as well as had more positive attitudes toward human-robot intimacy and sexuality compared to non-Western participants.

5.7. The Effect of the Big-Five Personality Dimensions on Attitudes Toward Human-Robot Intimate Relationship

Regarding the effects of personality dimensions in HRI studies, Celiktutan and Gunes showed that the Extraversion and the Agreeableness personality dimensions had significant positive effects for the participants who had these personality dimensions when they were interacting with the humanoid-robot NAO (as cited in Salam et al., 2017). Also, the study conducted by Salam et al. (2017) in which the participants body activities and interpersonal aspects, such as physical distance and attention, were examined during their interaction with

NAO yielded similar results: the Extraversion personality dimension had a significant positive effect on the interaction of the participants with NAO. These were human-robot interaction studies where NAO physically interacted with the participants whereas the Lovotics and the Big-Five research examined only attitudes toward human-robot intimate relationship. Another difference was that NAO is considered a humanoid-robot, yet not as a humanoid-robot that is indistinguishable from a human as the INT-RO-1 mostly focused on. However, the Agreeableness personality dimension also statistically significantly added to the prediction of the INT-RO-1 ($p < .05$), whereas the Extraversion personality dimension did not ($p > .05$) (see Table 60). Therefore, the effects of the Big-Five Agreeableness personality dimension in future studies could be specifically focused on while interpreting the results.

In the Lovotics and the Big-Five research, Multiple Regression Analyses of the subscales on the INT-RO-1 subscales was also considered. The Big-Five Agreeableness and the Big-Five Openness subscales added statistically significantly to prediction of the INT-RO-1 total scores, the INT-RO-1 Trust scores, the INT-RO-1 Sexuality scores, and the INT-RO-1 Intimacy scores ($p < .05$), whereas the Extraversion, Conscientiousness, and Neuroticism subscales did not ($p > .05$) (see Tables 60, 63, 66, & 69). However, in the case of the INT-RO-1 Acceptance subscale, the Agreeableness, the Conscientiousness, and the Openness subscales added statistically significantly to the prediction of the INT-RO-1 Acceptance scores ($p < .05$) whereas the Extraversion and the Neuroticism subscales did not ($p > .05$) (see Table 72). The results suggested that the Agreeableness and Openness subscales were important in predicting attitudes toward human-robot intimate relationship while the Agreeableness, Conscientiousness, and Openness subscales were especially important when predicting the acceptance of human-robot intimate relationships.

The Multiple Regression Analyses of the INT-RO-1 subscales on the Big-Five subscales were also run to see if there could be statistically significant results. However, the

INT-RO-1 subscales (Trust, Sexuality, Intimacy, and Acceptance) did not statistically significantly predict the Big-Five total scores ($p = .642$), the Big-Five Extraversion subscale ($p = .131$), the Big-Five Conscientiousness subscale ($p = .204$), the Big-Five Neuroticism subscale ($p = .455$), or the Big-Five Openness subscale ($p = .065$) (see Tables 76, 79, 85, 88, & 91). However, the INT-RO-1 Trust subscale scores added statistically significantly to the prediction of the Big-Five Agreeableness Subscale ($p < .05$) while the Sexuality, the Intimacy, and the Acceptance subscales did not ($p > .05$) (see Table 81). Although most of the INT-RO-1 subscales did not statistically significantly predict any of the Big-Five subscales, one exception was shown in the case of the INT-RO-1 Trust subscale scores which added statistically significantly to the prediction of the Big-Five Agreeableness Subscale.

6. Conclusion

This study focused on people's attitudes to humanoid-robots and human-robot intimate relationships, as well as any possible role the Big-Five personality dimensions might play in attitudes towards human-robot interaction and intimacy. Other possible factors were also identified such as self-identified gender and culture (Western or non-Western). The inventories used in the project were the Attitudes Toward Human-Robot Intimate Relationship (INT-RO-1), that was prepared for the Lovotics and the Big-Five research, and the BFI to measure the correlation between two factors among undergraduate students.

The results showed that the majority of the participants agreed that humanoid-robots could be indistinguishable from humans the way they look and behave, that humanoid-robots could be a part of everyday human life, that humanoid-robots can be trusted, that human-robot sex can be a part of some people's daily life, that some people could be attracted to humanoid-robots in the future, and that one's intimate partner engaging in an intimate relationship with a humanoid-robot counts as infidelity. However, the majority of the participants disagreed that humanoid-robots could be indistinguishable from humans in the way they reason and think, that humanoid-robots could be trusted to take care of one's child, pet, the elderly, or as an intimate partner, that humanoid-robots become attracted to a human, that human-robot sex could be indistinguishable from human-human sex, that humanoid-robots could be capable of satisfying human emotional needs and one's own emotional needs, and that humanoid-robots could lead humans to give up on their human partners. The majority of participants also disagreed with the idea of human-robot marriages, humanoid-robots being part of their "own daily life", being attracted to a humanoid-robot and vice versa, and human-robot sex being a part of their "own daily life". Also, major differences were found in responses between the statements that referred to others, and the statements that referred to the participants' own preferences, with participants having significantly more negative

attitudes toward human-robot intimate relationships when they themselves were involved, compared to when “others” were involved. This difference pointed out to what Freud referred to as “the uncanny”, and what Mashiro Mori referred as the effect of the “uncanny valley” (Freud, 1919; Mara & Appel, 2015). The participants perceived a particular idea as a distant possibility for themselves whereas they were more or less accepting it for others.

The results also showed that individuals’ agreeableness trait and openness to experience potentially play a major role in predicting their attitudes toward human-robot intimate relationship unlike other traits they have. Additionally, the participants’ agreeableness and conscientiousness traits, as well as their openness to experiences can predict their attitudes toward human-robot intimacy, specifically, but not their extraversion and neuroticism traits unlike the literature review suggested.

Moreover, the effect of self-identified genders was statistically significant on attitudes toward human-robot intimate relationship, trusting humanoid-robots, attitudes toward human-robot sexuality, attitudes toward human-robot intimacy, and human-robot acceptance. Even though the female participants scored lower in overall scores, and across four INT-RO-1 subscales compared to males, and to participants who preferred not to say, there was not a statistically significant difference in Sexuality and Acceptance conditions; thus, one could suggest that the female participants had a more positive tendency of having positive attitudes toward humanoid-robots in the two conditions compared to the Trust and Intimacy conditions. The participants who preferred not to say obtained overall higher scores compared to both female and male condition. Even though the number of participants were not evenly distributed in the study sample, the results pointed to a positive relationship between gender fluidity and human-robot intimacy. Regarding the comparison of the non-Western participants with Western participants, Western participants were more positive regarding trusting and

accepting humanoid-robots and had more positive attitudes toward human-robot intimacy and sexuality compared to non-Western participants.

6.1. Limitations

One limitation was that the Western participants outnumbered the participants from the non-Western participants by a ratio of 207 (~81%) to 47 (~19%) (see Table 3 & Figure 4). Another limitation was that the sample consisted of mainly females, by a ratio of 174 females (~68%), 70 males (~28%), and 10 identified as “prefer not to say” (~4%) (see Table 1 & Figure 1). The third limitation was that the author did not have enough time to run a proper validation study for the INT-RO-1 inventory, which could have affected the results negatively. The items in the INT-RO-1 covered four major areas that were most relevant to the existing literature, which were attitudes toward humanoid-robots in Acceptance, Trust, Sexuality, and Intimacy. However, more items could be included in the INT-RO-1. Taking this into consideration, a second version of the INT-RO inventory could include more comprehensive details about human-robot intimacy. Finally, another limitation in the research was that the sample did not include any children or the elderly.

6.2. Suggestions for Future Research

In anticipation of future research, three Big-Five personality dimensions are important to highlight. The Agreeableness personality dimension statistically significantly added to the prediction of the INT-RO-1, whereas the Extraversion personality dimension did not. The results of Multiple Regression Analyses also suggested that the Agreeableness and the Openness personality dimensions were very important in predicting attitudes toward human-robot intimate relationship while the Agreeableness, the Conscientiousness, and the Openness personality dimensions were especially important when predicting the acceptance of human-

robot intimate relationships. The results also showed that future studies regarding personality dimensions and attitudes toward human-robot intimate relationships as well as the role of the trust factor in human-robot relationships could concentrate on the Big-Five Agreeableness Subscale as a point of focus. The inclusion of children was not deemed to be ethical considering the topic of the research. However, the inclusion of elderly participants in future research would be desirable.

7. References

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Appendix A

SECTION I

Informed Consent Form for the Lovotics and the Big-Five Research

This is an exploratory study which examines the correlation of the Big Five personality dimensions and attitudes on having an intimate relationship with an autonomous humanoid-robot. The research is being conducted, for the purpose of graduation from State University of New York - Empire State College, by Zeynep Deniztoker.

All of the information that is collected throughout this study is anonymous and will be used for thesis project research purposes only. There are no right or wrong answers. Please complete the questionnaire that consist of three parts. Please read the instructions carefully and choose the options that reflect your personal attitude. Thank you for participating in this research. Your responses are highly appreciated.

Please read each statement carefully.

Information About This Study:

1. The study you are about to participate in is a psychological research.
2. The purpose of this study is to examine the correlation of attitudes toward human-robot intimate relationship and Big-Five personality dimensions.
3. The study is in three-parts and these are: The Big-Five Personality Inventory, Attitudes Toward Human- Robot Intimate Relationship Questionnaire, and a demographic survey.
4. The questionnaires take approximately 15 minutes to complete. There are no right or wrong answers. The questionnaires demand only the participant's (your) subjective opinion.

Participating In This Study:

5. Taking part in this study is *completely voluntary* and the participant (you) may withdraw from completing the three-parts at any time, with no penalty.
6. There are no known risks for participating in this study and completing the questionnaires.
7. The information collected through this three-part study will be used for a Senior Project Thesis.
8. The information collected through this three-part study will be completely anonymous and cannot be linked to the participant's (your) identity.
9. If you need further assistance, or any concern, and/or you want to be informed of the results of the study, the contact information of the researcher is zeynep_deniztoker240@esc.edu

If, after reading the nine statements above, you decide to participate in this study, please sign to show that you agree with the following three statements:

1. You have understood the nine statements stated above and accept them.
2. You are 18 or older.
3. You understand that you voluntarily agree to participate in this study.

Name:

Date:

Signature:

Appendix B

SECTION II (PART I)

Attitudes Toward Human-Robot Intimate Relationship Questionnaire (INT-RO 1)

Instructions: Technology is developing fast in the field of robotics, and there is intense debate and research in the field of Human-Robot Interaction (HRI). This research concerns the development of humanoid-robots that look, speak, act, and are capable of reasoning and thinking like humans. This questionnaire examines your personal attitude toward having an intimate relationship with an autonomous humanoid-robot.

Please read the statements below attentively and choose a number for each statement indicating your personal attitude on human-robot intimate relationships.

1	2	3	4	5
Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

1. ____ In the near future, humanoid-robots will be indistinguishable from humans the way they look and behave.
2. ____ In the near future, humanoid-robots will be indistinguishable from humans by the way they reason and think.
3. ____ Humanoid-robots could be a part of everyday human life.
4. ____ A human could trust a humanoid-robot.
5. ____ A human could trust a humanoid-robot for taking care of one's child.
6. ____ A human could trust a humanoid-robot for taking care of one's pet.
7. ____ A human could trust a humanoid-robot for taking care of the elderly.
8. ____ A human could trust a humanoid-robot as an intimate partner.
9. ____ In the near future, human-robot sex could be a part of some people's daily life.
10. ____ Some people could become attracted to a humanoid-robot.
11. ____ A humanoid-robot could become attracted to a human.
12. ____ In the near future, human-robot sex could be indistinguishable from human-human sex.
13. ____ Humanoid-robots could be capable of satisfying human emotional needs.
14. ____ Humanoid-robots could be so desirable that some people might give up having a human partner.
15. ____ Humans should have the right to marry their humanoid-robot partner.
16. ____ Humanoid-robots could be a part of my everyday life.
17. ____ I could become attracted to a humanoid-robot.
18. ____ A humanoid-robot could become attracted to me.
19. ____ In the near future, human-robot sex could be a part of my daily life.
20. ____ A humanoid-robot could satisfy my emotional needs.
21. ____ Humanoid-robots could be so desirable that I might give up having a human partner.
22. ____ If I found out that my intimate partner was engaging in an intimate relationship with a humanoid-robot, I would consider that infidelity.

SECTION III (PART II)

The Big Five Inventory

Instructions: Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

1 Disagree strongly	2 Disagree a little	3 Neither agree nor disagree	4 Agree a little	5 Agree strongly
---------------------------	------------------------	------------------------------------	---------------------	---------------------

I see myself as someone who...

- | | |
|---|---|
| 1. _____ Is talkative | 24. _____ Is emotionally stable, not easily
upset |
| 2. _____ Tends to find fault with others | 25. _____ Is inventive |
| 3. _____ Does a thorough job | 26. _____ Has an assertive personality |
| 4. _____ Is depressed, blue | 27. _____ Can be cold and aloof |
| 5. _____ Is original, comes up with new
ideas | 28. _____ Perseveres until the task is finished |
| 6. _____ Is reserved | 29. _____ Can be moody |
| 7. _____ Is helpful and unselfish with others | 30. _____ Values artistic, aesthetic
experiences |
| 8. _____ Can be somewhat careless | 31. _____ Is sometimes shy, inhibited |
| 9. _____ Is relaxed, handles stress well | 32. _____ Is considerate and kind to almost
everyone |
| 10. _____ Is curious about many different
things | 33. _____ Does things efficiently |
| 11. _____ Is full of energy | 34. _____ Remains calm in tense situations |
| 12. _____ Starts quarrels with others | 35. _____ Prefers work that is routine |
| 13. _____ Is a reliable worker | 36. _____ Is outgoing, sociable |
| 14. _____ Can be tense | 37. _____ Is sometimes rude to others |
| 15. _____ Is ingenious, a deep thinker | 38. _____ Makes plans and follows through
with them |
| 16. _____ Generates a lot of enthusiasm | 39. _____ Gets nervous easily |
| 17. _____ Has a forgiving nature | 40. _____ Likes to reflect, play with ideas |
| 18. _____ Tends to be disorganized | 41. _____ Has few artistic interests |
| 19. _____ Worries a lot | 42. _____ Likes to cooperate with others |
| 20. _____ Has an active imagination | 43. _____ Is easily distracted |
| 21. _____ Tends to be quiet | 44. _____ Is sophisticated in art, music, or
literature. |
| 22. _____ Is generally trusting | |
| 23. _____ Tends to be lazy | |

Please check: Did you write a number in front of each statement?

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SECTION IV (PART III)
Demographic Survey

Instructions: Please choose/complete the demographic information below as it applies to you.

1. Self-Identified Gender:

Female

Male

Prefer not to say

Other (please specify): _____

2. Age: _____

3. Nationality: _____

SECTION V

Thank you very much for participating in this futuristic research!
The information you provide for this research is highly appreciated.

Appendix C

Tables

Table 1

1. Self-identified Gender Statistics of the Lovotics and the Big-Five Research Participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Female	174	68.5	68.5	68.5
Male	70	27.6	27.6	96.1
Prefer not to say	10	3.9	3.9	100.0
Total	254	100.0	100.0	

Table 2

Demographic Statistics of the Lovotics and the Big-Five Research Participants

		1. Self-identified Gender	2. Age	3. Nationality	4. Culture
N	Valid	254	254	254	254
	Missing	0	0	0	0
	Mean		22.88		
	Median		22.00		
	Mode		21		
	Std. Deviation		5.181		
	Minimum		17		
	Maximum		54		

Table 3

Demographic Statistics of the Lovotics and the Big-Five Research Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NonWestern	47	18.5	18.5	18.5
	Western	207	81.5	81.5	100.0
	Total	254	100.0	100.0	

Table 4

Descriptive Statistics of the INT-RO-1 Scale

		Statistic	Std. Error	
INTRO_SCALE	Mean	57.7913	1.03648	
	95% Confidence Interval for Mean	Lower Bound	55.7501	
		Upper Bound	59.8326	
	5% Trimmed Mean	57.4996		
	Median	58.0000		
	Variance	272.869		
	Std. Deviation	16.51876		
	Minimum	22.00		
	Maximum	110.00		
	Range	88.00		
	Interquartile Range	24.25		
	Skewness	.233	.153	
	Kurtosis	-.279	.304	

Table 5

Tests of Normality Statistics for the INT-RO-1 Scale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INTRO_SCALE	.058	254	.037	.991	254	.129

a. Lilliefors Significance Correction

Table 6

Descriptive Statistics for the INT-RO-1 Trust Subscale

		Statistic	Std. Error
INTRO_TRUST	Mean	13.1654	.33256
	95% Confidence Interval for Mean		
		Lower Bound	12.5104
		Upper Bound	13.8203
	5% Trimmed Mean	13.0276	
	Median	13.0000	
	Variance	28.091	
	Std. Deviation	5.30011	
	Minimum	5.00	
	Maximum	25.00	
	Range	20.00	
	Interquartile Range	8.00	
	Skewness	.208	.153
	Kurtosis	-.802	.304

Table 7

Tests of Normality Statistics for the INT-RO-1 Trust Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INTRO TRUST	.075	254	.001	.964	254	.000

a. Lilliefors Significance Correction

Table 8

Descriptive Statistics for the INT-RO-1 Sexuality Subscale

		Statistic	Std. Error	
INTRO_SEXUALITY	Mean	6.9882	.18682	
	95% Confidence Interval for Mean	Lower Bound	6.6203	
		Upper Bound	7.3561	
	5% Trimmed Mean	6.8451		
	Median	7.0000		
	Variance	8.865		
	Std. Deviation	2.97749		
	Minimum	3.00		
	Maximum	15.00		
	Range	12.00		
	Interquartile Range	4.00		
	Skewness	.482	.153	
	Kurtosis	-.453	.304	

Table 9

Tests of Normality Statistics for the INT-RO-1 Sexuality Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INTRO_SEXUALITY	.101	254	.000	.944	254	.000

a. Lilliefors Significance Correction

Table 10

Descriptive Statistics for the INT-RO-1 Intimacy Subscale

		Statistic	Std. Error
INTRO_INTIMACY	Mean	14.5669	.33254
	95% Confidence Interval for Mean		
	Lower Bound	13.9120	
	Upper Bound	15.2218	
	5% Trimmed Mean	14.3758	
	Median	14.0000	
	Variance	28.088	
	Std. Deviation	5.29985	
	Minimum	6.00	
	Maximum	30.00	
	Range	24.00	
	Interquartile Range	8.00	
	Skewness	.489	.153
	Kurtosis	-.254	.304

Table 11

Tests of Normality Statistics for the INT-RO-1 Intimacy Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INTRO_INTIMACY	.084	254	.000	.970	254	.000

a. Lilliefors Significance Correction

Table 12

Descriptive Statistics for the INT-RO-1 Acceptance Subscale

		Statistic	Std. Error
INTRO_ACCEPTANCE	Mean	23.0709	.35979
	95% Confidence Interval for Mean		
	Lower Bound	22.3623	
	Upper Bound	23.7794	
	5% Trimmed Mean	23.0713	
	Median	23.0000	
	Variance	32.880	
	Std. Deviation	5.73414	
	Minimum	8.00	
	Maximum	40.00	
	Range	32.00	
	Interquartile Range	8.00	
	Skewness	-.040	.153
	Kurtosis	-.261	.304

Table 13

Tests of Normality Statistics for the INT-RO-1 Acceptance Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INTRO_ACCEPTANCE	.070	254	.004	.992	254	.226

a. Lilliefors Significance Correction

Table 14

Descriptive Statistics for the BFI Extraversion Subscale

		Statistic	Std. Error
BFI_EXTRAVERSION	Mean	25.6024	.30400
	95% Confidence Interval for Mean		
	Lower Bound	25.0037	
	Upper Bound	26.2011	
	5% Trimmed Mean	25.6181	
	Median	25.5000	
	Variance	23.474	
	Std. Deviation	4.84496	
	Minimum	12.00	
	Maximum	38.00	
	Range	26.00	
	Interquartile Range	6.00	
	Skewness	-.039	.153
	Kurtosis	-.067	.304

Table 15

Tests of Normality Statistics for the BFI Extraversion Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BFI EXTRAVERSION	.063	254	.015	.994	254	.368

a. Lilliefors Significance Correction

Table 16

Descriptive Statistics for the BFI Agreeableness Subscale

		Statistic	Std. Error
BFI_AGREEABLENESS	Mean	32.2835	.31215
	95% Confidence Interval for Mean		
	Lower Bound	31.6687	
	Upper Bound	32.8982	
	5% Trimmed Mean	32.2913	
	Median	32.0000	
	Variance	24.749	
	Std. Deviation	4.97487	
	Minimum	18.00	
	Maximum	45.00	
	Range	27.00	
	Interquartile Range	7.00	
	Skewness	-.017	.153
	Kurtosis	-.143	.304

Table 17

Tests of Normality Statistics for the BFI Agreeableness Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BFI_AGREEABLENESS	.048	254	.200*	.993	254	.327

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 18

Descriptive Statistics for the BFI Conscientiousness Subscale

		Statistic	Std. Error
BFI_CONSCIENTIOUSNESS	Mean	30.2441	.34087
	95% Confidence Interval for Mean		
	Lower Bound	29.5728	
	Upper Bound	30.9154	
	5% Trimmed Mean	30.3281	
	Median	30.0000	
	Variance	29.513	
	Std. Deviation	5.43261	
	Minimum	14.00	
	Maximum	44.00	
	Range	30.00	
	Interquartile Range	8.00	
	Skewness	-.149	.153
	Kurtosis	-.117	.304

Table 19

Tests of Normality Statistics for the BFI Conscientiousness Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BFI_CONSCIENTIOUSNESS	.069	254	.005	.992	254	.150

a. Lilliefors Significance Correction

Table 20

Descriptive Statistics for the BFI Neuroticism Subscale

		Statistic	Std. Error
BFI_NEUROTICISM	Mean	25.2323	.36911
	95% Confidence Interval for Mean		
	Lower Bound	24.5054	
	Upper Bound	25.9592	
	5% Trimmed Mean	25.2725	
	Median	25.0000	
	Variance	34.606	
	Std. Deviation	5.88268	
	Minimum	8.00	
	Maximum	40.00	
	Range	32.00	
	Interquartile Range	8.00	
	Skewness	.008	.153
	Kurtosis	-.222	.304

Table 21

Tests of Normality Statistics for the BFI Neuroticism Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BFI NEUROTICISM	.075	254	.002	.991	254	.131

a. Lilliefors Significance Correction

Table 22

Descriptive Statistics for the BFI Openness Subscale

		Statistic	Std. Error
BFI_OPENNESS	Mean	36.2205	.32795
	95% Confidence Interval for Mean		
	Lower Bound	35.5746	
	Upper Bound	36.8663	
	5% Trimmed Mean	36.3412	
	Median	36.0000	
	Variance	27.319	
	Std. Deviation	5.22674	
	Minimum	18.00	
	Maximum	49.00	
	Range	31.00	
	Interquartile Range	7.00	
	Skewness	-.364	.153
	Kurtosis	.429	.304

Table 23

Tests of Normality Statistics for the BFI Openness Subscale

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BFI OPENNESS	.066	254	.010	.987	254	.021

a. Lilliefors Significance Correction

Table 24

Descriptive Statistics for the INT-RO-1 Scale as the Dependent Variable

1. Self-identified Gender			Statistic	Std. Error	
INTRO1_SCALE	Female	Mean	54.8276	1.17942	
		95% Confidence Interval for Mean	Lower Bound	52.4997	
			Upper Bound	57.1555	
		5% Trimmed Mean	54.4911		
		Median	55.0000		
		Variance	242.039		
		Std. Deviation	15.55762		
		Minimum	22.00		
		Maximum	97.00		
		Range	75.00		
		Interquartile Range	22.00		
		Skewness	.255	.184	
		Kurtosis	-.337	.366	
			Male	Mean	62.8857
95% Confidence Interval for Mean	Lower Bound			59.0171	
	Upper Bound			66.7543	
5% Trimmed Mean	62.9365				
Median	64.5000				
Variance	263.233				
Std. Deviation	16.22446				
Minimum	22.00				
Maximum	99.00				
Range	77.00				
Interquartile Range	27.00				
Skewness	-.103			.287	
Kurtosis	-.405			.566	
Prefer not to say				Mean	73.7000
		95% Confidence Interval for Mean	Lower Bound	60.3720	
			Upper Bound	87.0280	
		5% Trimmed Mean	72.9444		
		Median	71.5000		
		Variance	347.122		
		Std. Deviation	18.63122		
		Minimum	51.00		
		Maximum	110.00		
		Range	59.00		
		Interquartile Range	27.50		
		Skewness	.637	.687	
		Kurtosis	-.096	1.334	

Table 25

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Scale
Dependent Variable: INTRO1 SCALE

F	df1	df2	Sig.
.438	2	251	.646

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + SelfidentifiedGender

Table 26
Tests of Between-Subjects Effects for the INT-RO-1 Scale
 Dependent Variable: INTRO1_SCALE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5875.928 ^a	2	2937.964	11.676	.000	.085
Intercept	305241.894	1	305241.894	1213.041	.000	.829
SelfidentifiedGender	5875.928	2	2937.964	11.676	.000	.085
Error	63160.013	251	251.634			
Total	917355.000	254				
Corrected Total	69035.941	253				

a. R Squared = .085 (Adjusted R Squared = .078)

Table 27
Multiple Comparisons for the INT-RO-1 Scale
 INTRO1_SCALE
 Tukey HSD

(I) 1. Self-identified Gender	(J) 1. Self-identified Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Female	Male	-8.0581*	2.24520	.001	-13.3516	-2.7646
	Prefer not to say	8.0581*	5.15844	.001	-31.0345	-6.7103
Male	Female		2.24520	.001	2.7646	13.3516
	Prefer not to say	-10.8143	5.36266	.110	-23.4578	1.8293
Prefer not to say	Female		5.15844	.001	6.7103	31.0345
	Male	10.8143	5.36266	.110	-1.8293	23.4578

Based on observed means.

The error term is Mean Square (Error) = 251.634.

*. The mean difference is significant at the .05 level.

Table 28

Descriptive Statistics for the INT-RO-1 Trust Subscale as the Dependent Variable

1. Self-identified Gender			Statistic	Std. Error	
INTRO1_TRUST	Female	Mean	12.2126	.38072	
		95% Confidence Interval for Mean	Lower Bound	11.4612	
			Upper Bound	12.9641	
		5% Trimmed Mean	12.0377		
		Median	12.0000		
		Variance	25.220		
		Std. Deviation	5.02199		
		Minimum	5.00		
		Maximum	24.00		
		Range	19.00		
		Interquartile Range	8.25		
		Skewness	.275	.184	
		Kurtosis	-.895	.366	
		Male	Male	Mean	15.0429
95% Confidence Interval for Mean	Lower Bound			13.7993	
	Upper Bound			16.2864	
5% Trimmed Mean	15.0635				
Median	15.0000				
Variance	27.201				
Std. Deviation	5.21546				
Minimum	5.00				
Maximum	25.00				
Range	20.00				
Interquartile Range	7.25				
Skewness	-.016			.287	
Kurtosis	-.666			.566	
Prefer not to say	Prefer not to say			Mean	16.6000
		95% Confidence Interval for Mean	Lower Bound	12.1748	
			Upper Bound	21.0252	
		5% Trimmed Mean	16.7778		
		Median	15.5000		
		Variance	38.267		
		Std. Deviation	6.18601		
		Minimum	5.00		
		Maximum	25.00		
		Range	20.00		
		Interquartile Range	8.75		
		Skewness	-.238	.687	
		Kurtosis	.120	1.334	

Table 29

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Trust Subscale

Dependent Variable: INTRO1_TRUST

F	df1	df2	Sig.
.064	2	251	.938

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + SelfidentifiedGender

Table 30

Tests of Between-Subjects Effects for the INT-RO-1 Trust Subscale

Dependent Variable: INTRO1_TRUST

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	522.652 ^a	2	261.326	9.962	.000	.074
Intercept	16023.156	1	16023.156	610.809	.000	.709
SelfidentifiedGender	522.652	2	261.326	9.962	.000	.074
Error	6584.404	251	26.233			
Total	51132.000	254				
Corrected Total	7107.055	253				

a. R Squared = .074 (Adjusted R Squared = .066)

Table 31
Multiple Comparisons for the INT-RO-1 Trust Subscale
 INTRO1_TRUST
 Tukey HSD

(I) 1. Self-identified Gender	(J) 1. Self-identified Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Female	Male	-2.8302*	.72492	.000	-4.5394	-1.1211
	Prefer not to say	2.8302*	1.66554	.024	-8.3142	-.4605
Male	Female		.72492	.000	1.1211	4.5394
	Prefer not to say	-1.5571	1.73148	.641	-5.6395	2.5252
Prefer not to say	Female		1.66554	.024	.4605	8.3142
	Male	1.5571	1.73148	.641	-2.5252	5.6395

Based on observed means.

The error term is Mean Square (Error) = 26.233.

*. The mean difference is significant at the .05 level.

Table 32

Descriptive Statistics for the INT-RO-1 Sexuality Subscale as the Dependent Variable

1. Self-identified Gender			Statistic	Std. Error	
INTRO1_SEXUALITY	Female	Mean	6.6954	.21695	
		95% Confidence Interval for Mean	Lower Bound	6.2672	
			Upper Bound	7.1236	
		5% Trimmed Mean	6.5421		
		Median	6.5000		
		Variance	8.190		
		Std. Deviation	2.86180		
		Minimum	3.00		
		Maximum	15.00		
		Range	12.00		
		Interquartile Range	4.00		
		Skewness	.577	.184	
		Kurtosis	-.191	.366	
		Male	Mean	7.4000	.36196
95% Confidence Interval for Mean	Lower Bound		6.6779		
	Upper Bound		8.1221		
5% Trimmed Mean	7.3333				
Median	7.0000				
Variance	9.171				
Std. Deviation	3.02837				
Minimum	3.00				
Maximum	13.00				
Range	10.00				
Interquartile Range	4.25				
Skewness	.182		.287		
Kurtosis	-.914		.566		
Prefer not to say	Mean		9.2000	1.14310	
	95% Confidence Interval for Mean	Lower Bound	6.6141		
		Upper Bound	11.7859		
	5% Trimmed Mean	9.1111			
	Median	8.5000			
	Variance	13.067			
	Std. Deviation	3.61478			
	Minimum	5.00			
	Maximum	15.00			
	Range	10.00			
	Interquartile Range	7.25			
	Skewness	.345	.687		
	Kurtosis	-1.384	1.334		

Table 33

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Sexuality Subscale

Dependent Variable: INTRO1_SEXUALITY

F	df1	df2	Sig.
1.145	2	251	.320

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + SelfidentifiedGender

Table 34

Tests of Between-Subjects Effects for the INT-RO-1 Sexuality Subscale

Dependent Variable: INTRO1_SEXUALITY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	75.708 ^a	2	37.854	4.384	.013	.034
Intercept	4521.061	1	4521.061	523.605	.000	.676
SelfidentifiedGender	75.708	2	37.854	4.384	.013	.034
Error	2167.256	251	8.634			
Total	14647.000	254				
Corrected Total	2242.965	253				

a. R Squared = .034 (Adjusted R Squared = .026)

Table 35
Multiple Comparisons for the INT-RO-1 Sexuality Subscale
 INTRO1_SEXUALITY

Tukey HSD

(I) 1. Self-identified Gender	(J) 1. Self-identified Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Female	Male	-.7046	.41590	.209	-1.6852	.2760
	Prefer not to say		.95555	.025	-4.7575	-.2517
Male	Female	.7046	.41590	.209	-.2760	1.6852
	Prefer not to say	-1.8000	.99338	.168	-4.1421	.5421
Prefer not to say	Female		.95555	.025	.2517	4.7575
	Male	1.8000	.99338	.168	-.5421	4.1421

Based on observed means.

The error term is Mean Square (Error) = 8.634.

*. The mean difference is significant at the .05 level.

Table 36

Descriptive Statistics for the INT-RO-1 Intimacy Subscale as the Dependent Variable

1. Self-identified Gender			Statistic	Std. Error	
INTRO1_INTIMACY	Female	Mean	13.5632	.36593	
		95% Confidence Interval for Mean	Lower Bound		12.8410
			Upper Bound		14.2855
		5% Trimmed Mean	13.3633		
		Median	13.0000		
		Variance	23.299		
		Std. Deviation	4.82695		
		Minimum	6.00		
		Maximum	28.00		
		Range	22.00		
		Interquartile Range	7.00		
		Skewness	.582		.184
		Kurtosis	-.105		.366
			Male		Mean
95% Confidence Interval for Mean	Lower Bound			15.0090	
	Upper Bound			17.5910	
5% Trimmed Mean	16.2302				
Median	17.0000				
Variance	29.314				
Std. Deviation	5.41429				
Minimum	6.00				
Maximum	30.00				
Range	24.00				
Interquartile Range	8.00				
Skewness	.122			.287	
Kurtosis	-.300			.566	
Prefer not to say				Mean	19.9000
		95% Confidence Interval for Mean	Lower Bound	15.2340	
			Upper Bound	24.5660	
		5% Trimmed Mean	19.9444		
		Median	20.0000		
		Variance	42.544		
		Std. Deviation	6.52261		
		Minimum	9.00		
		Maximum	30.00		
		Range	21.00		
		Interquartile Range	10.25		
		Skewness	-.216	.687	
		Kurtosis	-.620	1.334	

Table 37

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Intimacy Subscale

Dependent Variable: INTRO1_INTIMACY

F	df1	df2	Sig.
1.466	2	251	.233

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + SelfidentifiedGender

Table 38

Tests of Between-Subjects Effects for the INT-RO-1 Intimacy Subscale

Dependent Variable: INTRO1_INTIMACY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	669.958 ^a	2	334.979	13.063	.000	.094
Intercept	20630.836	1	20630.836	804.539	.000	.762
SelfidentifiedGender	669.958	2	334.979	13.063	.000	.094
Error	6436.405	251	25.643			
Total	61004.000	254				
Corrected Total	7106.362	253				

a. R Squared = .094 (Adjusted R Squared = .087)

Table 39
Multiple Comparisons for the INT-RO-1 Intimacy Subscale
 INTRO1_INTIMACY

Tukey HSD

(I) 1. Self-identified Gender	(J) 1. Self-identified Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Female	Male	-2.7368*	.71673	.000	-4.4266	-1.0469
	Prefer not to say	2.7368*	1.64672	.000	-10.2193	-2.4543
Male	Female		.71673	.000	1.0469	4.4266
	Prefer not to say	-3.6000	1.71191	.091	-7.6362	.4362
Prefer not to say	Female		1.64672	.000	2.4543	10.2193
	Male	3.6000	1.71191	.091	-.4362	7.6362

Based on observed means.

The error term is Mean Square (Error) = 25.643.

*. The mean difference is significant at the .05 level.

Table 40

Descriptive Statistics for the INT-RO-1 Acceptance Subscale as the Dependent Variable

1. Self-identified Gender			Statistic	Std. Error	
INTRO1_ACCEPTANCE	Female	Mean	22.3563	.41225	
		95% Confidence Interval for Mean	Lower Bound		21.5426
			Upper Bound		23.1700
		5% Trimmed Mean	22.4151		
		Median	23.0000		
		Variance	29.572		
		Std. Deviation	5.43799		
		Minimum	8.00		
		Maximum	35.00		
		Range	27.00		
		Interquartile Range	8.00		
		Skewness	-.194		.184
		Kurtosis	-.559		.366
			Male		Mean
95% Confidence Interval for Mean	Lower Bound			22.7190	
	Upper Bound			25.5667	
5% Trimmed Mean	24.2302				
Median	23.5000				
Variance	35.660				
Std. Deviation	5.97164				
Minimum	8.00				
Maximum	35.00				
Range	27.00				
Interquartile Range	8.25				
Skewness	-.090			.287	
Kurtosis	-.390			.566	
Prefer not to say				Mean	28.0000
		95% Confidence Interval for Mean	Lower Bound	23.6683	
			Upper Bound	32.3317	
		5% Trimmed Mean	27.6111		
		Median	25.0000		
		Variance	36.667		
		Std. Deviation	6.05530		
		Minimum	23.00		
		Maximum	40.00		
		Range	17.00		
		Interquartile Range	10.50		
		Skewness	1.055	.687	
		Kurtosis	-.092	1.334	

Table 41

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Acceptance Subscale

Dependent Variable: INTRO1_ACCEPTANCE

F	df1	df2	Sig.
.348	2	251	.706

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + SelfidentifiedGender

Table 42

Tests of Between-Subjects Effects for the INT-RO-1 Acceptance Subscale

Dependent Variable: INTRO1_ACCEPTANCE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	412.245 ^a	2	206.122	6.544	.002	.050
Intercept	46238.410	1	46238.410	1467.890	.000	.854
SelfidentifiedGender	412.245	2	206.122	6.544	.002	.050
Error	7906.479	251	31.500			
Total	143514.000	254				
Corrected Total	8318.724	253				

a. R Squared = .050 (Adjusted R Squared = .042)

Table 43
Multiple Comparisons for the INT-RO-1 Acceptance Subscale
 INTRO1_ACCEPTANCE

Tukey HSD

(I) 1. Self-identified Gender	(J) 1. Self-identified Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Female	Male	-1.7865	.79438	.065	-3.6594	.0864
	Prefer not to say		1.82511	.006	-9.9467	-1.3406
Male	Female	1.7865	.79438	.065	-.0864	3.6594
	Prefer not to say	-3.8571	1.89736	.106	-8.3306	.6163
Prefer not to say	Female		1.82511	.006	1.3406	9.9467
	Male	3.8571	1.89736	.106	-.6163	8.3306

Based on observed means.

The error term is Mean Square (Error) = 31.500.

*. The mean difference is significant at the .05 level.

Table 44

Descriptive Statistics of the INT-RO-1 as the Dependent Variable for Different Cultures

4. NonWestern-Western		Statistic	Std. Error		
INTRO1_SCALE	NonWestern	Mean	55.9787	2.17153	
		95% Confidence Interval			
		Lower Bound	51.6077		
		Upper Bound	60.3498		
		for Mean			
		5% Trimmed Mean	55.2801		
		Median	58.0000		
		Variance	221.630		
		Std. Deviation	14.88724		
		Minimum	29.00		
		Maximum	97.00		
		Range	68.00		
		Interquartile Range	15.00		
		Skewness	.648		.347
		Kurtosis	.918		.681
Western	Western	Mean	58.2029	1.17279	
		95% Confidence Interval			
		Lower Bound	55.8907		
		Upper Bound	60.5151		
		for Mean			
		5% Trimmed Mean	58.0051		
		Median	58.0000		
		Variance	284.716		
		Std. Deviation	16.87353		
		Minimum	22.00		
		Maximum	110.00		
		Range	88.00		
		Interquartile Range	26.00		
		Skewness	.156		.169
		Kurtosis	-.411		.337

Table 45

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Scale for Different Cultures

Dependent Variable: INTRO1 SCALE

F	df1	df2	Sig.
3.137	1	252	.078

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + NonWestern_Western

Table 46

Tests of Between-Subjects Effects of the INT-RO-1 for Different Cultures

Dependent Variable: INTRO1_SCALE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	189.484 ^a	1	189.484	.694	.406	.003
Intercept	499375.122	1	499375.122	1827.872	.000	.879
NonWestern_Western	189.484	1	189.484	.694	.406	.003
Error	68846.457	252	273.200			
Total	917355.000	254				
Corrected Total	69035.941	253				

a. R Squared = .003 (Adjusted R Squared = -.001)

Table 47

Descriptive Statistics of the INT-RO-1 Trust Subscale as the Dependent Variable for Different Cultures

4. NonWestern-Western		Statistic	Std. Error		
INTRO1_TRUST	NonWestern	Mean	12.5106	.76394	
		95% Confidence Interval			
		Lower Bound	10.9729		
		Upper Bound	14.0484		
		5% Trimmed Mean	12.3452		
		Median	12.0000		
		Variance	27.429		
		Std. Deviation	5.23729		
		Minimum	5.00		
		Maximum	24.00		
		Range	19.00		
		Interquartile Range	8.00		
		Skewness	.573		.347
		Kurtosis	-.569		.681
	Western		Mean		13.3140
		95% Confidence Interval			
		Lower Bound	12.5856		
		Upper Bound	14.0424		
		5% Trimmed Mean	13.1841		
		Median	14.0000		
		Variance	28.255		
		Std. Deviation	5.31557		
		Minimum	5.00		
		Maximum	25.00		
		Range	20.00		
		Interquartile Range	8.00		
		Skewness	.132	.169	
		Kurtosis	-.799	.337	

Table 48

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Trust Subscale for Different Cultures

Dependent Variable: INTRO1 TRUST

F	df1	df2	Sig.
.154	1	252	.695

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + NonWestern_Western

Table 49

Tests of Between-Subjects Effects of the INT-RO-1 Trust Subscale for Different Cultures

Dependent Variable: INTRO1 TRUST

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	24.721 ^a	1	24.721	.880	.349	.003
Intercept	25544.847	1	25544.847	908.924	.000	.783
NonWestern_Western	24.721	1	24.721	.880	.349	.003
Error	7082.334	252	28.105			
Total	51132.000	254				
Corrected Total	7107.055	253				

a. R Squared = .003 (Adjusted R Squared = -.001)

Table 50
Descriptive Statistics of the INT-RO-1 Sexuality Subscale as the Dependent Variable for Different Cultures

4. NonWestern-Western		Statistic	Std. Error
INTRO1_SEXUALITY	Non-Western	Mean	.41734
		95% Confidence Interval Lower Bound for Mean	5.5004
		Upper Bound	7.1805
		5% Trimmed Mean	6.1170
		Median	6.0000
		Variance	8.186
		Std. Deviation	2.86111
		Minimum	3.00
		Maximum	14.00
		Range	11.00
		Interquartile Range	4.00
		Skewness	.921
		Kurtosis	.681
	Western	Mean	.20785
		95% Confidence Interval Lower Bound for Mean	6.7255
		Upper Bound	7.5451
		5% Trimmed Mean	7.0123
		Median	7.0000
		Variance	8.943
		Std. Deviation	2.99045
		Minimum	3.00
		Maximum	15.00
		Range	12.00
		Interquartile Range	4.00
		Skewness	.399
		Kurtosis	-.337

Table 51

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Sexuality Subscale for Different Cultures

Dependent Variable: INTRO1 SEXUALITY

F	df1	df2	Sig.
.390	1	252	.533

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + NonWestern_Western

Table 52

Tests of Between-Subjects Effects of the INT-RO-1 Sexuality Subscale for Different Cultures

Dependent Variable: INTRO1 SEXUALITY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	24.199 ^a	1	24.199	2.748	.099	.011
Intercept	6955.632	1	6955.632	789.997	.000	.758
NonWestern_Western	24.199	1	24.199	2.748	.099	.011
Error	2218.766	252	8.805			
Total	14647.000	254				
Corrected Total	2242.965	253				

a. R Squared = .011 (Adjusted R Squared = .007)

Table 53

Descriptive Statistics of the INT-RO-1 Intimacy Subscale as the Dependent Variable for Different Cultures

4. NonWestern-Western		Statistic	Std. Error	
INTRO1_INTIMACY	Non Western	Mean	13.8298	.71673
	95% Confidence Interval for Mean	Lower Bound	12.3871	
		Upper Bound	15.2725	
	5% Trimmed Mean	13.5426		
	Median	13.0000		
	Variance	24.144		
	Std. Deviation	4.91369		
	Minimum	6.00		
	Maximum	28.00		
	Range	22.00		
	Interquartile Range	6.00		
	Skewness	.803	.347	
	Kurtosis	.960	.681	
	Western	Mean	14.7343	.37399
		95% Confidence Interval for Mean	Lower Bound	13.9970
Upper Bound			15.4716	
5% Trimmed Mean		14.5687		
Median		14.0000		
Variance		28.953		
Std. Deviation		5.38083		
Minimum		6.00		
Maximum		30.00		
Range		24.00		
Interquartile Range		8.00		
Skewness		.426	.169	
Kurtosis		-.404	.337	

Table 54

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Intimacy Subscale for Different Cultures

Dependent Variable: INTRO1 INTIMACY

F	df1	df2	Sig.
2.320	1	252	.129

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + NonWestern_Western

Table 55

Tests of Between-Subjects Effects of the INT-RO-1 Intimacy Subscale for Different Cultures

Dependent Variable: INTRO1_INTIMACY

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	31.337 ^a	1	31.337	1.116	.292	.004
Intercept	31251.810	1	31251.810	1113.135	.000	.815
NonWestern_Western	31.337	1	31.337	1.116	.292	.004
Error	7075.025	252	28.075			
Total	61004.000	254				
Corrected Total	7106.362	253				

a. R Squared = .004 (Adjusted R Squared = .000)

Table 56

Descriptive Statistics of the INT-RO-1 Acceptance Subscale as the Dependent Variable for Different Cultures

		4. NonWestern-Western	Statistic	Std. Error		
INTRO1_ACCEPTANCE	Non	Mean	23.2979	.71518		
	Western	95% Confidence Interval	Lower Bound		21.8583	
		for Mean	Upper Bound		24.7375	
		5% Trimmed Mean			23.2908	
		Median			24.0000	
		Variance			24.040	
		Std. Deviation			4.90304	
		Minimum			12.00	
		Maximum			33.00	
		Range			21.00	
		Interquartile Range			6.00	
		Skewness			-.198	.347
		Kurtosis			-.107	.681
		Western	Mean		23.0193	.41119
		Western	95% Confidence Interval		Lower Bound	22.2086
			for Mean		Upper Bound	23.8300
			5% Trimmed Mean			23.0107
			Median			23.0000
	Variance				35.000	
	Std. Deviation				5.91605	
Minimum			8.00			
Maximum			40.00			
Range			32.00			
Interquartile Range			8.00			
Skewness			-.012	.169		
Kurtosis			-.314	.337		

Table 57

Levene's Test of Equality of Error Variances^a for the INT-RO-1 Acceptance Subscale for Different Cultures

Dependent Variable: INTRO1_ACCEPTANCE

F	df1	df2	Sig.
2.810	1	252	.095

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + NonWestern_Western

Table 58

Tests of Between-Subjects Effects of the INT-RO-1 Acceptance Subscale for Different Cultures

Dependent Variable: INTRO_ACCEPTANCE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2.972 ^a	1	2.972	.090	.764	.000
Intercept	82171.082	1	82171.082	2490.107	.000	.908
NonWestern_Western	2.972	1	2.972	.090	.764	.000
Error	8315.752	252	32.999			
Total	143514.000	254				
Corrected Total	8318.724	253				

a. R Squared = .000 (Adjusted R Squared = -.004)

Table 59

Model Summary^b for the INT-RO-1 Scale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.300 ^a	.090	.071	15.91742	1.971

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM, BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS, BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_SCALE

Table 60

Coefficients^a for the INT-RO-1 Scale as the Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	67.200	12.711		5.287	.000		
BFI EXTRAVERSION	.194	.231	.057	.838	.403	.799	1.252
BFI AGREEABLENESS	-.697	.223	-.210	-3.124	.002	.814	1.229
BFI CONSCIENTOUSNESS	-.372	.206	-.122	-1.807	.072	.799	1.252
BFI NEUROTICISM	-.271	.194	-.096	-1.396	.164	.770	1.298
BFI_OPENNESS	.724	.202	.229	3.579	.000	.897	1.115

a. Dependent Variable: INTRO1_SCALE

Table 61
ANOVA^b for the INT-RO-1 Scale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6201.590	5	1240.318	4.895	.000 ^a
	Residual	62834.351	248	253.364		
	Total	69035.941	253			

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM, BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS, BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_SCALE

Table 62

Model Summary^b for the INT-RO-1 Trust Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.285 ^a	.081	.063	5.13068	1.852

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM,

BFI_AGREEABLENESS, BFI_CONSCIENTIOUSNESS, BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_TRUST

Table 63

Coefficients^a for the INT-RO-1 Trust Subscale as the Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	16.890	4.097		4.122	.000		
BFI EXTRAVERSION	.133	.074	.122	1.789	.075	.799	1.252
BFI AGREEABLENESS	-.281	.072	-.263	-3.904	.000	.814	1.229
BFI CONSCIENTIOUSNESS	-.021	.066	-.022	-.316	.752	.799	1.252
BFI NEUROTICISM	-.096	.062	-.106	-1.531	.127	.770	1.298
BFI OPENNESS	.137	.065	.135	2.106	.036	.897	1.115

a. Dependent Variable: INTRO1_TRUST

Table 64

ANOVA^b for the INT-RO-1 Trust Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	578.726	5	115.745	4.397	.001 ^a
	Residual	6528.329	248	26.324		
	Total	7107.055	253			

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM,
BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS,
BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_TRUST

Table 65

Model Summary^b for the INT-RO-1 Sexuality Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.268 ^a	.072	.053	2.89754	2.043

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM, BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS, BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_SEXUALITY

Table 66

Coefficients^a for the INT-RO-1 Sexuality Subscale as the Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1 (Constant)	9.949	2.314			4.300	.000		
BFI EXTRAVERSION	-.032	.042	-.052		-.762	.447	.799	1.252
BFI AGREEABLENESS	-.104	.041	-.173		-2.557	.011	.814	1.229
BFI CONSCIENTOUSNESS	-.066	.038	-.120		-1.760	.080	.799	1.252
BFI NEUROTICISM	-.045	.035	-.089		-1.279	.202	.770	1.298
BFI OPENNESS	.120	.037	.211		3.259	.001	.897	1.115

a. Dependent Variable: INTRO1_SEXUALITY

Table 67

ANOVA^b for the INT-RO-1 Sexuality Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160.818	5	32.164	3.831	.002 ^a
	Residual	2082.147	248	8.396		
	Total	2242.965	253			

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM,
BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS,
BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_SEXUALITY

Table 68

Model Summary^b for the INT-RO-1 Intimacy Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.256 ^a	.065	.047	5.17474	2.008

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM, BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS, BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_INTIMACY

Table 69

Coefficients^a for the INT-RO-1 Intimacy Subscale as the Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1 (Constant)	16.613	4.132			4.020	.000		
BFI EXTRAVERSION	.040	.075	.037		.535	.593	.799	1.252
BFI AGREEABLENESS	-.159	.072	-.149		-2.191	.029	.814	1.229
BFI CONSCIENTOUSNESS	-.117	.067	-.120		-1.751	.081	.799	1.252
BFI NEUROTICISM	-.085	.063	-.095		-1.351	.178	.770	1.298
BFI OPENNESS	.214	.066	.211		3.255	.001	.897	1.115

a. Dependent Variable: INTRO1_INTIMACY

Table 70

ANOVA^b for the INT-RO-1 Intimacy Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	465.427	5	93.085	3.476	.005 ^a
	Residual	6640.935	248	26.778		
	Total	7106.362	253			

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM,
BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS,
BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_INTIMACY

Table 71

Model Summary^b for the INT-RO-1 Acceptance Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.277 ^a	.077	.058	5.56522	2.041

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM, BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS, BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_ACCEPTANCE

Table 72

Coefficients^a for the INT-RO-1 Acceptance Subscale as the Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1 (Constant)	23.748	4.444			5.344	.000		
BFI EXTRAVERSION	.052	.081	.044		.647	.518	.799	1.252
BFI AGREEABLENESS	-.153	.078	-.133		-1.968	.050	.814	1.229
BFI CONSCIENTOUSNESS	-.168	.072	-.159		-2.331	.021	.799	1.252
BFI NEUROTICISM	-.045	.068	-.046		-.659	.510	.770	1.298
BFI OPENNESS	.252	.071	.230		3.571	.000	.897	1.115

a. Dependent Variable: INTRO1_ACCEPTANCE

Table 73

ANOVA^b for the INT-RO-1 Acceptance Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	637.745	5	127.549	4.118	.001 ^a
	Residual	7680.979	248	30.972		
	Total	8318.724	253			

a. Predictors: (Constant), BFI_OPENNESS, BFI_NEUROTICISM,
BFI_AGREEABLENESS, BFI_CONSCIENTOUSNESS,
BFI_EXTRAVERSION

b. Dependent Variable: INTRO1_ACCEPTANCE

Table 74

Model Summary^b for the BFI Scale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.100 ^a	.010	-.006	12.44963	2.094

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_SCALE

Table 75
Coefficients^a for the BFI Scale as the Dependent Variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	149.260	3.287		45.403	.000		
INTRO1 TRUST	-.085	.191	-.036	-.444	.657	.597	1.675
INTRO1 SEXUALITY	-.575	.384	-.138	-1.494	.136	.467	2.139
INTRO1 INTIMACY	.153	.259	.065	.590	.556	.324	3.087
INTRO1 ACCEPTANCE	.140	.221	.065	.633	.528	.382	2.619

a. Dependent Variable: BFI_SCALE

Table 76

ANOVA^b for the BFI Scale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	390.439	4	97.610	.630	.642 ^a
	Residual	38593.325	249	154.993		
	Total	38983.764	253			

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_SCALE

Table 77

Model Summary^b for the BFI Extraversion Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.167 ^a	.028	.012	4.81494	2.227

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_EXTRAVERSION

Table 78

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	24.505	1.271		19.273	.000		
	INTRO1 TRUST	.119	.074	.130	1.609	.109	.597	1.675
	INTRO1 SEXUALITY	-.306	.149	-.188	-2.060	.040	.467	2.139
	INTRO1 INTIMACY	.068	.100	.074	.674	.501	.324	3.087
	INTRO1 ACCEPTANCE	.030	.085	.035	.349	.728	.382	2.619

a. Dependent Variable: BFI_EXTRAVERSION

Table 79

ANOVA^b for the BFI Extraversion Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	166.100	4	41.525	1.791	.131 ^a
	Residual	5772.739	249	23.184		
	Total	5938.839	253			

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_EXTRAVERSION

Table 80

Model Summary^b for the BFI Agreeableness Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.204 ^a	.041	.026	4.90961	1.812

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_AGREEABLENESS

Table 81

Coefficients^a for the BFI Agreeableness Subscale as the Dependent Variable

Model		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	34.475	1.296		26.592	.000		
	INTRO1	-.157	.075	-.167	-2.079	.039	.597	1.675
	TRUST							
	INTRO1	-.257	.152	-.154	-1.692	.092	.467	2.139
	SEXUALITY							
	INTRO1	.085	.102	.091	.833	.406	.324	3.087
	INTIMACY							
	INTRO1	.018	.087	.021	.210	.834	.382	2.619
	ACCEPTANCE							

a. Dependent Variable: BFI_AGREEABLENESS

Table 82

ANOVA^b for the BFI Agreeableness Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	259.620	4	64.905	2.693	.032 ^a
	Residual	6001.971	249	24.104		
	Total	6261.591	253			

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_AGREEABLENESS

Table 83

Model Summary^b for the BFI Conscientiousness Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.153 ^a	.023	.008	5.41139	1.996

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_CONSCIENTIOUSNESS

Table 84

Coefficients^a for the BFI Conscientiousness Subscale as the Dependent Variable

Model		Unstandardized		Standardized		Sig.	Collinearity Statistics	
		B	Std. Error	Beta	t		Tolerance	VIF
1	(Constant)	32.843	1.429		22.985	.000		
	INTRO1 TRUST	.092	.083	.090	1.107	.269	.597	1.675
	INTRO1 SEXUALITY	-.130	.167	-.071	-.777	.438	.467	2.139
	INTRO1 INTIMACY	.030	.113	.029	.268	.789	.324	3.087
	INTRO1 ACCEPTANCE	-.145	.096	-.153	-1.509	.133	.382	2.619

a. Dependent Variable: BFI_CONSCIENTIOUSNESS

Table 85

ANOVA^b for the BFI Conscientiousness Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	175.359	4	43.840	1.497	.204 ^a
	Residual	7291.508	249	29.283		
	Total	7466.866	253			

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_CONSCIENTIOUSNESS

Table 86

Model Summary^b for the BFI Neuroticism Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.120 ^a	.015	-.001	5.88659	1.857

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_NEUROTICISM

Table 87

Coefficients^a for the BFI Neuroticism Subscale as the Dependent Variable

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	24.850	1.554		15.986	.000		
	INTRO1 TRUST	-.125	.090	-.113	-1.383	.168	.597	1.675
	INTRO1 SEXUALITY	.091	.182	.046	.499	.619	.467	2.139
	INTRO1 INTIMACY	-.099	.123	-.090	-.810	.419	.324	3.087
	INTRO1 ACCEPTANCE	.123	.104	.120	1.179	.239	.382	2.619

a. Dependent Variable: BFI_NEUROTICISM

Table 88

ANOVA^b the BFI Neuroticism Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	126.976	4	31.744	.916	.455 ^a
	Residual	8628.319	249	34.652		
	Total	8755.295	253			

a. Predictors: (Constant), INTRO1_ACCEPTANCE,
INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_NEUROTICISM

Table 89

Model Summary^b for the BFI Openness Subscale as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.187 ^a	.035	.019	5.17611	2.053

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_OPENNESS

Table 90

Coefficients^a the BFI Openness Subscale as the Dependent Variable

Model		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	32.586	1.367		23.841	.000		
	INTRO1	-.014	.079	-.014	-.177	.860	.597	1.675
	TRUST							
	INTRO1	.028	.160	.016	.173	.863	.467	2.139
	SEXUALITY							
	INTRO1	.069	.108	.070	.643	.521	.324	3.087
	INTIMACY							
	INTRO1	.113	.092	.124	1.234	.218	.382	2.619
	ACCEPTANCE							

a. Dependent Variable: BFI_OPENNESS

Table 91

ANOVA^b for the BFI Openness Subscale as the Dependent Variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	240.415	4	60.104	2.243	.065 ^a
	Residual	6671.239	249	26.792		
	Total	6911.654	253			

a. Predictors: (Constant), INTRO1_ACCEPTANCE, INTRO1_TRUST, INTRO1_SEXUALITY, INTRO1_INTIMACY

b. Dependent Variable: BFI_OPENNESS

Appendix D

Figures

Figure 1

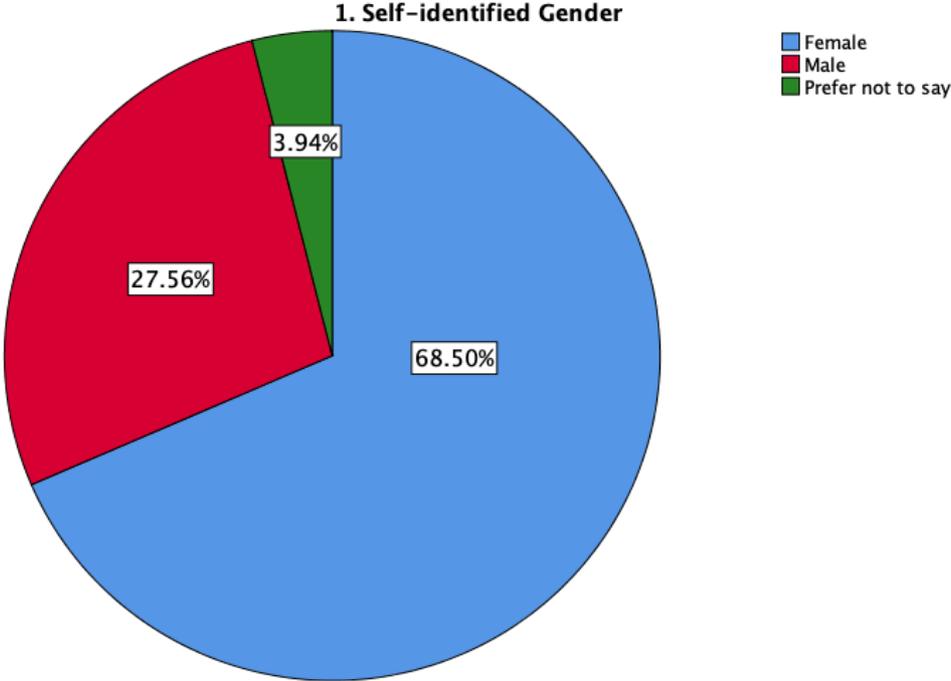


Figure 2

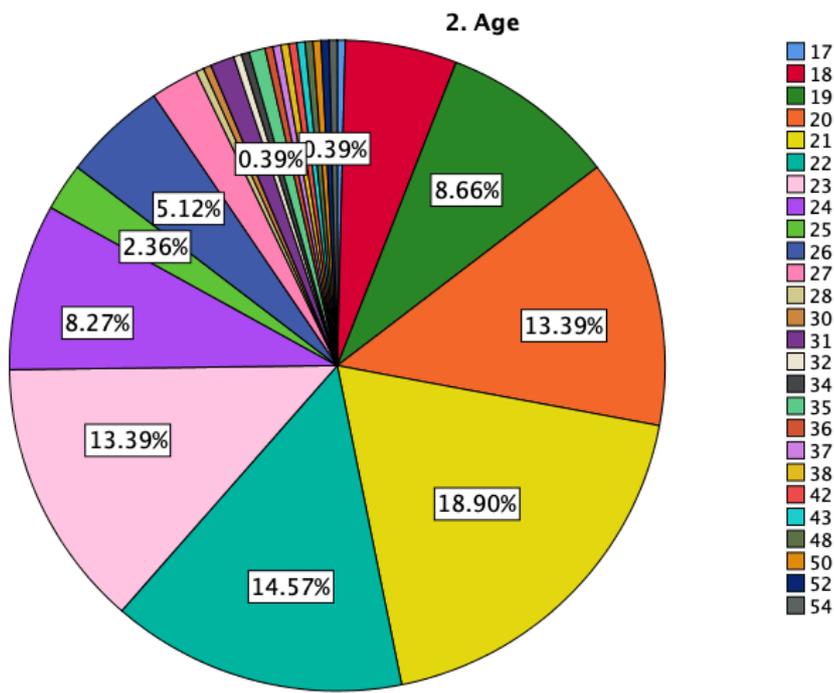


Figure 3

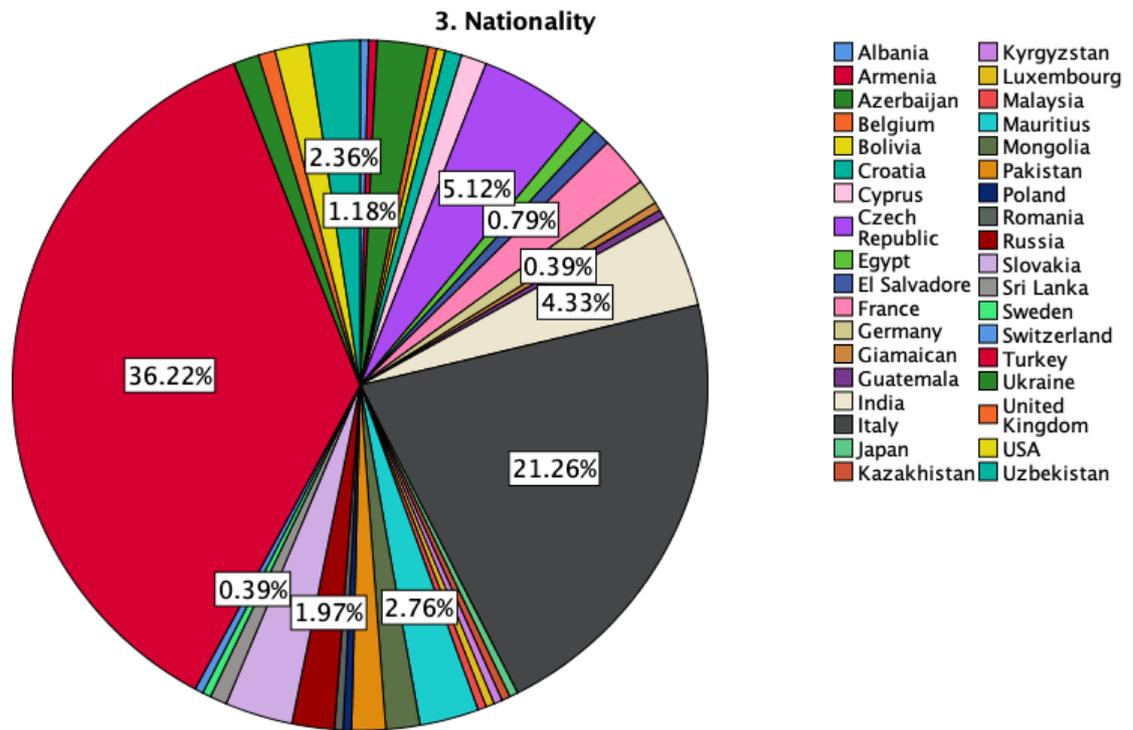


Figure 4

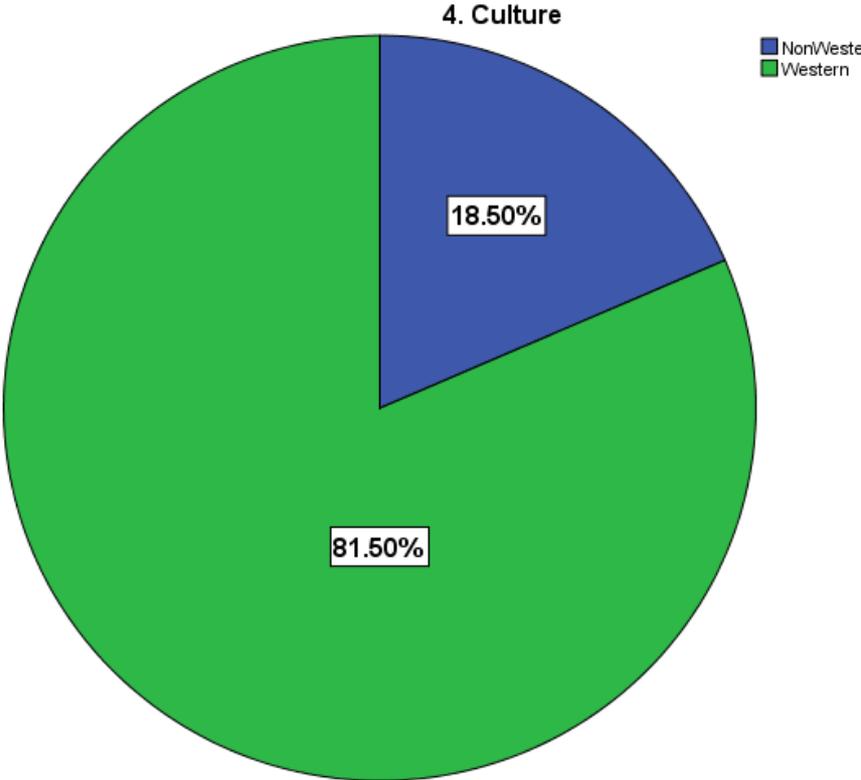


Figure 5



Zeynep S. Deniztoker
 Psychology, Human-Robot Intimacy Studies & Artificial...
 1mo • Edited

Hello! Are you an undergraduate student? Could you please fill out my questionnaire for my thesis project by clicking the link below? I am completing my thesis project for my graduation at State University of New York - Empire State College. Your responses are valuable for me! :) Thank you!

<http://bit.ly/lovotics>

Merhaba! Üniversite öğrencisi misin? Lütfen yukarıdaki linke tıklayarak tez projesi için hazırladığım anketi doldurabilir misin? Mezuniyetim için çalışma yaptığım tez projemi State University of New York - Empire State College'da tamamlıyorum. Yanıtlarınız benim için çok değerli! :) Şimdiden teşekkürler!

**#futurist #futuristic #future #robot #humanoidrobots
 #robotics #ai #AI #consciousness #artificialconsciousness
 #synthetic #psychology #hri #study #research #project
 #lovotics #love #relationship #personality #personalityfactors
 #bigfive #bigfivepersonalities #empirestatecollege #esc
 #stateuniversityofnewyork #suny**

138 views

 Like  Comment  Share

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 Leave your thoughts here... 

Figure 6



Avery 5371

Figure 7

1. In the near future, humanoid-robots will be indistinguishable from humans the way they look and behave.

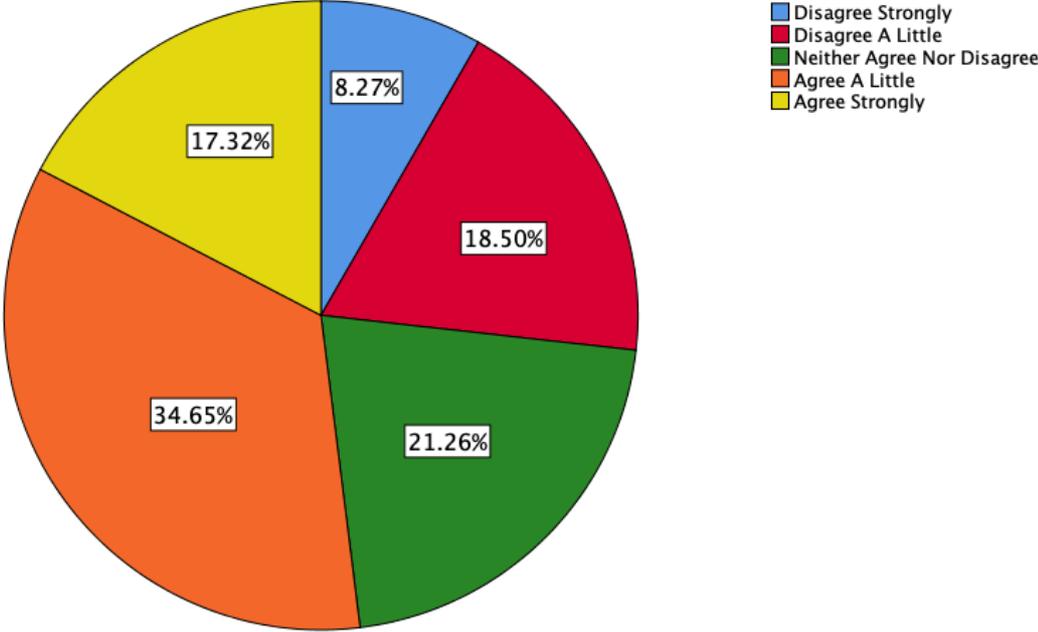


Figure 8

2. In the near future, humanoid-robots will be indistinguishable from humans by the way they reason and think.

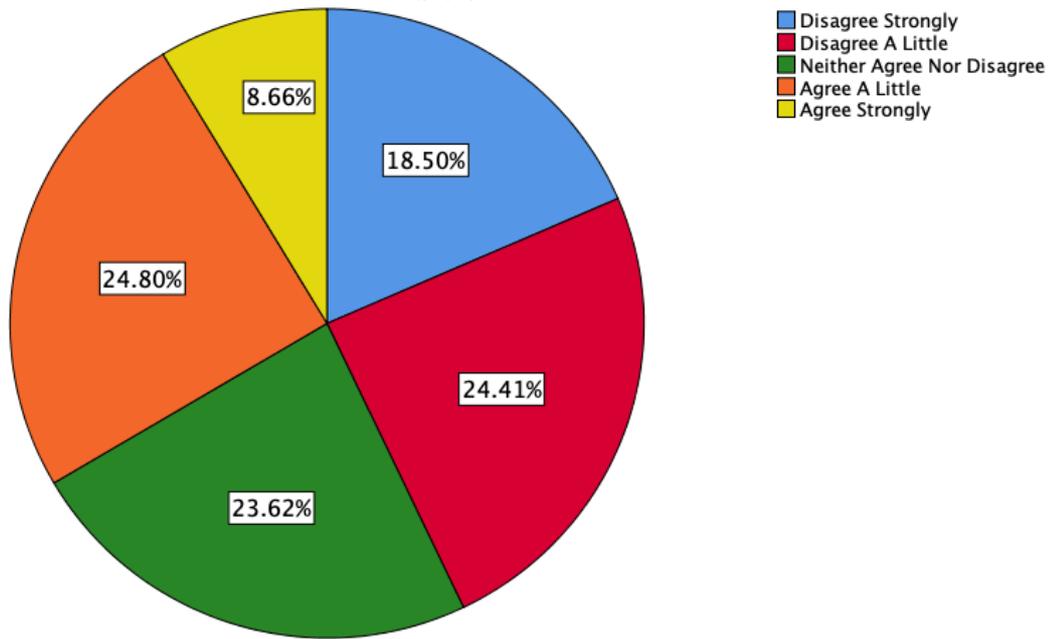


Figure 9

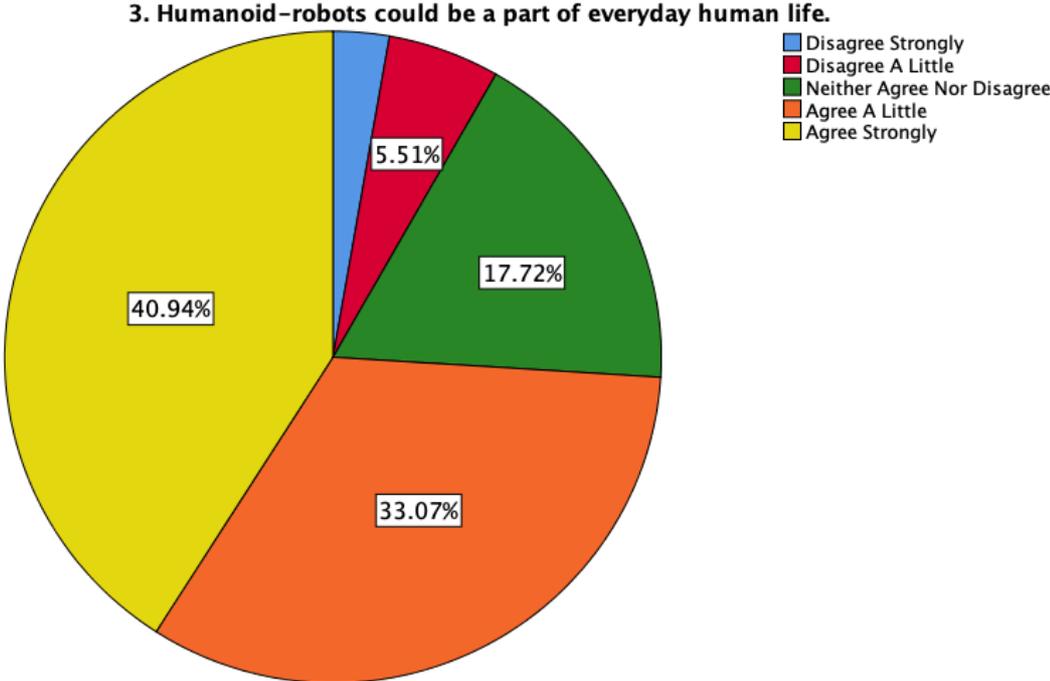


Figure 10

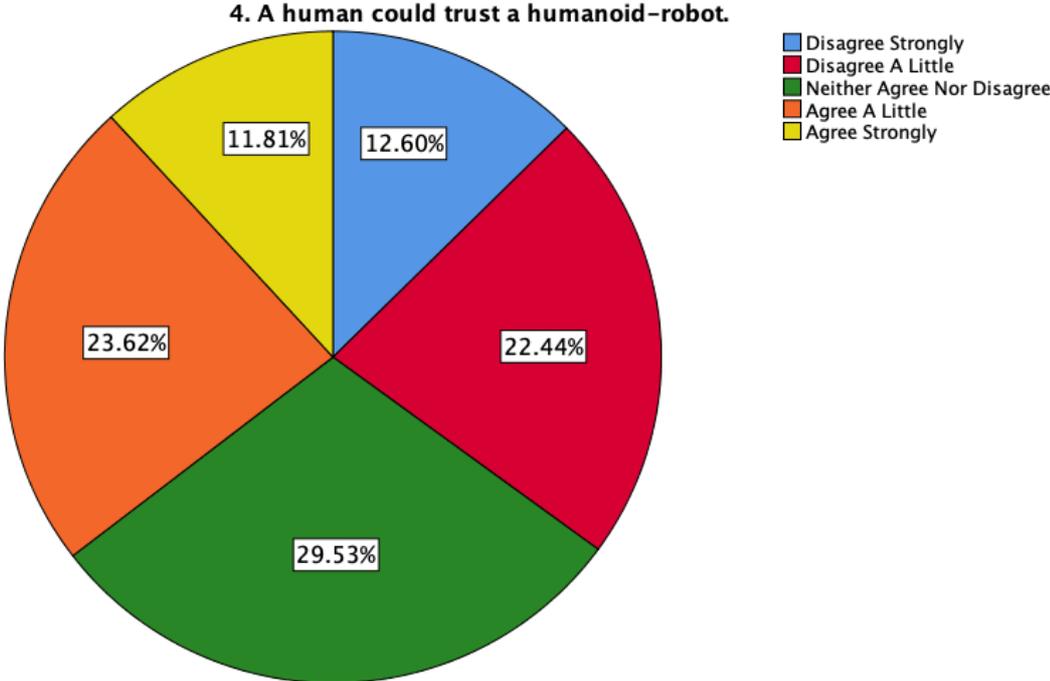


Figure 11

5. A human could trust a humanoid-robot for taking care of one's child.

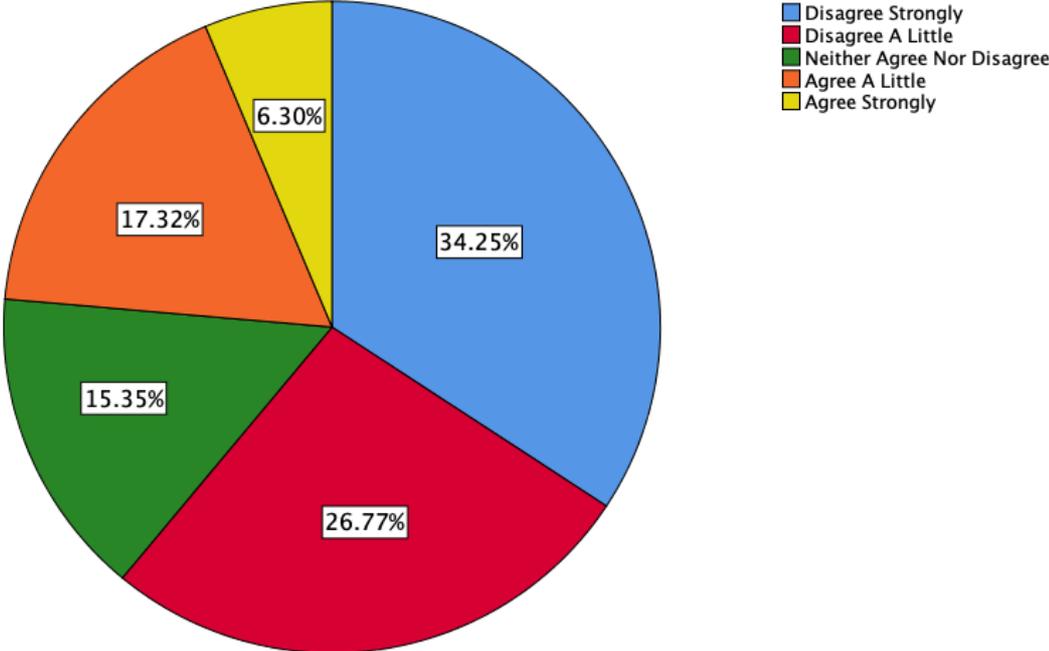


Figure 12

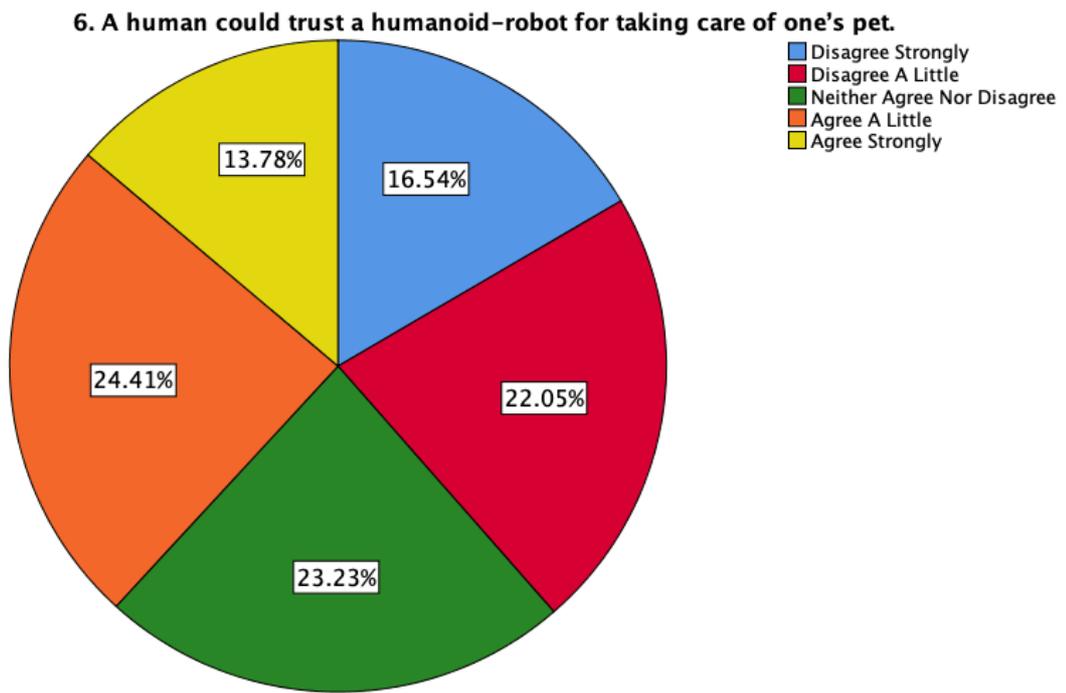


Figure 13

7. A human could trust a humanoid-robot for taking care of the elderly.

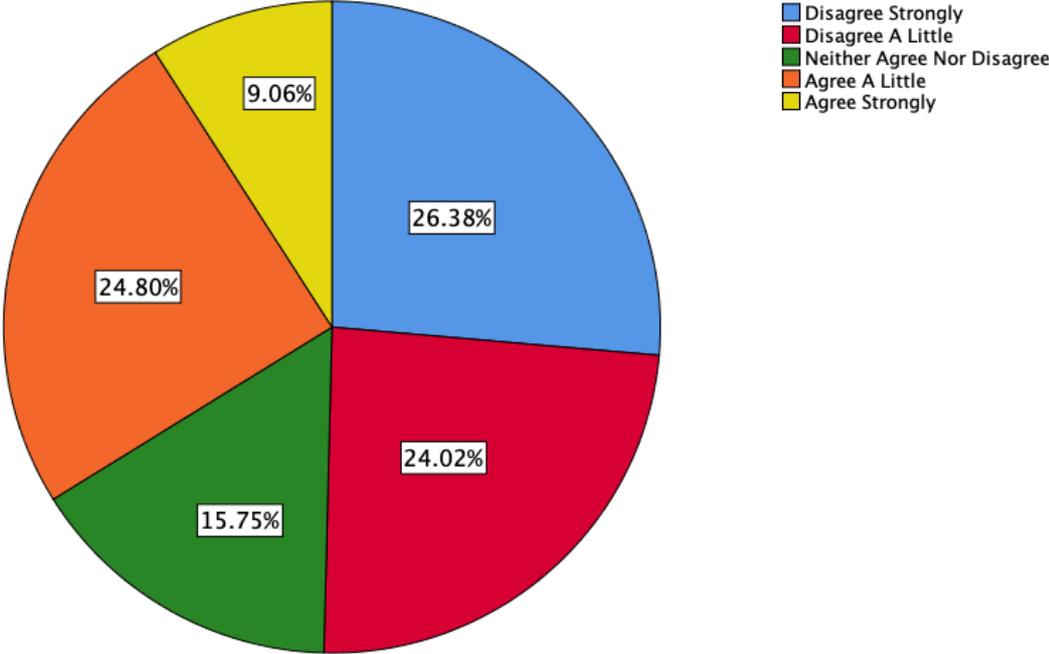


Figure 14

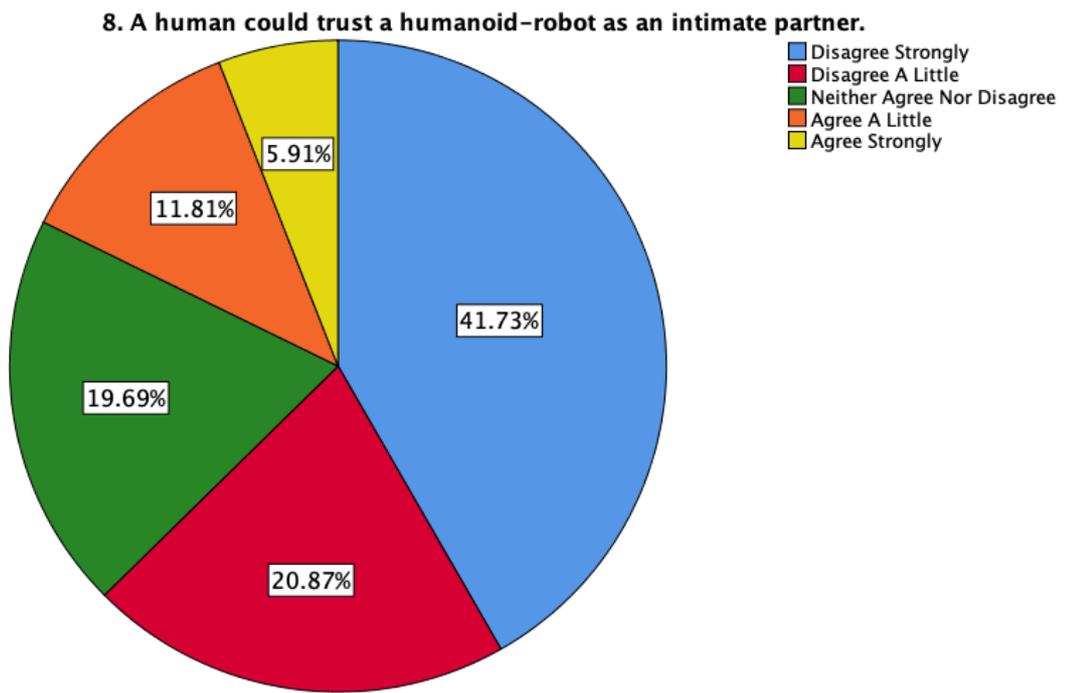


Figure 15

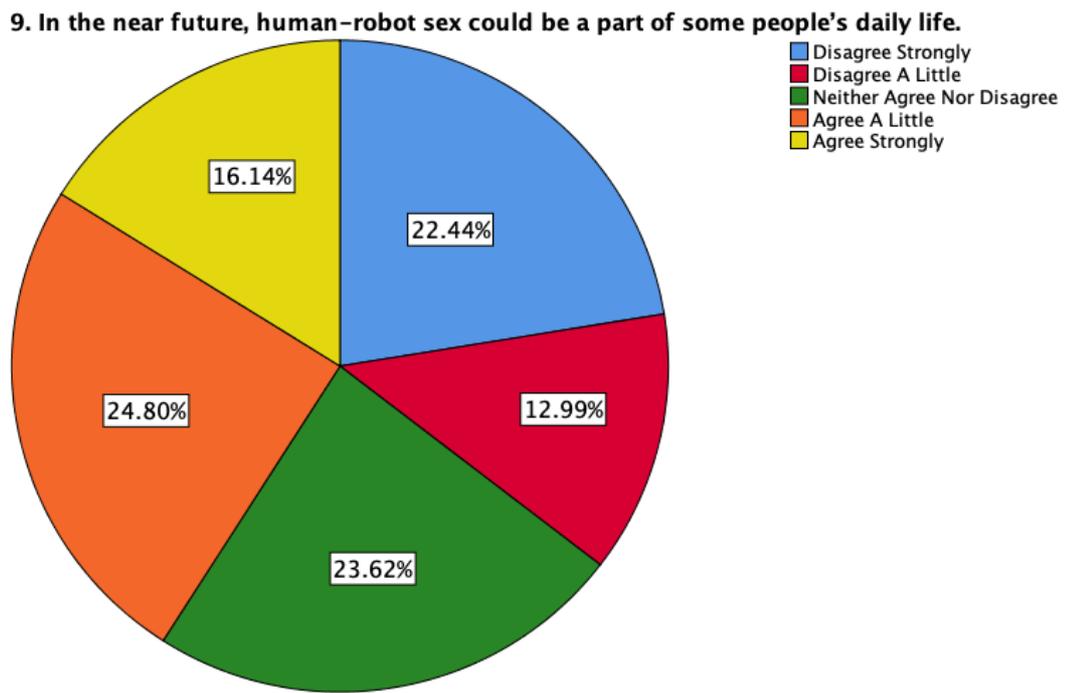


Figure 16

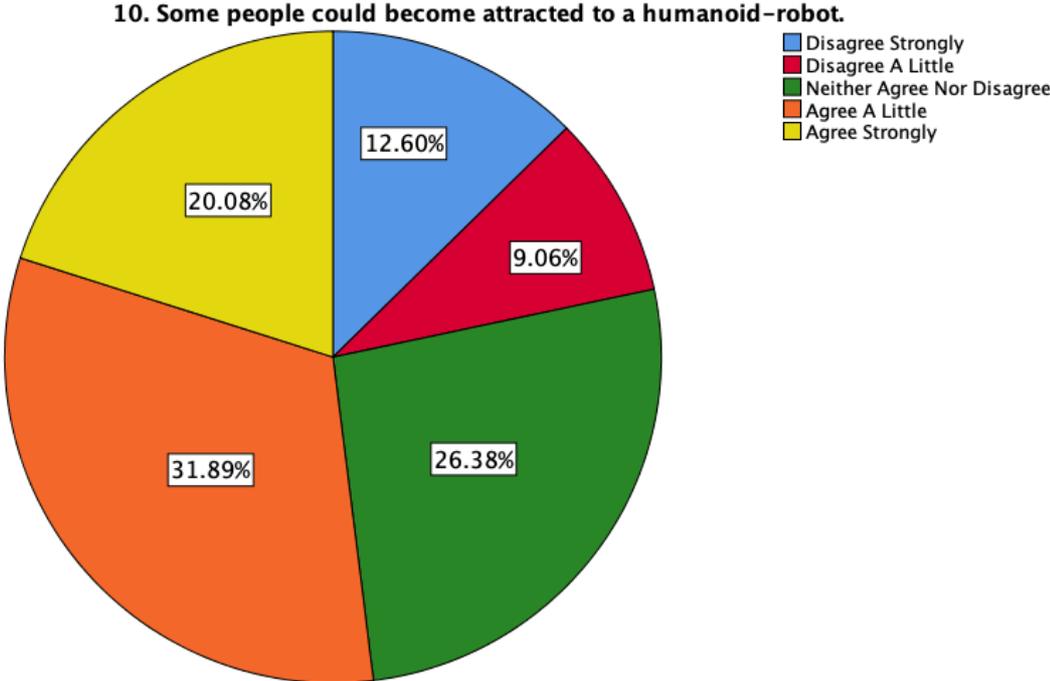


Figure 17

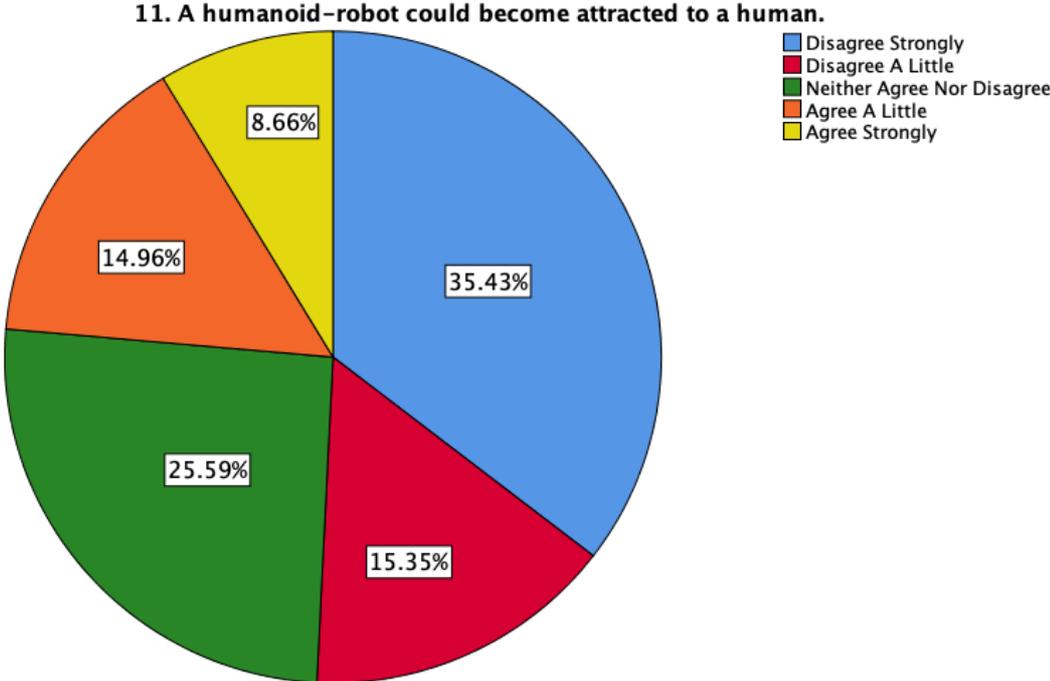


Figure 18

12. In the near future, human-robot sex could be indistinguishable from human-human sex.

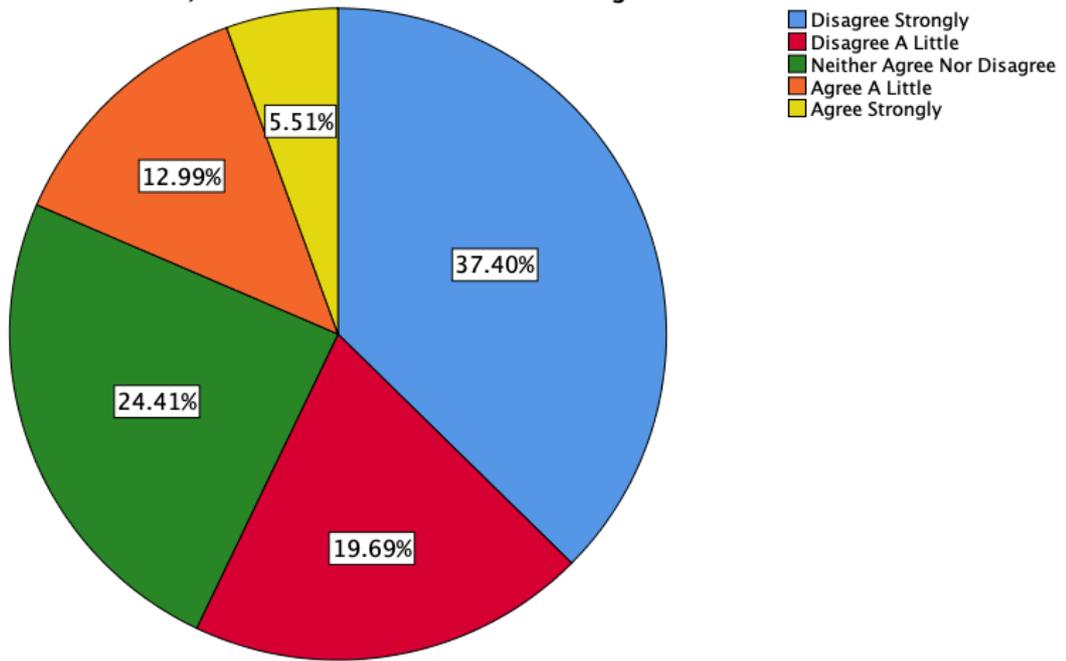


Figure 19

13. Humanoid-robots could be capable of satisfying human emotional needs.

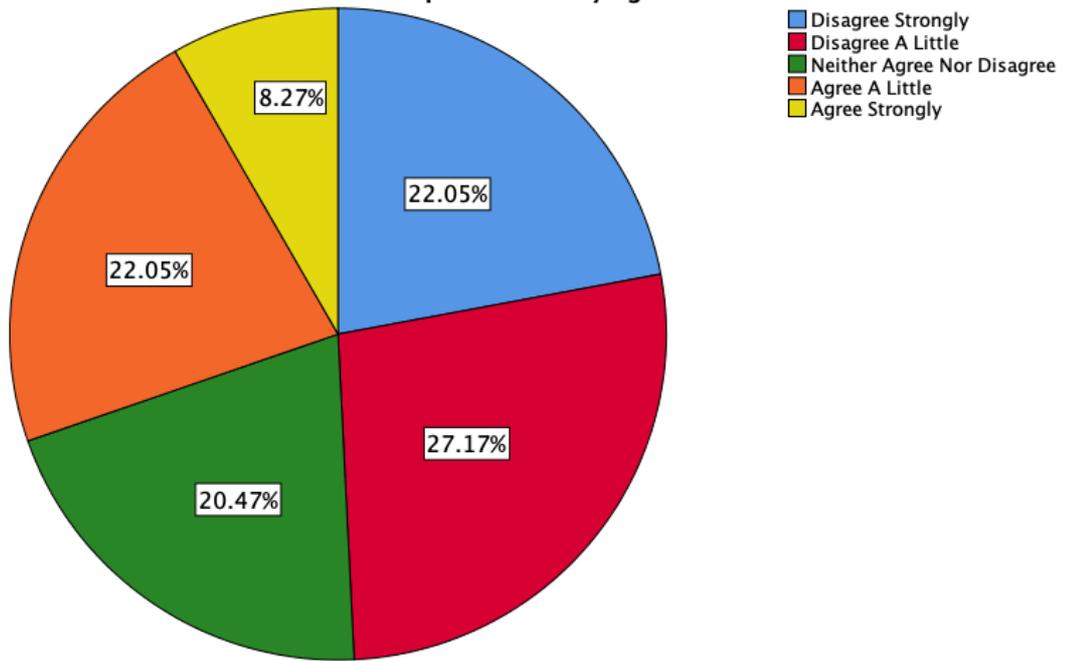


Figure 20

14. Humanoid-robots could be so desirable that some people might give up having a human partner.

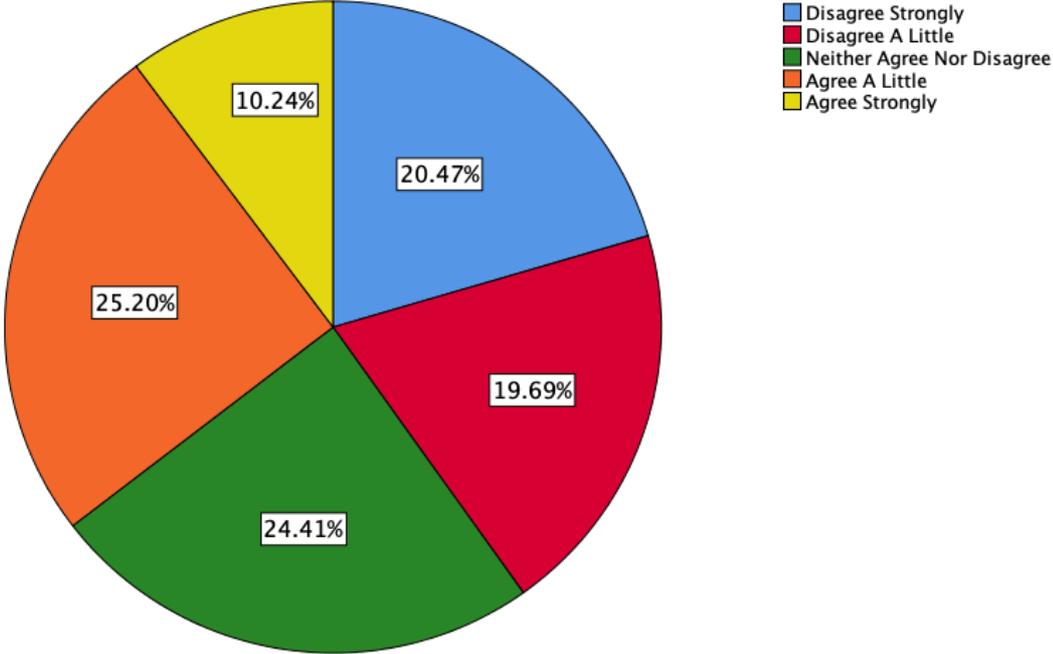


Figure 21

15. Humans should have the right to marry their humanoid-robot partner.

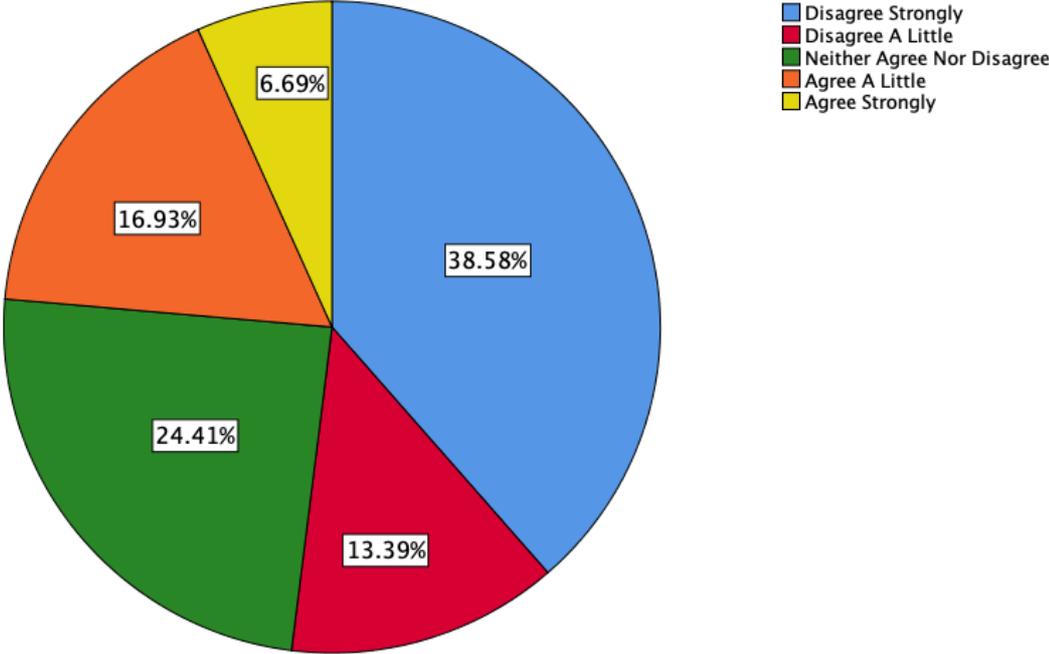


Figure 22

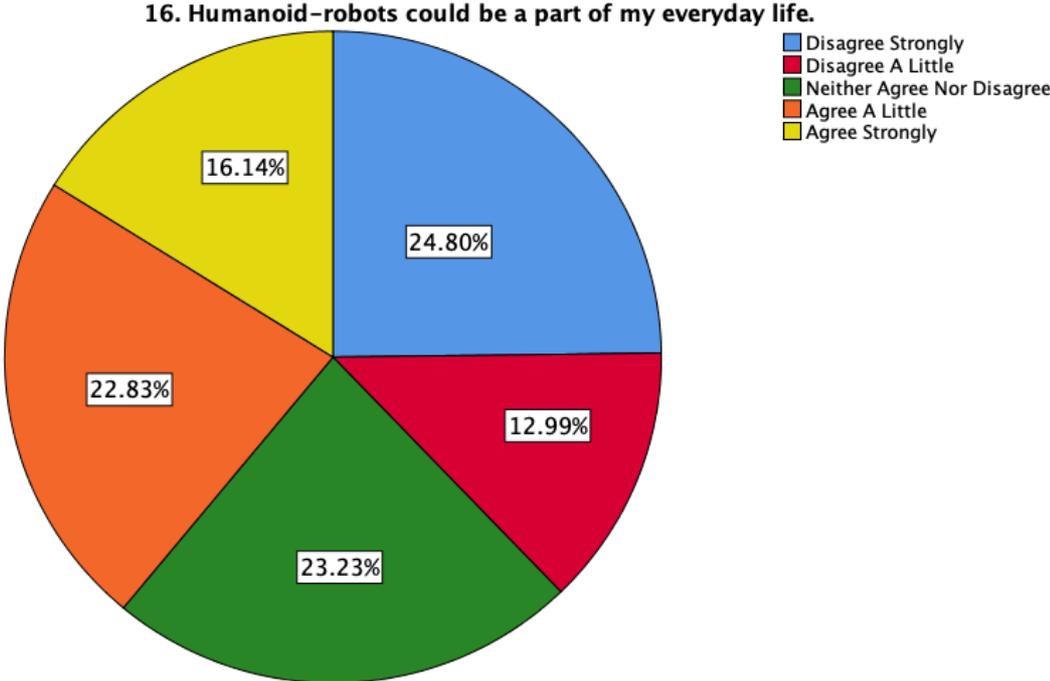


Figure 23

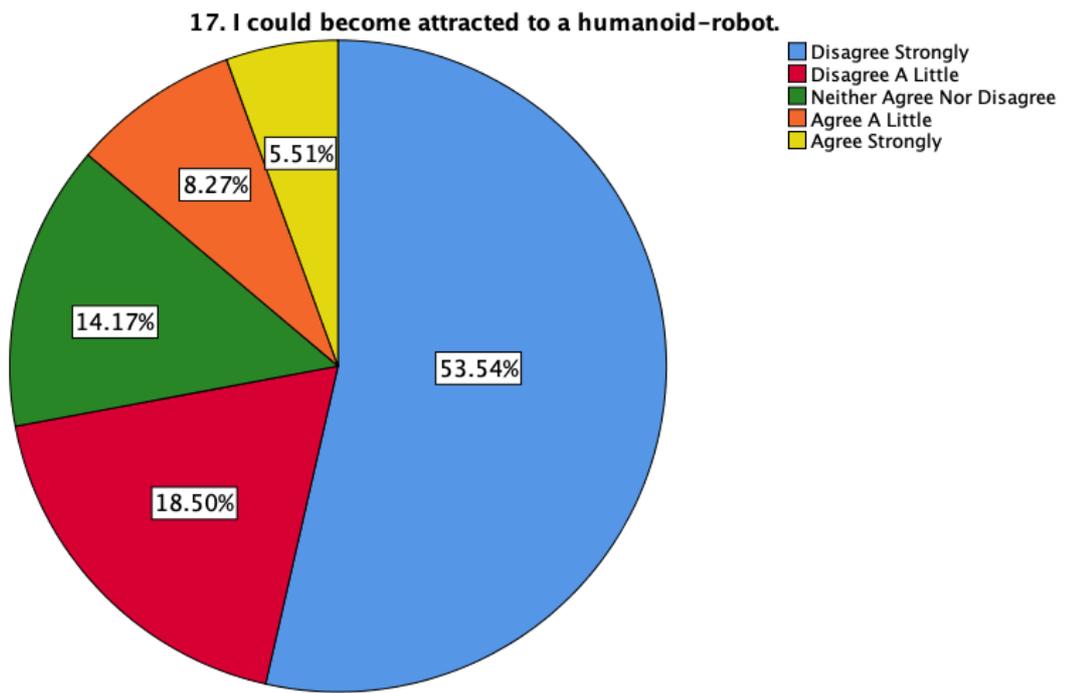


Figure 24

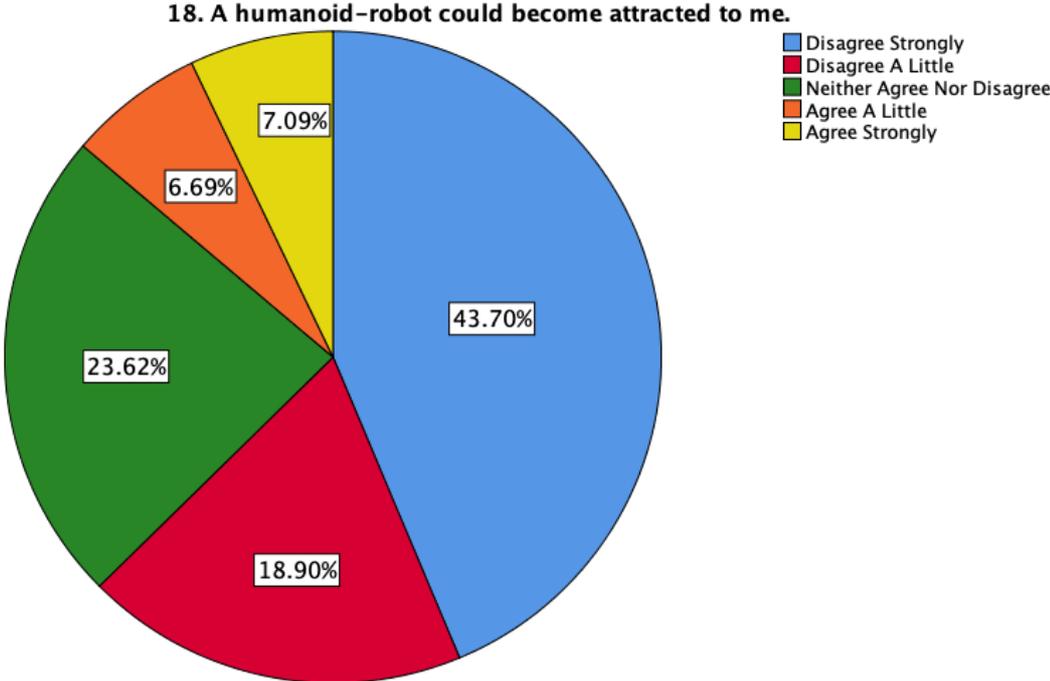


Figure 25

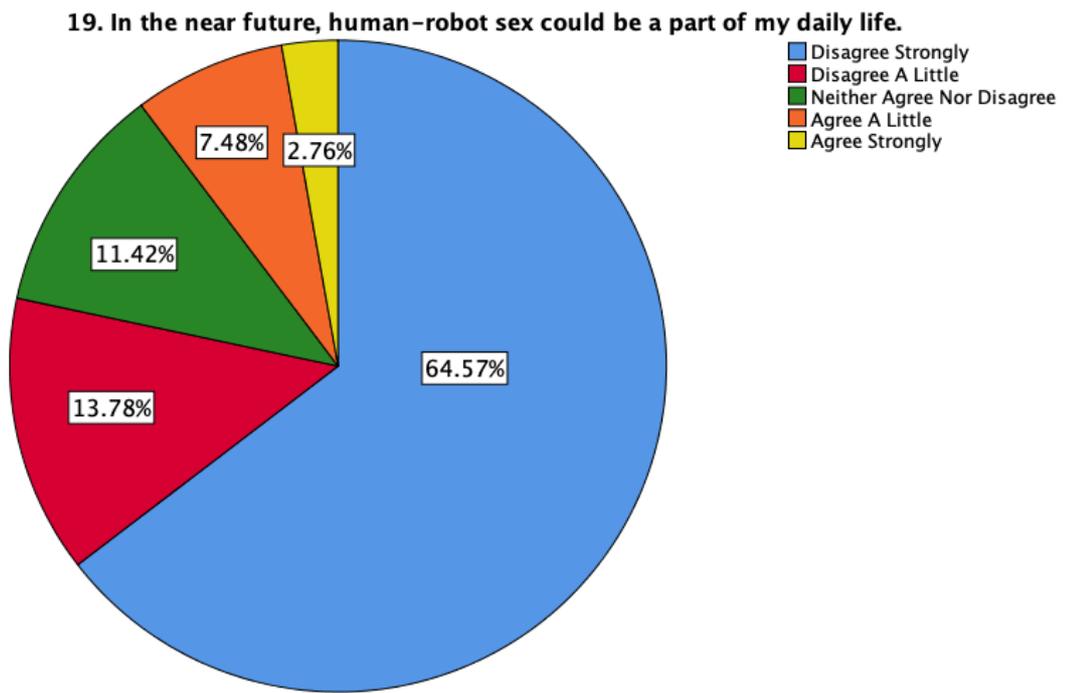


Figure 26

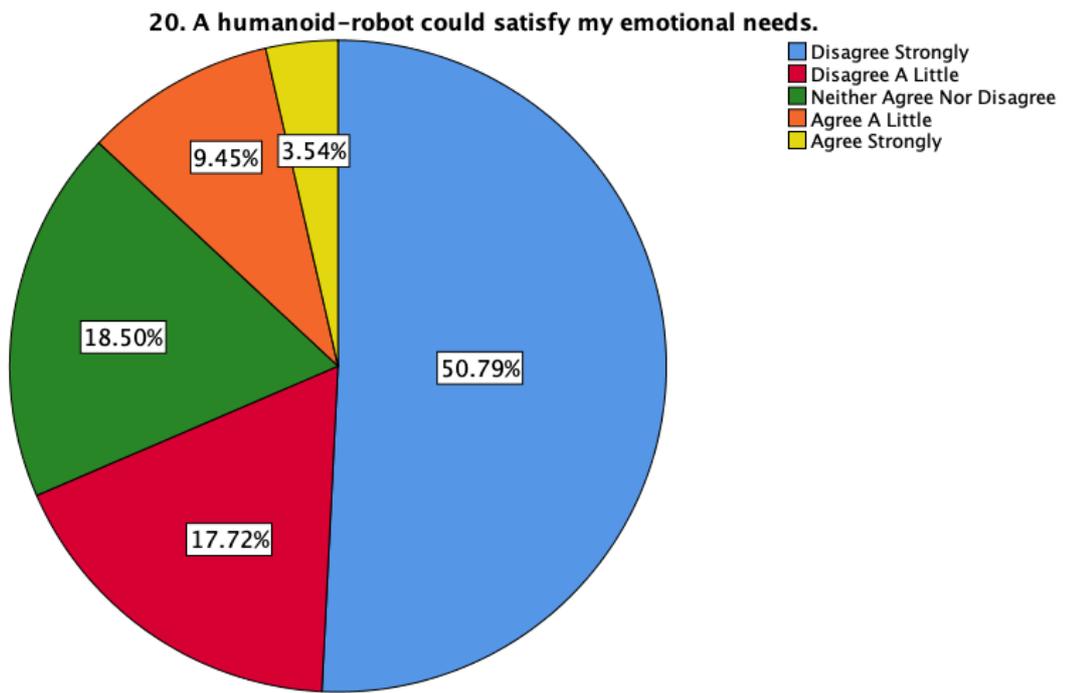


Figure 27

21. Humanoid-robots could be so desirable that I might give up having a human partner.

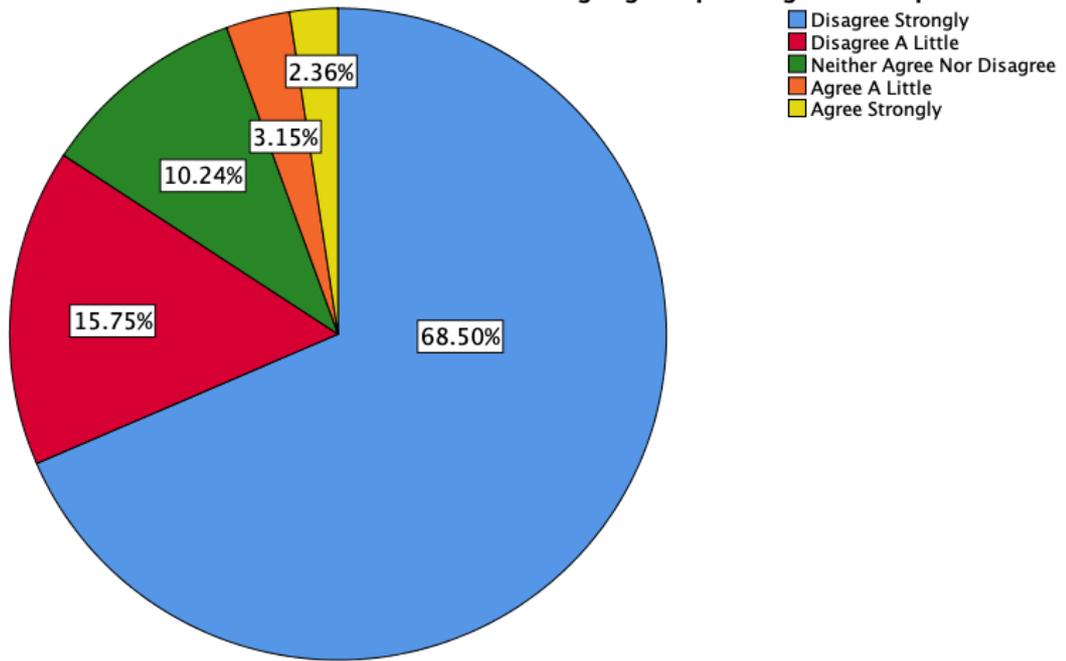


Figure 28

22. If I found out that my intimate partner was engaging in an intimate relationship with a humanoid-robot, I would consider that infidelity.

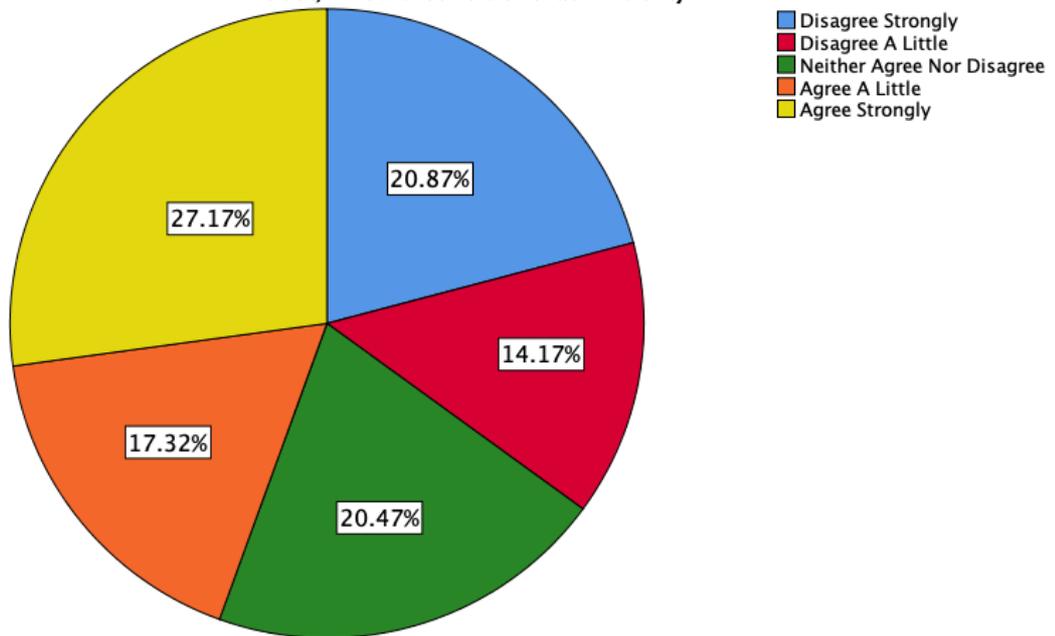


Figure 29

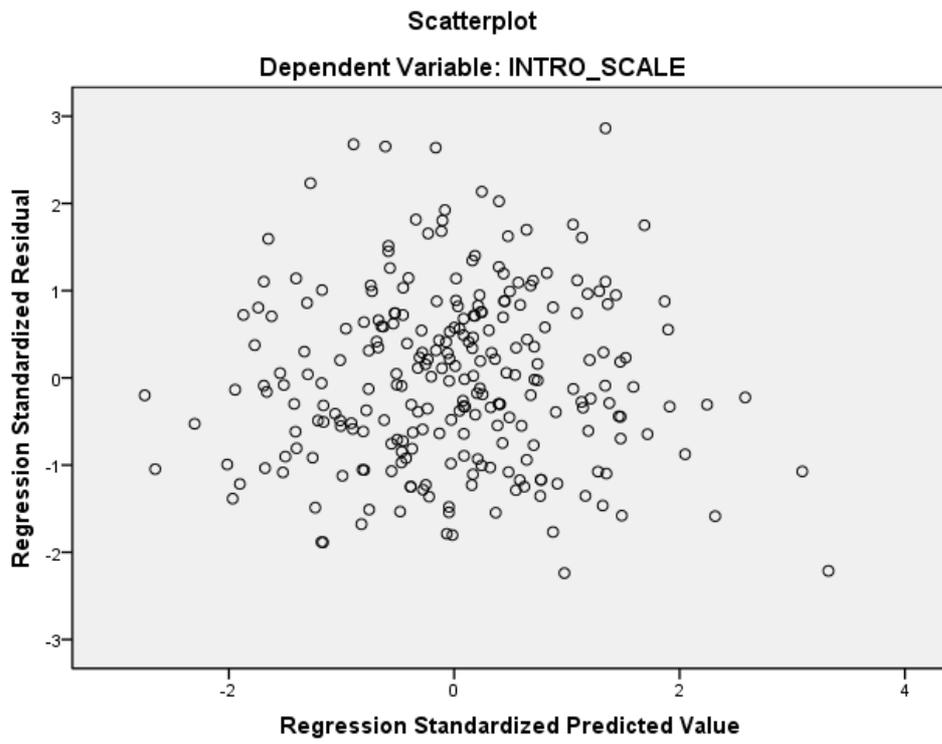


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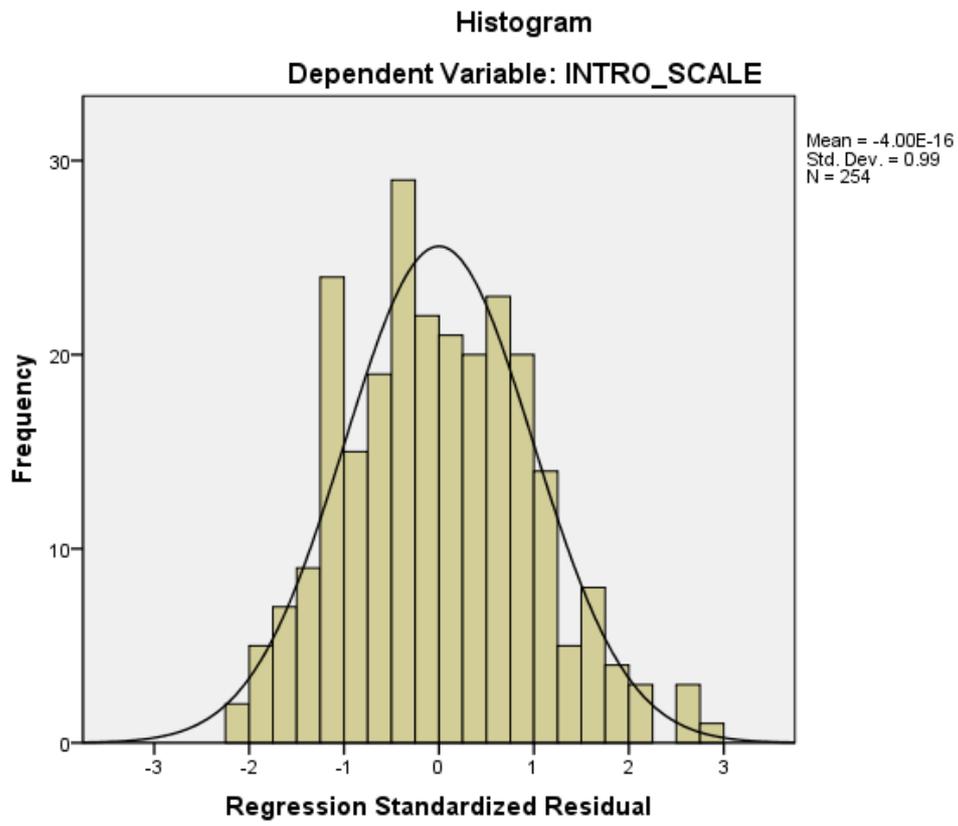


Figure 31

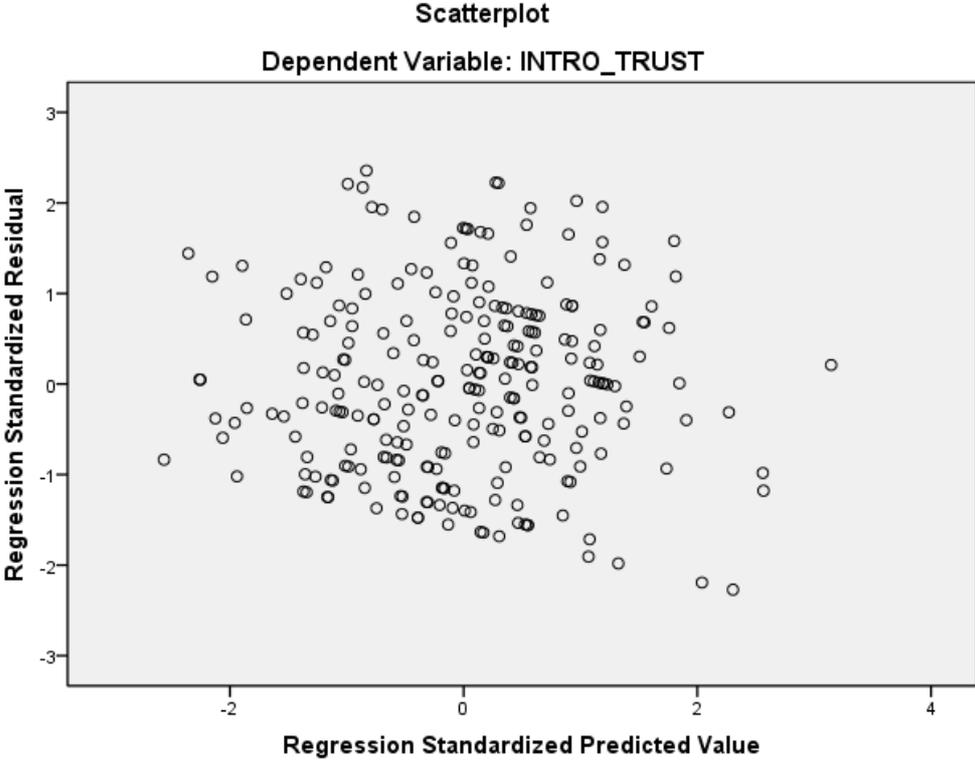


Figure 32

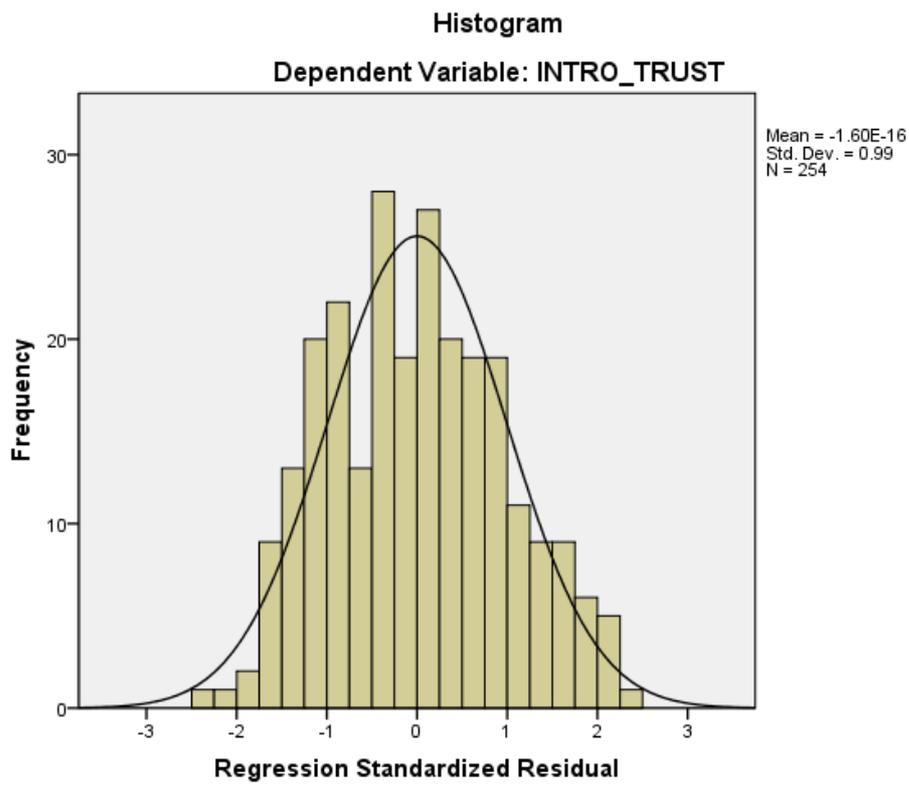


Figure 33

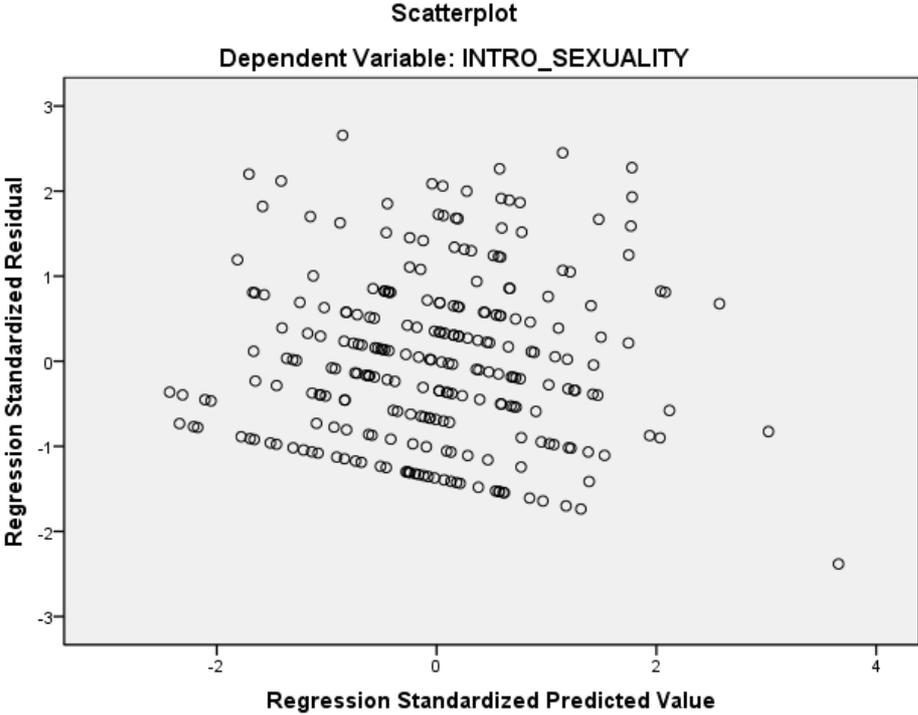


Figure 34

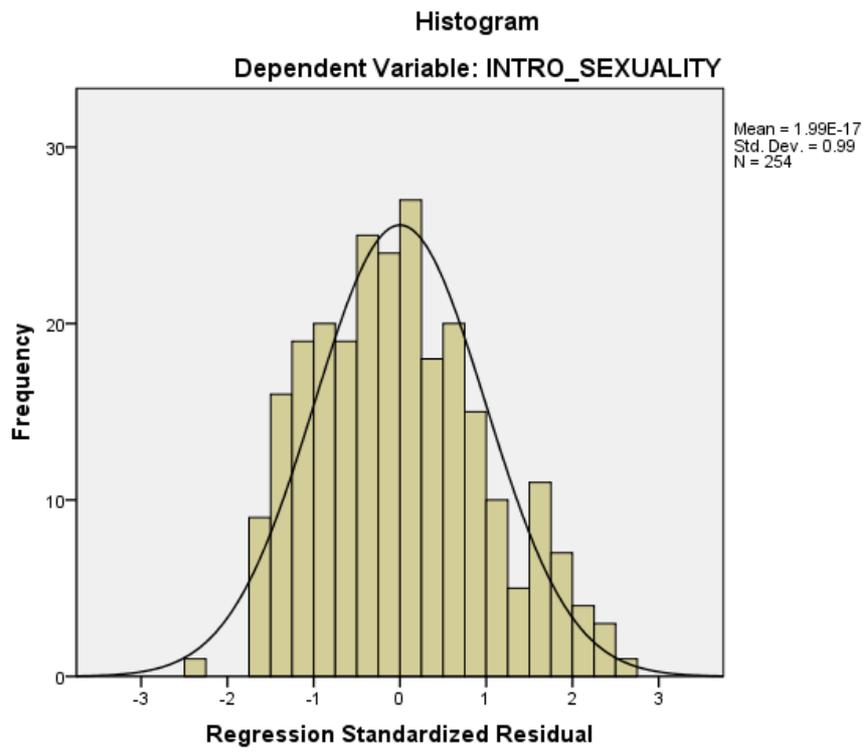


Figure 35

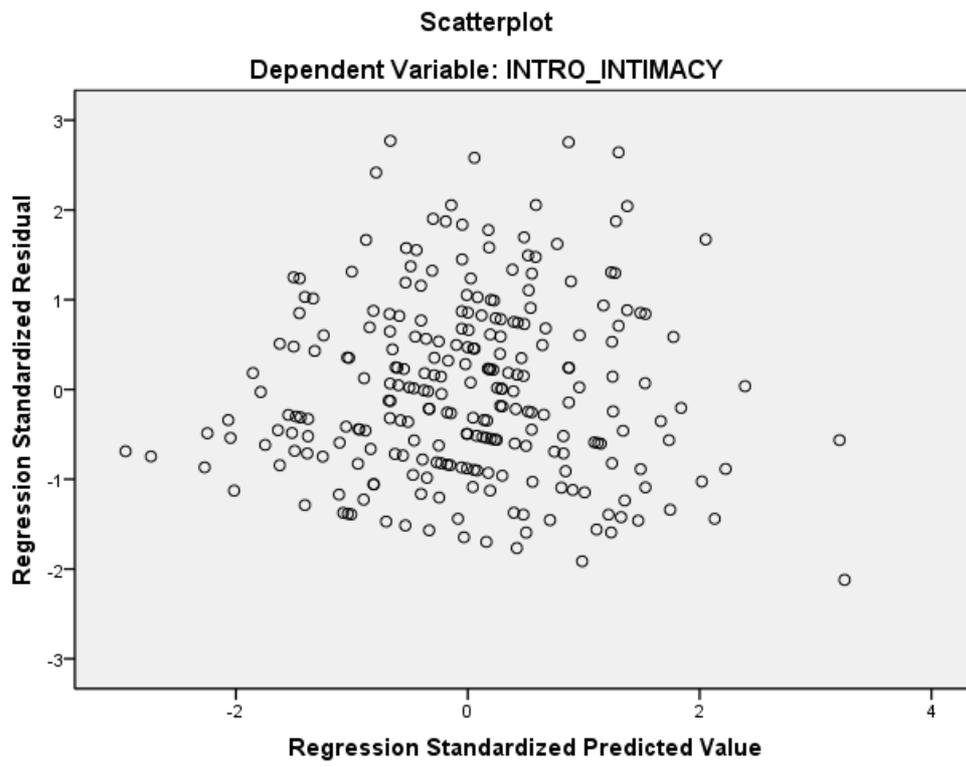


Figure 36

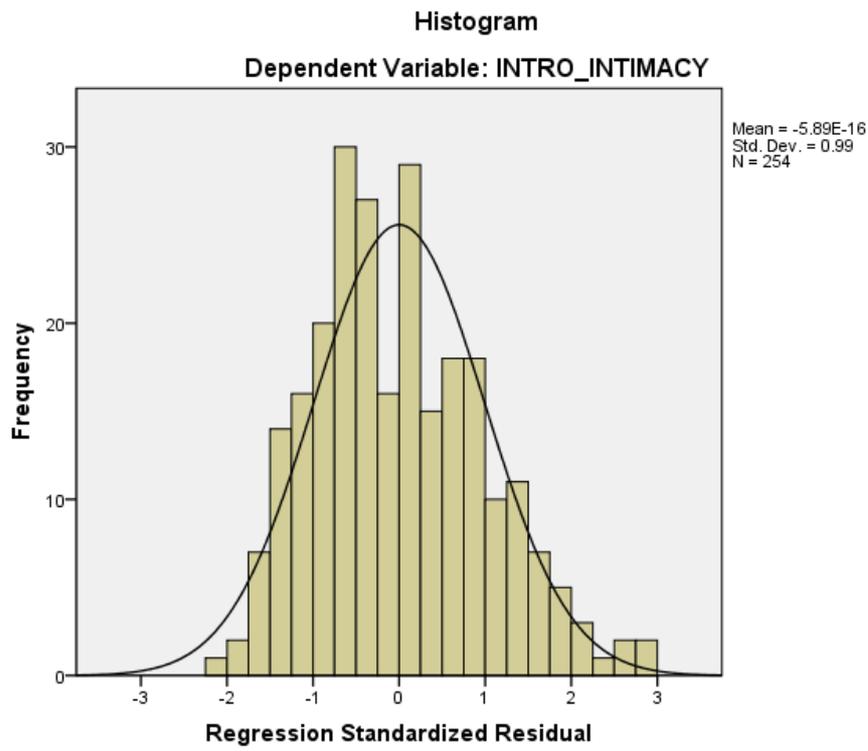


Figure 37

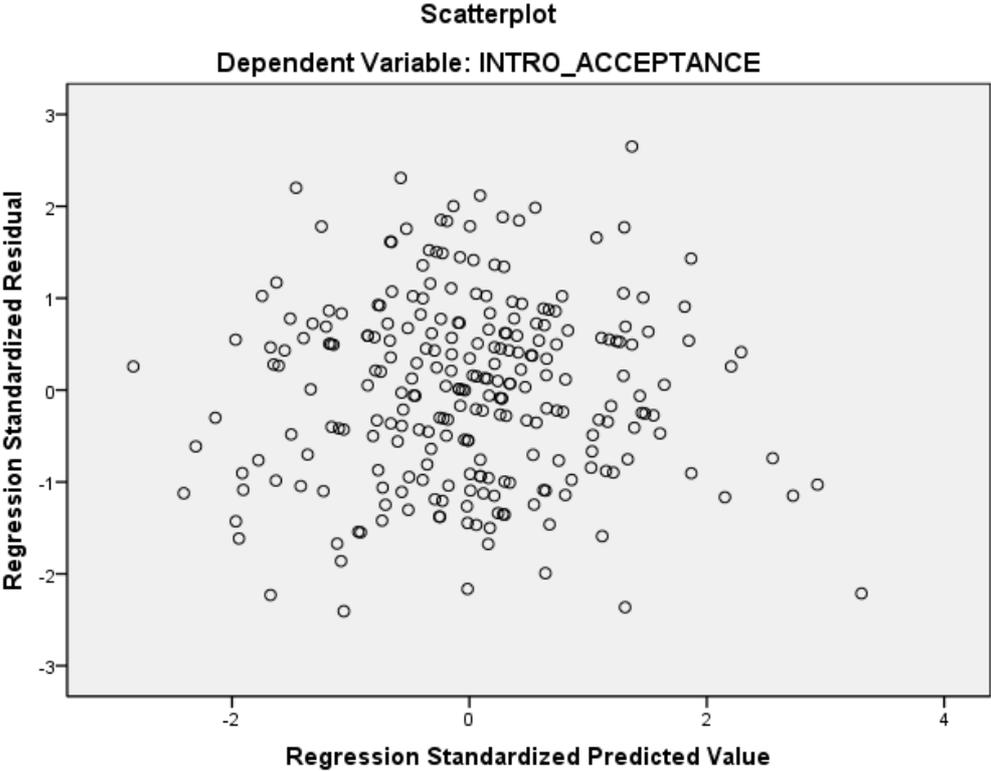


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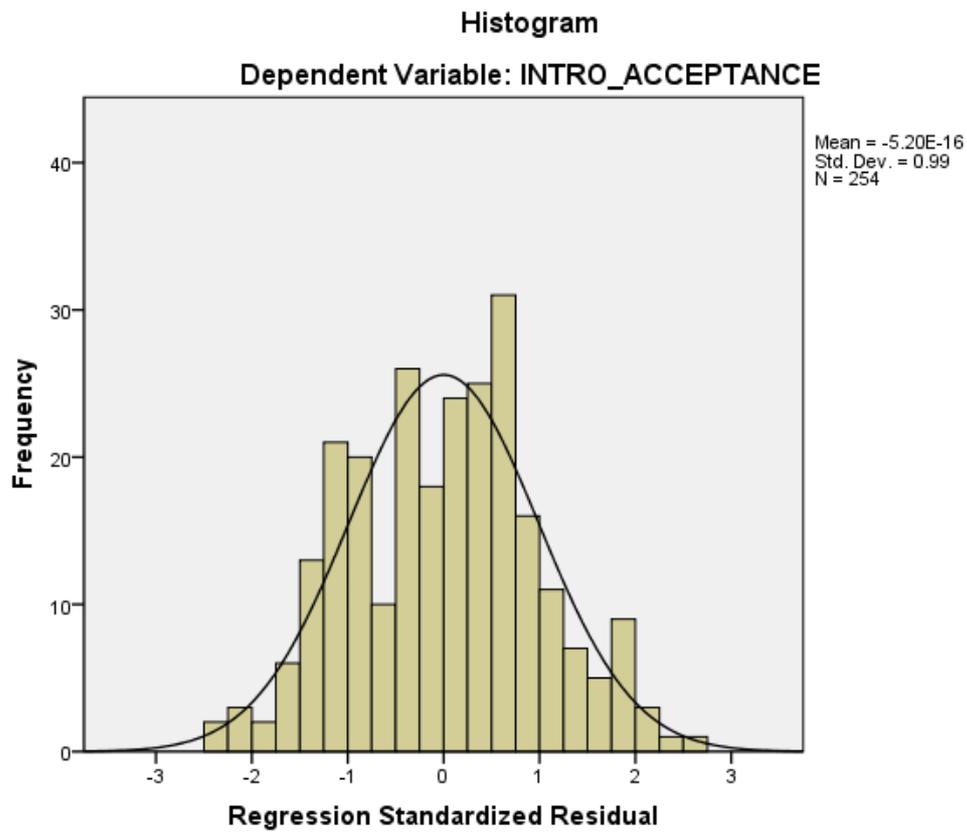


Figure 39

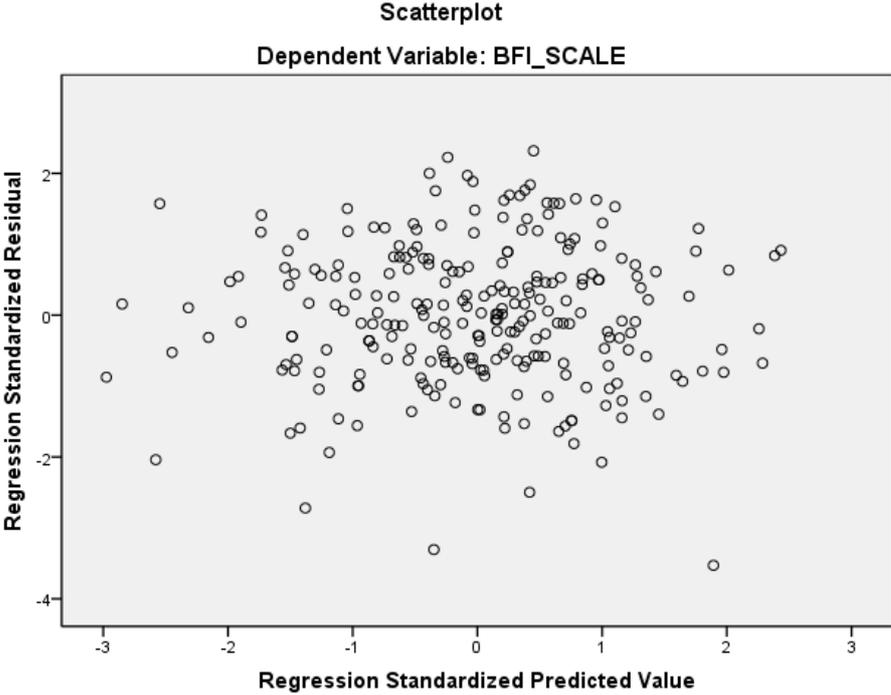


Figure 40

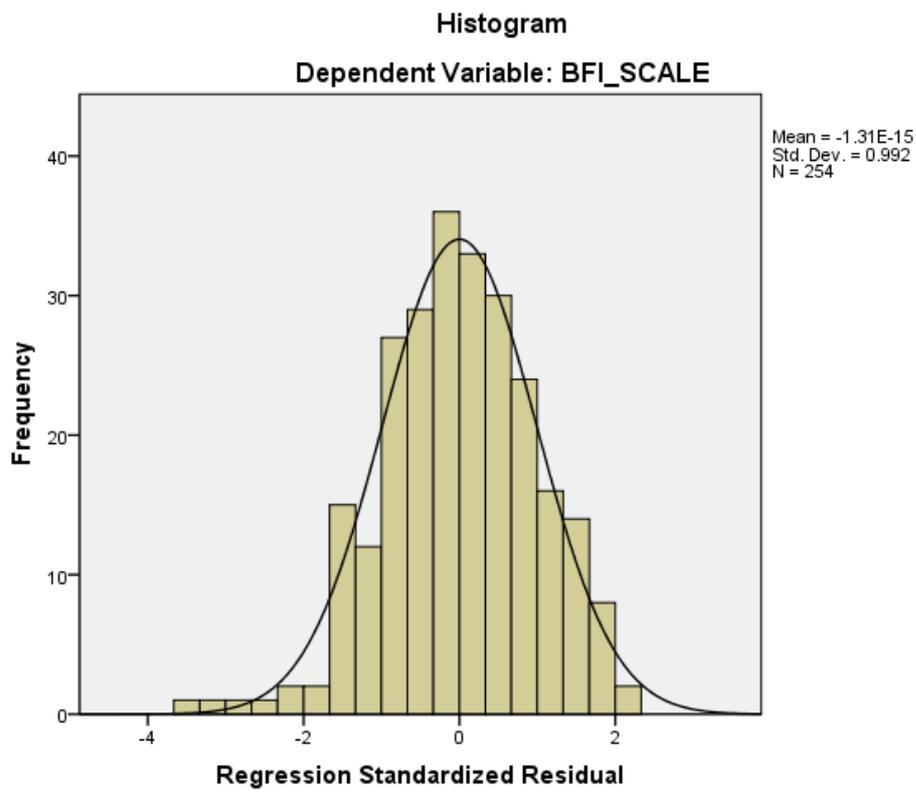


Figure 41

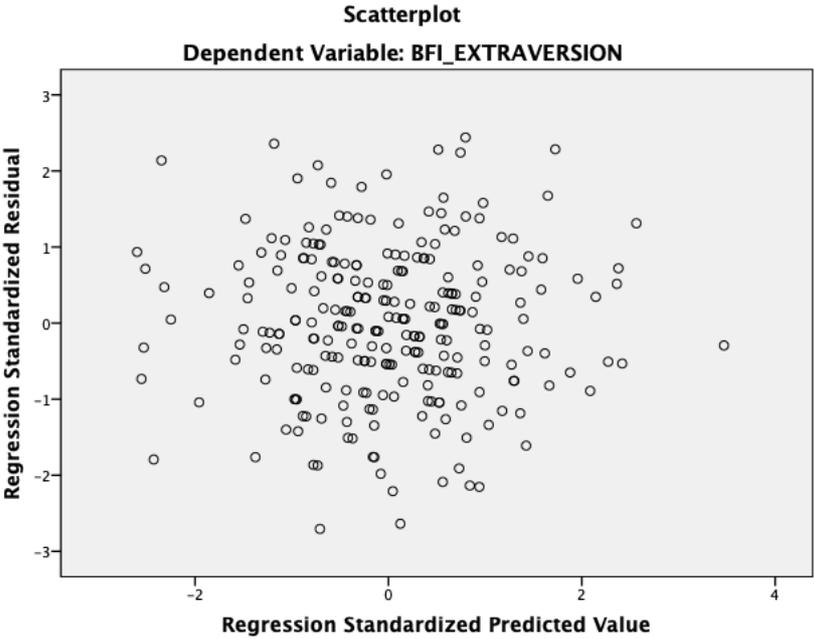


Figure 42

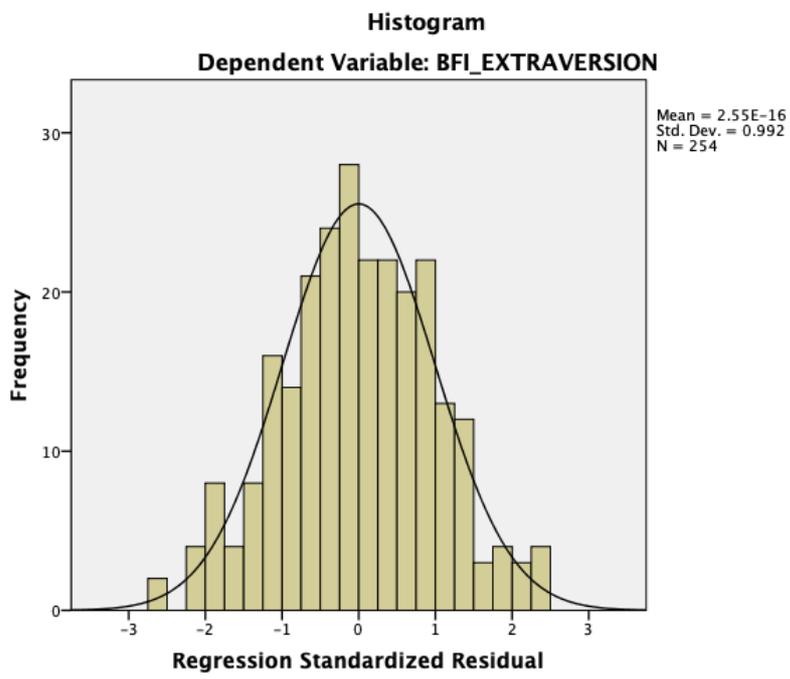


Figure 43

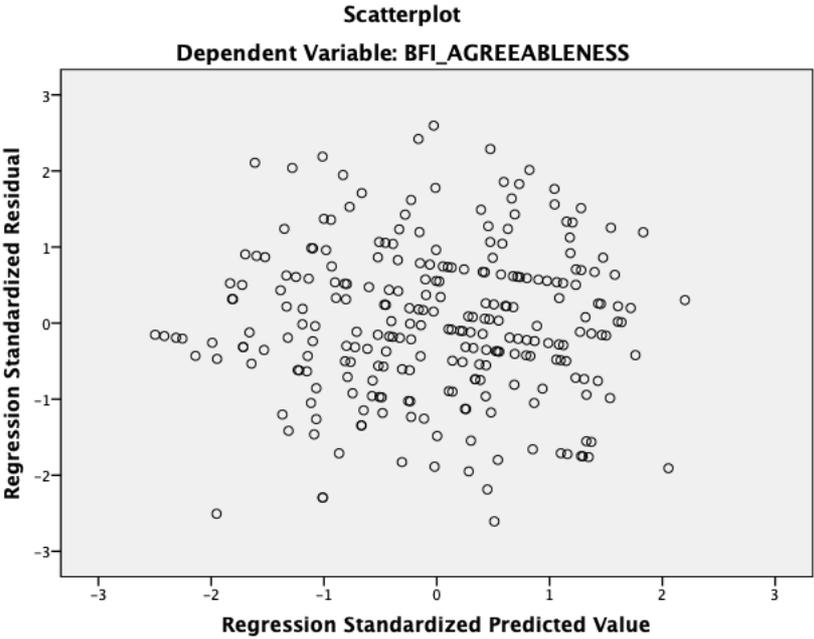


Figure 44

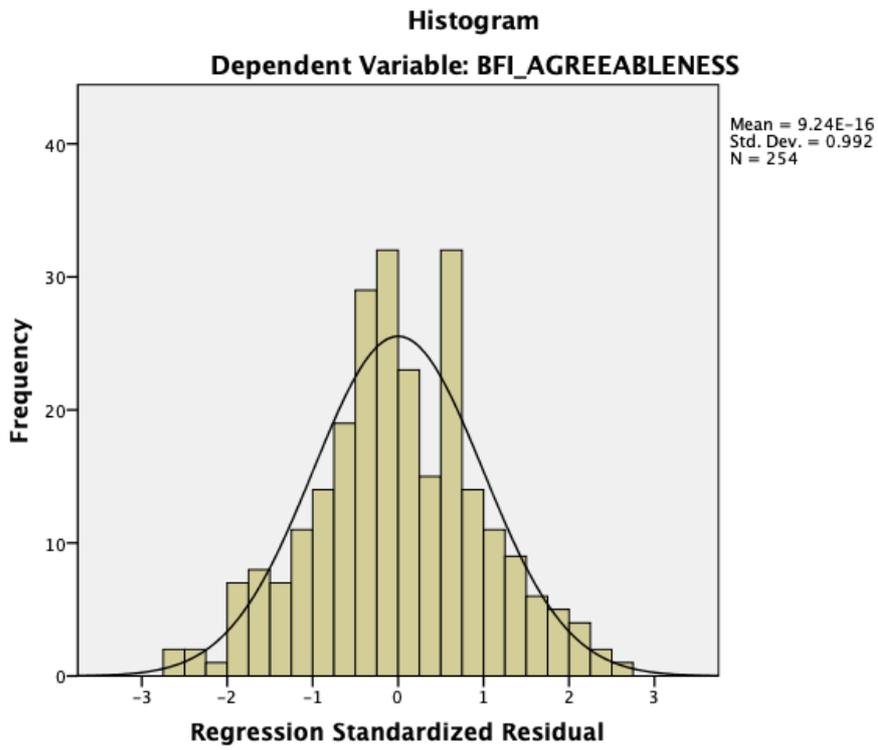


Figure 45

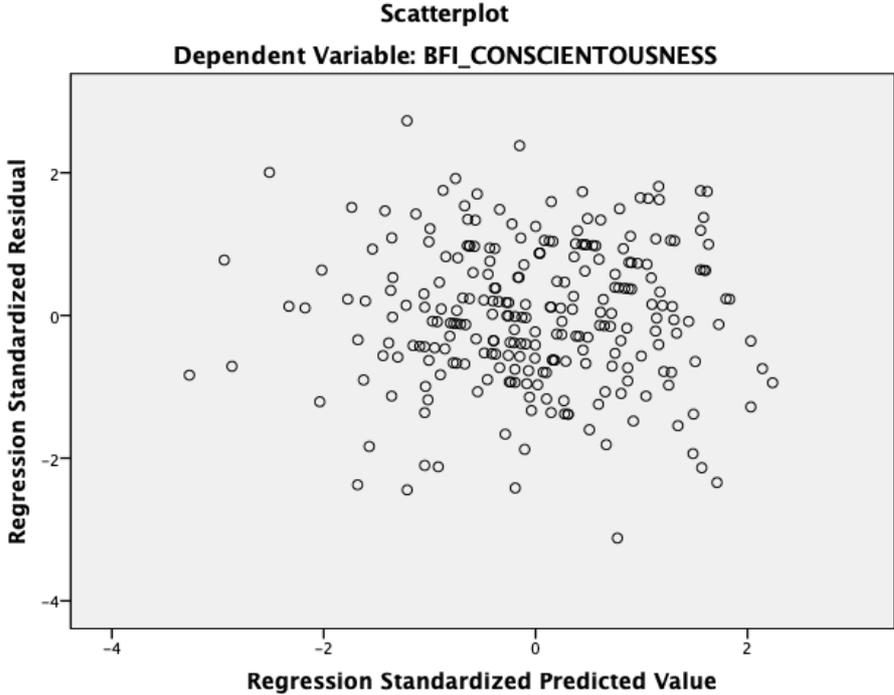


Figure 46

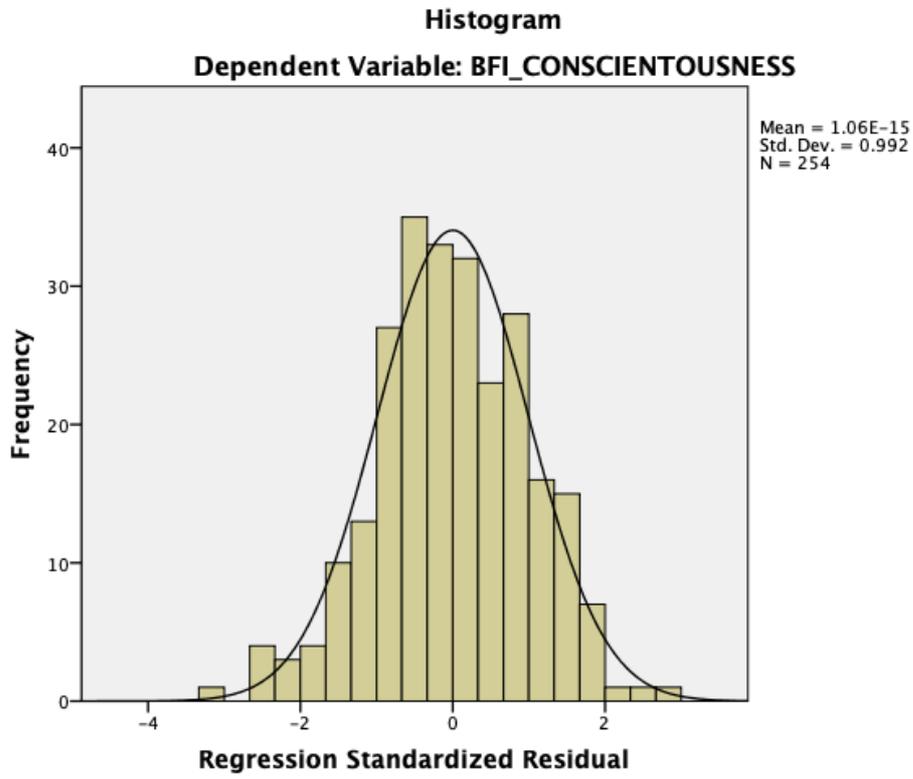


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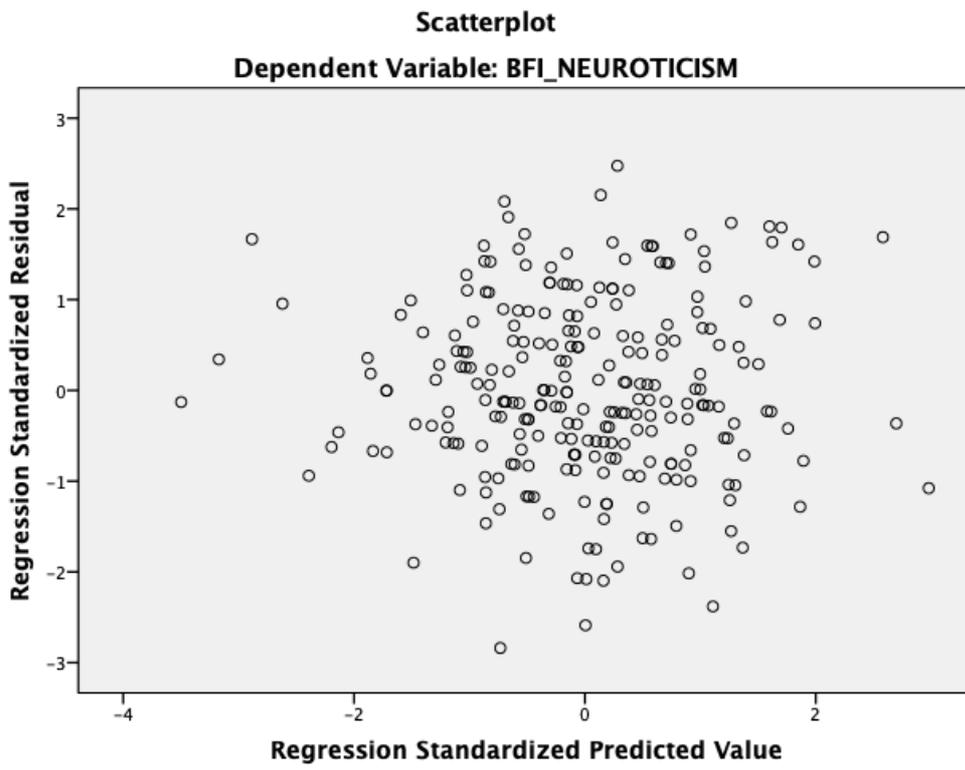


Figure 48

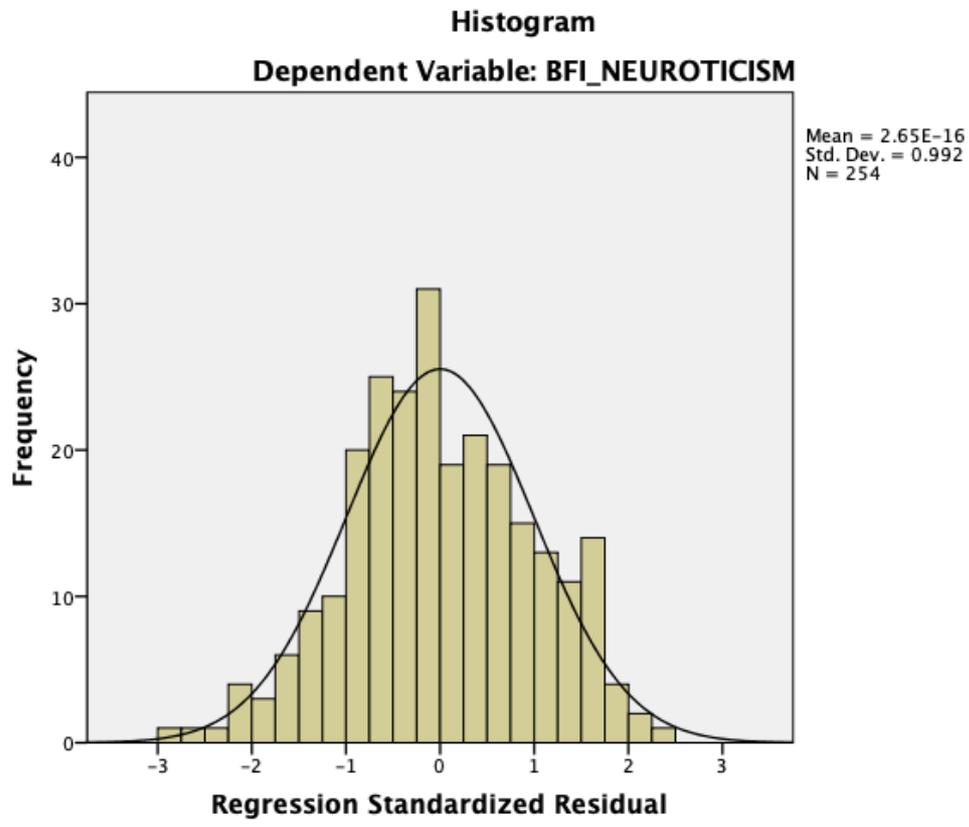


Figure 49

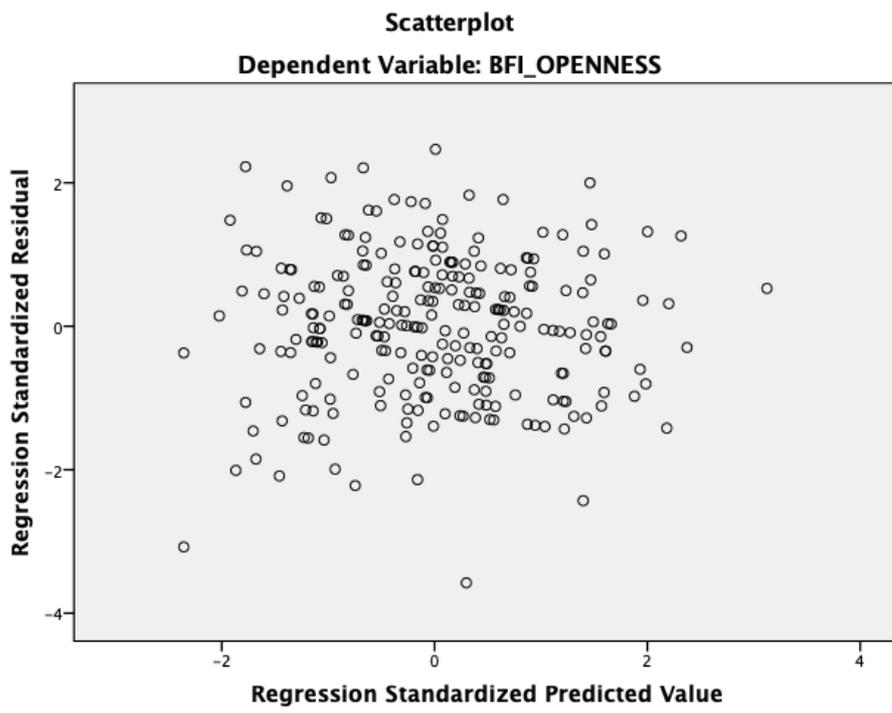
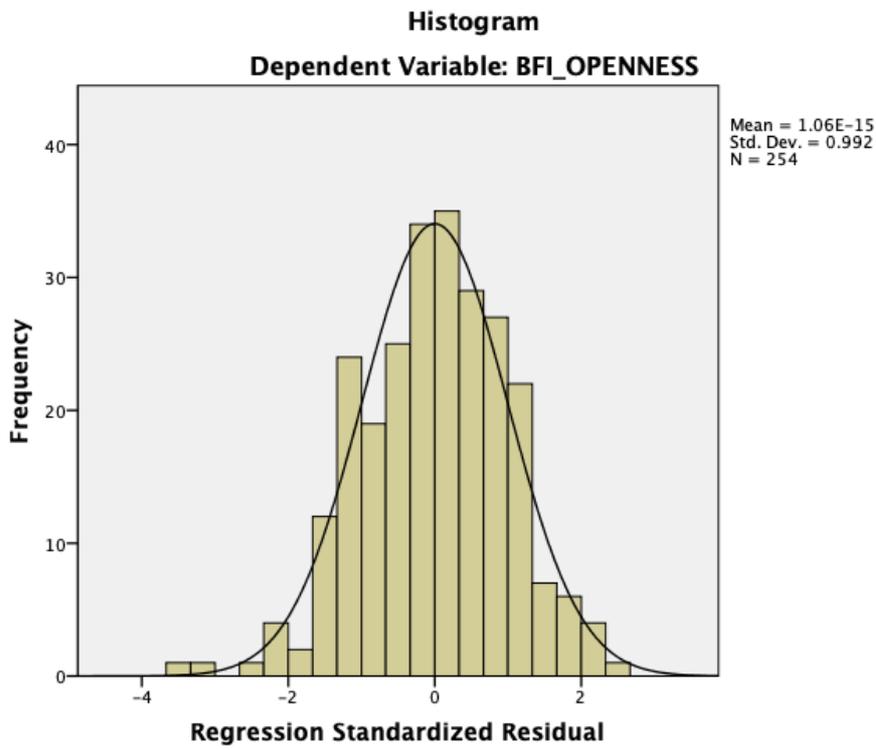


Figure 50



Emotional Eating: Differences Amongst Stress Levels, Gender, Race and Age

Terezia Hetesova and Anna Pryanishnikova

Abstract

Emotionality and stress have been shown to affect eating habits in individuals and therefore also their weight and health. In our study we looked at whether stress can predict emotional eating and the differences in emotional eating amongst different gender, race and age. The results of our study showed that stress did not significantly predict emotional eating. The difference in emotional eating amongst various gender and age was also not significant, however, there was a significant difference between “Asian” and “White participants. “Asian” participants showed more effective self-efficacy when it came to emotional eating. Moreover, another regression showed that gender significantly predicted emotional eating. These results combined explain that the most endangered group when it comes to regulation of emotional eating are white women. The risk of low restraint in emotional eating is not only weight gain, but also depression and heart disease. Our study calls for intervention in these cases, in terms of informing the most endangered group about the phenomena suggested by our results and higher emphasis of monitoring of eating habits in this group.

Keywords: emotional eating, stress, gender, race, age

Emotional Eating: Differences Amongst Stress Levels, Gender, Race and Age

Good eating habits are an important part of leading a healthy lifestyle. People's nutrition can be influenced by various factors, including personal preferences, socioeconomic status, social determinants, geopolitical area of origin and gender. Psychological determinants, such as mood, stress and emotions can also have a significant influence on an individual's eating habits. Emotional eating refers to the process of consuming food as a response to feelings (negative or positive) instead of hunger (Stapleton, 2016). Various human and animal studies show that stress levels may play different roles in affecting eating behavior, depending on the circumstances (Beydoun, 2014). However, the effects of stress or other emotional influences can have different effects depending on the person. There are people who eat much more than usual under a significant level of stress, but there are also people whose appetite suppresses significantly during periods of stress or other emotional pressure. This research was designed to investigate the factors that can influence eating habits, including stress level, gender and race, particularly going deeper into the subject of emotional eating.

Most of the time intense emotions can trigger the food intake through a "fight-or-flight" response, which subsequently results in glucose release into the blood stream, therefore suppressing the feeling of hunger (Gold, 2002). Abnormal eating behavior is in many occasions the result of impaired cognitive eating control and an attempt to regulate one's emotions (Macht, 2000). Therefore, stress can increase the consumption of "nutrient poor" food that are high in sugar and fat content, which then decreases the intake of healthy foods such as fruits and vegetables. This then, overall reduces the dietary quality of an individual. However, emotional eating is more frequently caused specifically by negative emotions, such as sadness, loneliness and concern (Konttinen, 2010).

A person's belief in their ability to cope with stress also plays a role in how the level of stress affects the eating habits. A study which investigated how food can be used as a coping mechanism for stress, resulted in a significant positive relationship between emotion and stress-induced eating (emotional eating) and the self-perception of an individual on their ability to cope with the stress itself (Donohoe, 2016).

A study by Thompson (2015), which was aiming to investigate gender and racial differences in emotional eating, along with food addiction symptoms and body weight satisfaction among undergraduates resulted in interesting findings. Total food addiction symptoms were significantly higher in African American participants, indicating more food dependence. Females were much more likely to report depression, stress and anxiety, which subsequently influenced the level of overeating, comparing to the male participants. Females were also much less satisfied with their body size, according to the results from the study (Thompson, 2015).

Another perspective explains that frequent excessive consumption of food, which often leads to weight gain, could be characterized as an addiction. Some foods, particularly those that are high in sugar, salt and fat, show a higher addictive quality than other foods (Kemp, 2011). The neural activation that occurs in this type of eating behavior is considered similar to the neural activation of substance dependence (Gearhardt, 2011). Both food and substance addiction involve the production of the neurotransmitter dopamine, which serves as the pleasure hormone and in both addiction cases, can psychologically be viewed as a "reward". When people consume the foods full of sugar, salt or fat - more dopamine is produced (Volkow, 2002).

A large study of physical activity was carried out to examine the associations of specific emotions or moods and emotional eating in adolescents. Participants were from diverse backgrounds from seven different middle schools. The results of a cross-sectional

analysis showed no difference in emotional eating depending on gender but showed that the Perceived stress was associated with emotional eating. Gender stratified analyses showed a significant association of stress and anxiety in emotional eating of girls, but in boys - only confused mood was associated with emotional eating (Nguyen-Rodriguez, 2009). According to the statistics from Canada since year 2003, females have been reporting significantly more stress than males (Statistics Canada, 2013). In regard to how the increased rates of women reporting stress and unhealthy eating patterns, a study that focused on the female sample was carried out. By using a naturalistic approach during the study, the researcher could capture a more realistic view of how stress can affect eating habits. The participants of the study were asked to track the foods they consume using an iPhone application, which currently is a very well-known tool for counting calories in order to maintain or lose weight. This way, the participants could easily log their food intake every day. Results of this research included that eighty three percent of participants reported that their eating behavior is influenced by stress and forty eight percent confirmed that they overeat when under the influence of stress. Meanwhile, 35 percent of participants have reported that they “under-eat” when they feel stressed. The research has shown a link between stress and a change in food preferences. The data from many studies indicates a change toward unhealthy food (more specifically - snack food) when under the influence of stress. This particular research has confirmed this statement, as eighty percent of participants reported that they prefer sweet food when they are stressed, and seventy six percent chose salty snacks for emotional eating. Even though emotional eating is a process that all people probably experienced at least once in their life, the majority of studies which research this topic include focusing on obese populations. Sim and Zeman (2008), found that perceived stress can explain a high proportion of the variance in emotional eating in a sub-sample of overweight and obese participants rather than in the overall sample.

Frequent emotional eating is often associated with negative consequences, including a high possibility of symptoms of depression and anxiety, an increased risk for heart disease, and most of all, an increased risk of obesity (Ho, 2014). Responding to emotional cues, both negative and positive, by indulging on food is relatively easy, as food surrounds us and takes a big part of our daily life. It may also be considered not only a response to a particular emotion, but a distraction from the main problem that is causing these particular emotions. The main reason why frequent emotional eating can become a problem, is because when strong emotions arise, people usually choose to indulge on “comfort foods”, which are often not considered healthy and have rather bad nutritional value. Investigating and understanding how gender and racial differences, along with emotional factors can influence emotional eating habits may help to the treatment of excessive food consumption (Thompson, 2015). Increased amounts of stress can contribute not only to a variety of negative health consequences, but also mental health difficulties can arise because of an intense amount of stress (Quick, Quick, Nelson, Hurrell, 1997). Besides eating habits, stress can also lead to negative changes in the individual’s lifestyle including smoking and increased alcohol consumption. Our study will focus on differences in emotional eating amongst different age, gender and race. Moreover, we will examine whether one’s stress levels can predict emotional eating.

Method

Participants

This study was based on a sample of university students. The size of the sample was 110 participants, out of which 57.27% (63 participants) were female and 42.73% (47 participants) were male. This sample included students of the University of New York in Prague, University of Chemistry and Technology, and University of Economics, all situated in Prague. The ages of the participants ranged from 18-36. The sample of participants used in

this research consisted of students of various nationalities, including students from Czech Republic, Russia, Slovakia, England, Sweden, Norway, Switzerland, Azerbaijan, Georgia, Macedonia, Ukraine, South Korea, France, India, Algeria, Germany, Denmark, America, Scotland, Poland, Yemen, Kazakhstan, Belarus, Croatia, Uzbekistan, Dominican Republic, Turkey, Tunisia, Finland, Jordan, Italy, Holland, Japan, Hungary, Mongolia, Ireland, Kyrgyzstan, Vietnam and Luxembourg. The majority of the participants were “White” (74.55%), the second largest group of participants identified as “Asian” (17.27%), and the remaining percentage consisted of “Native Americans”, “Hispanics”, and participants that were of “Other” races. Anonymity of the participants was preserved in line with the ethical guidelines for psychological research.

Materials

The study was based on a combination of two questionnaires which were previously used in research that aims to investigate the effect of stress on eating habits and emotional eating. The first part of the questionnaire consisted of the Three-Factor Eating Questionnaire, which measures three dimensions of human eating behavior. The second part of the questionnaire consisted of the Perceived Stress Scale questionnaire, which measures the levels of perceived stress in participants. The questionnaire also asked about gender, nationality, race and age details that were collected for the purpose of assessing differences amongst different groups. Participants also had to sign an informed consent.

Procedure

Prior to the beginning of the study, 120 questionnaires were printed out. The questionnaires were handed out to participants along with an informed consent form. The participants were informed that they could withdraw from the study at any point of the research. Participants were politely asked if they were willing to fill out a questionnaire voluntarily and no reward or payment was given for participation. Informed consent forms

were signed by participants before beginning the participation in the study. The questionnaires were given out to participants during class time or breaks in between class. Professors of the class were previously asked for consent to give out the questionnaires to the students during class time. After the participants have finished filling out the questionnaires, the papers were collected along with the signed consent forms. It was made sure that all questionnaires are fully completed, but a small portion of data was unclear or missing and was replaced by the average of the specific questions. There was no physical or emotional harm caused to the participants and deception was not used, however, after gathering data we were contacted by one participant, and asked to remove their data from study, due to newly discovered eating disorder. This data were removed, and the participant was once again reminded of the availability of counseling services at University of New York in Prague. The data collected from the questionnaires were then analyzed, looking into both the hypothesized regression between perceived stress and emotional eating, and also possible differences in gender and race. A statistical analysis was performed in order to prove or disprove the initial hypothesis.

Results

Graphs were conducted to describe our sample in terms of gender, race and age (see Figure 1, 2 and 3).

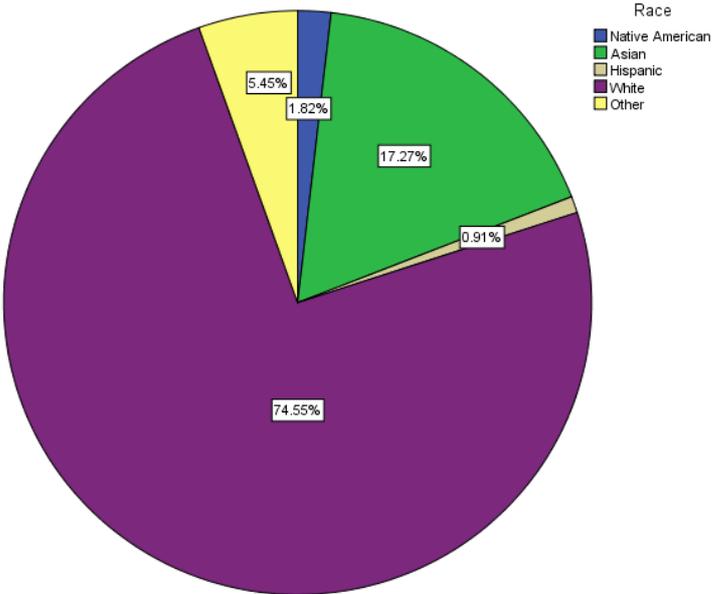


Figure 1. Race - Pie Chart

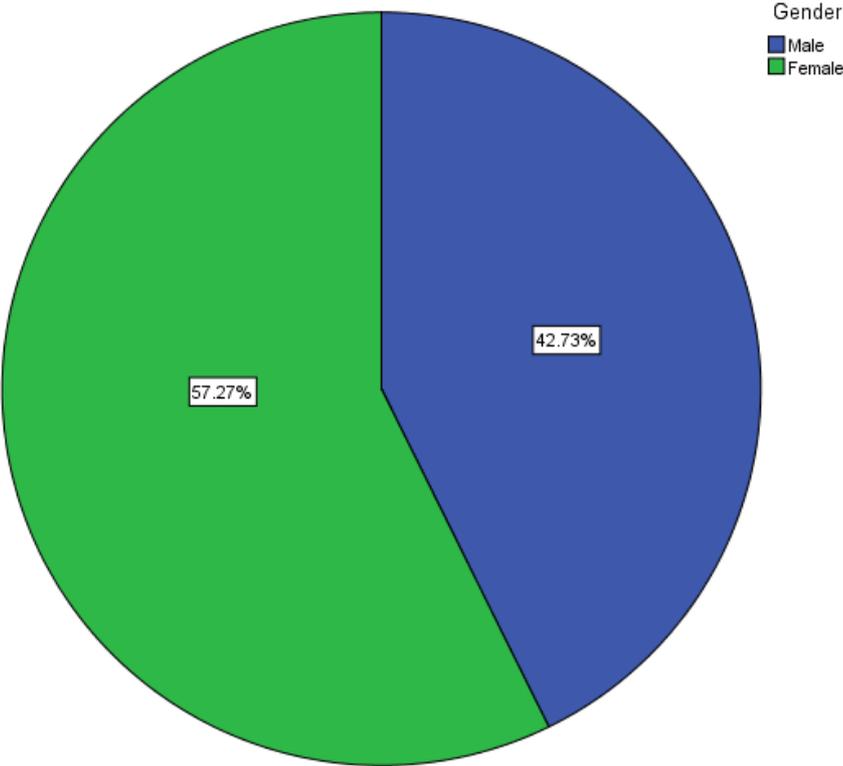


Figure 2. Gender – Pie Chart

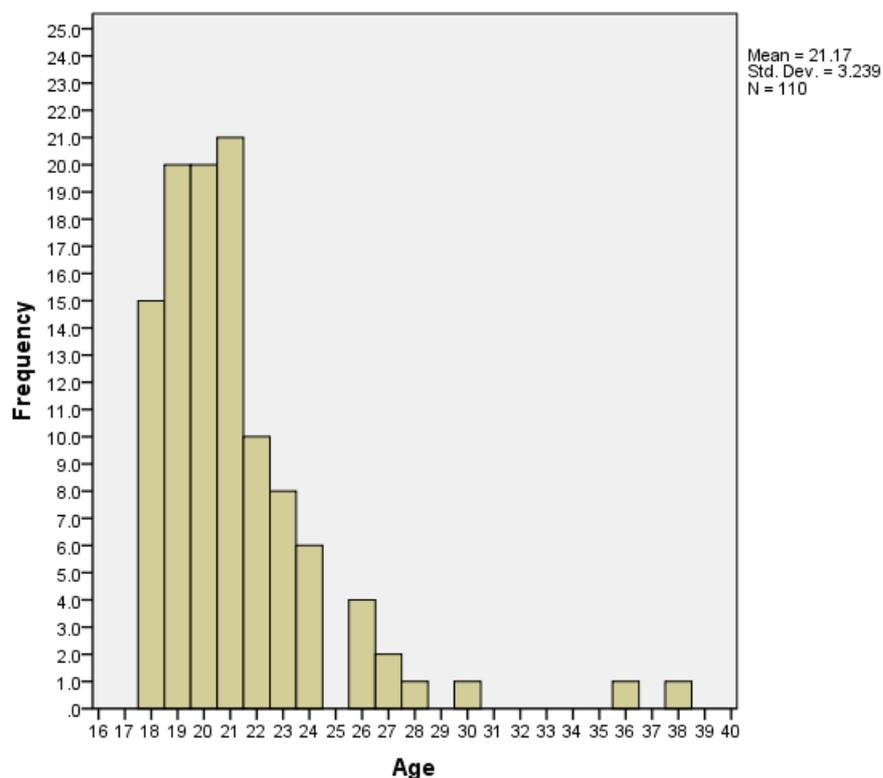


Figure 3. Age - Histogram

A linear regression was run to determine whether perceived stress level could predict emotional eating (see Table 1). The results showed no significance ($p > .05$) (see Table 2 and 3). However, another linear regression run to establish whether gender predicted emotional eating showed statistically significant results,

$F(1,108) = 5.996, p = .016$ (see Table 5)

and gender accounted for 4.4% of the explained variability in emotional eating (see Table 4).

The regression equation was:

emotional eating (EA)

$EA = 34.167 + (2.131 \times \text{gender})$ (see Table 6)

Therefore, the first part of our hypothesis, that stress would predict emotional eating, was not confirmed.

Table 1

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.056 ^a	.003	-.006	4.631

a. Predictors: (Constant), Perceived Stress

b. Dependent Variable: Emotional Eating

Table 2

ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	7.247	1	7.247	.338	.562 ^a
Residual	2316.216	108	21.446		
Total	2323.464	109			

a. Predictors: (Constant), Perceived Stress

b. Dependent Variable: Emotional Eating

Table 3

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	36.096	2.486		14.522	.000
Perceived Stress	.065	.111	.056	.581	.562

a. Dependent Variable: Emotional Eating

Table 4

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.229 ^a	.053	.044	4.515

a. Predictors: (Constant), Gender

b. Dependent Variable: Emotional Eating

Table 5

ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	122.205	1	122.205	5.996	.016 ^a
Residual	2201.258	108	20.382		
Total	2323.464	109			

a. Predictors: (Constant), Gender

b. Dependent Variable: Emotional Eating

Table 6

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	34.167	1.435		23.816	.000
Gender	2.131	.870	.229	2.449	.016

a. Dependent Variable: Emotional Eating

A three-way MANOVA was run to see the difference in emotional eating and perceived stress, depending on participants' age (below 21, 21-25, 25 and above), gender (male, female) and race (white, asian). The results did not show statistically significant difference in emotional eating ($p > .05$) (see Table 7).

However, separate ANOVAs were run to determine whether the variables individually had a significant effect on emotional eating. Race had a significant effect on emotional eating, $F(1, 90) = 5.078$, $p = .027$, $\eta^2 = .053$ (see Table 8).

The Tukey post hoc analysis did not show any significant results (see Table 9).

Therefore, our hypothesis that gender, race, and age would have a significant effect on emotional eating and stress was confirmed only partially.

Table 7

Multivariate Tests^c

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.970	1420.117 ^a	2.000	89.000	.000	.970
	Wilks' Lambda	.030	1420.117 ^a	2.000	89.000	.000	.970
	Hotelling's Trace	31.913	1420.117 ^a	2.000	89.000	.000	.970
	Roy's Largest Root	31.913	1420.117 ^a	2.000	89.000	.000	.970
age_bands	Pillai's Trace	.053	1.221	4.000	180.000	.303	.026
	Wilks' Lambda	.948	1.212 ^a	4.000	178.000	.307	.027
	Hotelling's Trace	.055	1.202	4.000	176.000	.312	.027
	Roy's Largest Root	.041	1.856 ^b	2.000	90.000	.162	.040
gender	Pillai's Trace	.039	1.807 ^a	2.000	89.000	.170	.039
	Wilks' Lambda	.961	1.807 ^a	2.000	89.000	.170	.039
	Hotelling's Trace	.041	1.807 ^a	2.000	89.000	.170	.039
	Roy's Largest Root	.041	1.807 ^a	2.000	89.000	.170	.039
race	Pillai's Trace	.055	2.608 ^a	2.000	89.000	.079	.055
	Wilks' Lambda	.945	2.608 ^a	2.000	89.000	.079	.055
	Hotelling's Trace	.059	2.608 ^a	2.000	89.000	.079	.055
	Roy's Largest Root	.059	2.608 ^a	2.000	89.000	.079	.055
age_bands * gender	Pillai's Trace	.017	.384	4.000	180.000	.820	.008
	Wilks' Lambda	.983	.381 ^a	4.000	178.000	.822	.008
	Hotelling's Trace	.017	.378	4.000	176.000	.824	.009
	Roy's Largest Root	.016	.701 ^b	2.000	90.000	.499	.015
age_bands * race	Pillai's Trace	.054	1.252	4.000	180.000	.291	.027
	Wilks' Lambda	.946	1.256 ^a	4.000	178.000	.289	.027
	Hotelling's Trace	.057	1.260	4.000	176.000	.288	.028
	Roy's Largest Root	.057	2.574 ^b	2.000	90.000	.082	.054
gender * race	Pillai's Trace	.036	1.662 ^a	2.000	89.000	.196	.036
	Wilks' Lambda	.964	1.662 ^a	2.000	89.000	.196	.036
	Hotelling's Trace	.037	1.662 ^a	2.000	89.000	.196	.036
	Roy's Largest Root	.037	1.662 ^a	2.000	89.000	.196	.036
age_bands * gender * race	Pillai's Trace	.011	.486 ^a	2.000	89.000	.617	.011
	Wilks' Lambda	.989	.486 ^a	2.000	89.000	.617	.011
	Hotelling's Trace	.011	.486 ^a	2.000	89.000	.617	.011
	Roy's Largest Root	.011	.486 ^a	2.000	89.000	.617	.011

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + age_bands + gender + race + age_bands * gender + age_bands * race + gender * race + age_bands * gender * race

Table 8

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Emotional Eating	373.075 ^a	10	37.307	1.874	.059	.172
	Perceived Stress	132.945 ^b	10	13.294	.832	.599	.085
Intercept	Emotional Eating	41454.090	1	41454.090	2081.849	.000	.959
	Perceived Stress	14822.442	1	14822.442	927.815	.000	.912
age_bands	Emotional Eating	36.429	2	18.215	.915	.404	.020
	Perceived Stress	51.106	2	25.553	1.599	.208	.034
gender	Emotional Eating	58.109	1	58.109	2.918	.091	.031
	Perceived Stress	14.293	1	14.293	.895	.347	.010
race	Emotional Eating	101.122	1	101.122	5.078	.027	.053
	Perceived Stress	5.021	1	5.021	.314	.576	.003
age_bands * gender	Emotional Eating	7.987	2	3.994	.201	.819	.004
	Perceived Stress	19.112	2	9.556	.598	.552	.013
age_bands * race	Emotional Eating	76.417	2	38.208	1.919	.153	.041
	Perceived Stress	24.860	2	12.430	.778	.462	.017
gender * race	Emotional Eating	48.132	1	48.132	2.417	.124	.026
	Perceived Stress	17.662	1	17.662	1.106	.296	.012
age_bands * gender * race	Emotional Eating	16.892	1	16.892	.848	.359	.009
	Perceived Stress	2.744	1	2.744	.172	.680	.002
Error	Emotional Eating	1792.094	90	19.912			
	Perceived Stress	1437.808	90	15.976			
Total	Emotional Eating	143111.000	101				
	Perceived Stress	50235.000	101				
Corrected Total	Emotional Eating	2165.168	100				
	Perceived Stress	1570.752	100				

a. R Squared = .172 (Adjusted R Squared = .080)

b. R Squared = .085 (Adjusted R Squared = -.017)

Table 9

Tukey HSD

		Dependent Variable		(I) age_bands	(J) age_bands	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
									Lower Bound	Upper Bound
Emotional Eating	Tukey HSD	dimension2	below 21	dimension3	21-25	1.09	1.091	.579	-1.51	3.69
					25 and above	1.99	1.580	.420	-1.77	5.76
			21-25	dimension3	below 21	-1.09	1.091	.579	-3.69	1.51
					25 and above	.90	1.766	.866	-3.30	5.11
			25 and above	dimension3	below 21	-1.99	1.580	.420	-5.76	1.77
					21-25	-.90	1.766	.866	-5.11	3.30
	Bonferroni	dimension2	below 21	dimension3	21-25	1.09	1.091	.961	-1.57	3.75
					25 and above	1.99	1.580	.631	-1.86	5.85
			21-25	dimension3	below 21	-1.09	1.091	.961	-3.75	1.57
					25 and above	.90	1.766	1.000	-3.40	5.21
			25 and above	dimension3	below 21	-1.99	1.580	.631	-5.85	1.86
					21-25	-.90	1.766	1.000	-5.21	3.40
Perceived Stress	Tukey HSD	dimension2	below 21	dimension3	21-25	-1.65	.977	.215	-3.98	.68
					25 and above	-1.18	1.415	.683	-4.55	2.19
			21-25	dimension3	below 21	1.65	.977	.215	-.68	3.98
					25 and above	.47	1.582	.953	-3.30	4.24
			25 and above	dimension3	below 21	1.18	1.415	.683	-2.19	4.55
					21-25	-.47	1.582	.953	-4.24	3.30
	Bonferroni	dimension2	below 21	dimension3	21-25	-1.65	.977	.284	-4.03	.73
					25 and above	-1.18	1.415	1.000	-4.63	2.27
			21-25	dimension3	below 21	1.65	.977	.284	-.73	4.03
					25 and above	.47	1.582	1.000	-3.39	4.33
			25 and above	dimension3	below 21	1.18	1.415	1.000	-2.27	4.63
					21-25	-.47	1.582	1.000	-4.33	3.39

Based on observed means.

The error term is Mean Square(Error) = 15.976.

Discussion

As our hypothesis states, the focus of this study was to examine differences in emotional eating and perceived stress levels depending on variables: gender, age and race. Moreover, we wanted to see if stress could predict emotional eating. Although we did not find statistically significant difference in emotional eating in different age and gender, nor in the prediction of emotional eating based on stress, another regression was run to establish whether gender could predict emotional eating. This was one of the two markers highlighting the importance of our study: gender statistically significantly predicts emotional eating; there is a statistical difference between “White” and “Asian” race in emotional eating. Therefore, our hypothesis, also partially confirmed, led to more relevant and noteworthy findings.

The choice of method was based on literature review; therefore, the partial insignificance of the results was unexpected. This was inconsistent with previous research, which suggested stress was closely related to emotional eating (Nguyen-Rodriguez, 2009). Occurrence of such results can be explained in various ways. For one, the Perceived Stress Scale asks questions about the past month of the participants, while the Three-Factor Eating Questionnaire asks about general lifestyle. Moreover, our research was conducted during a non-stressful period of the semester and our sample did not vary as much as it mostly consisted of private university students. Taking these two factors into consideration, we can see that our results might not represent the actual statistical effect of stress on emotional eating. The implications for further research are following: In case the same method is chosen, it would be more effective to gather data during a more stressful period of participants’ lives. A larger sample, or a sample consisting of individuals whose lives do not overlap to the extent that was present in our research, might represent the population more effectively. However, based on our results we would recommend using a different questionnaire or adding perceived adequacy of stress coping to the original questionnaire.

In the case of age, the absence of significance can be understood from simply inspecting Figure 3. Most of our participants were twenty-two years old, therefore it was irrelevant to include it in the factorial design. Once again, increase of the variability of the sample and the sample size might show more consistent results.

Gender did not show significant results in the case of its separate contribution to the factorial statistical design, however, it significantly predicted emotional eating in the case of regression. This is consistent with our literature review, and further calls for intervention, as these results show women are more likely to turn to food to gain emotional stability (Statistics Canada, 2013).

Lastly, race showed to be a significant factor in emotional eating. The highest percentage of participants was “Asian” and “White”, other races were not sufficiently represented, therefore these two were the only races included in the statistical analysis (see Figure 2). “White” participants were more likely to consume food due to emotion. We believe this is due to cultural factors, however, none of the available studies suggested these results.

To conclude, women and “white” participants showed to have lower restraint when it came to emotional eating. It is important to address this, as these eating habits can have series of negative consequences including depression and increased risk of heart disease (Ho, 2014). Additionally, there were many factors to why our hypothesis was confirmed only partially, however, as our sample consisted from participants around the age of 21 which are attending a private university, these results can be representative of the sample we used (see Figure 3).

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Appendix

INFORMED CONSENT FORM

1. This research study will examine the relationship between factors such as age, gender, race, nationality and emotional eating. If you agree to participate, you will be asked to answer survey questions that ask about perceived stress levels and eating habits.
2. You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.
3. Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted, and you may learn something about this area of research (i.e., factors that are related to emotional eating).
4. You will be given additional information about the study after your participation is complete.
5. If you agree to participate in the study, it may take up to 20 minutes to complete the survey.
6. All data from this study will be kept from inappropriate disclosure and will be accessible only to the researchers. The researchers are not interested in anyone's individual responses, only the average responses of everyone in the study.
7. Risks: The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns. In case you are not a student of UNYP you can contact me directly at xhetesovat@student.unyp.cz and I will refer you to an appropriate mental health provider.
8. This research study is being conducted by Terézia Hetešová and Anna Pryanishnikova for a Cognition course. The course instructor is Vartan Agopian, Lecturer in the Psychology department at the University of New York in Prague. If you have questions or concerns about your participation in this study, you may contact the researcher at xhetesovat@student.unyp.cz.
9. You may obtain information about the outcome of the study at the end of the Fall 2018 semester by contacting the researcher listed above.
10. Personal Copy of Consent Form: You may receive a blank, unsigned copy of this consent form at the beginning of the study.
11. Verification of Adult Age: By signing below, you attest that you are 18 years old or older.
12. By signing below, you are indicating that you have freely consented to participate in this research study.

PARTICIPANT'S FULL NAME (printed): _____

PARTICIPANT'S SIGNATURE: _____ DATE: _____

Emotional Eating Questionnaire

Age: _____

Gender (*Circle*): **Male** **Female**

Race:

Native American

Asian

African-American

Hispanic

White

Other

Nationality: _____

Part A

Please read each statement and select from multiple choice options the answer that indicates the frequency with which you find yourself feeling or experiencing what is being described in the statement below.

1. When I smell a delicious food, I find it very difficult to keep from eating , even if I have just finished a meal.

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

2. When I feel anxious, I find myself eating

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

3. Sometimes when I start eating, I just can't seem to stop

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

4. Being with someone who is eating often makes me hungry enough to eat also.

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

5. When I feel blue, I often overeat

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

6. When I see a real delicacy , I often get so hungry that I have to eat right away

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

7. I get so hungry that my stomach often seems like a bottomless pit

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

8. I am always hungry so it is hard for me to stop eating before I finish the food on my plate

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

9. When I feel lonely , I console myself by eating

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

10. I consciously hold back at meals in order not to gain weight

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

11. I do not eat some foods, because they would make me fat

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

12. I am always hungry enough to eat at any time

Definitely true (4)/ mostly true(3)/ mostly false(2)/ definitely false (1)

13. How often do you feel hungry?

Only at meal times (1)/ sometimes between meals (2)/ often between meals (3)/almost always (4)

14. How frequently do you avoid consuming tempting foods?

Almost never (1)/ seldom (2)/ moderately likely (3)/ almost always (4)

15. How likely are you to consciously eat less than you want?

Unlikely (1)/ slightly likely (2)/ moderately likely (3)/ very likely (4)

16. Do you go on eating binges though you are not hungry?

Never (1)/ rarely (2)/ sometimes (3)/ at least once a week (4)

17. On a scale of 1 to 8 , where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never “giving in”) , what number would you give yourself?

Part B

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

- | | |
|--|-----------|
| 1. In the last month, how often have you been upset because of something that happened unexpectedly? | 0 1 2 3 4 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life? | 0 1 2 3 4 |
| 3. In the last month, how often have you felt nervous and “stressed”? | 0 1 2 3 4 |
| 4. In the last month, how often have you felt confident about your ability to handle your personal problems? | 0 1 2 3 4 |
| 5. In the last month, how often have you felt that things were going your way? | 0 1 2 3 4 |
| 6. In the last month, how often have you found that you could not cope with all the things that you had to do? | 0 1 2 3 4 |
| 7. In the last month, how often have you been able to control irritations in your life? | 0 1 2 3 4 |
| 8. In the last month, how often have you felt that you were on top of things? | 0 1 2 3 4 |
| 9. In the last month, how often have you been angered because of things that were outside of your control? | 0 1 2 3 4 |
| 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? | 0 1 2 3 4 |

Personality and Body Fat as Predictors of Eating Styles in
Young Adults

Thesis

By

Milena Ferenčíková

Submitted in Partial fulfillment

Of the Requirements for the degree of

Bachelor of Arts

in Psychology

State University of New York

Empire State College

2018

Reader: Ronnie Mathers, Ph.D.

Statutory Declaration/ Čestné prohlášení

I, Milena Ferenčíková, declare that the thesis entitled:

Personality and Body Fat as Predictors of Eating Styles in Young Adults

was written by myself independently, using the list of sources listed in the list of references. I am aware that my work will be published in accordance with § 47b of Act No. 111/1998 Coll., On Higher Education Institutions, as amended, and in accordance with the valid publication guidelines for university undergraduate thesis.

Já, Milena Ferenčíková, prohlašuji, že jsem tuto bakalářskou práci vypracovala samostatně s použitím uvedené literatury a zdrojů informací. Jsem si vědoma, že moje práce bude zveřejněna v souladu se zákonem § 47b č. 111/1998 Sb., o vysokých školách ve znění pozdějších předpisů, a v souladu s platnou Směrnicí o zveřejňování vysokoškolských závěrečných prací.

in Prague/ v Praze , 2.1. 2018

.....

Milena Ferenčíková

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Table of Contents

Chapter I	Introduction.....	6
Chapter II	Literature Review.....	10
	2.1 Eating.....	10
	2.1.1 Overeating.....	14
	2.1.1.1 Psychological Theories of Overeating.....	16
	2.1.1.1.1 Psychosomatic Theory.....	16
	2.1.1.1.2 Externality Theory.....	18
	2.1.1.1.3 Restraint Theory.....	20
	2.1.1.2 Overeating Styles.....	21
	2.1.1.2.1 Emotional Eating.....	21
	2.1.1.2.2 External Eating.....	26
	2.1.1.2.3 Restrained Eating.....	26
	2.1.1.2.4 Measures of Overeating Styles.....	27
	2.1.1.2.4.1 The Dutch Eating Behavior Questionnaire.....	31
	2.1.1.2.4.1.1 Emotional Eating.....	32
	2.1.1.2.4.1.2 External Eating.....	33
	2.1.1.2.4.1.3 Restrained Eating.....	33
	2.2 Health.....	34
	2.2.1 Body Fat.....	35
	2.2.1.1 Measures of Body Fat.....	35
	2.2.1.1.1 The Body Mass Index.....	36
	2.3 Personality.....	38
	2.3.1 Personality Traits.....	39
	2.3.1.1 Measures of Personality Traits.....	40
	2.3.1.1.1 The Big Five Inventory.....	45
	2.3.1.1.1.1 Extraversion vs. Introversion.....	46
	2.3.1.1.1.2 Agreeableness vs. Antagonism.....	47
	2.3.1.1.1.3 Conscientiousness vs. Lack of Direction.....	47
	2.3.1.1.1.4 Neuroticism vs. Emotional Stability.....	48
	2.3.1.1.1.5 Openness vs. Closedness to Experience.....	48
	2.4 Personality Traits, BMI and Overeating Styles.....	49
	2.4.1 Personality Traits and Overeating Styles.....	49
	2.4.2 Body Fat Differences on Emotional Eating.....	54
	2.4.3 Body Fat Differences on External Eating.....	55
	2.4.4 Body Fat Differences on Restrained Eating.....	56
	2.5 Hypotheses.....	57
Chapter III	Method.....	61
	3.1 Introduction.....	61
	3.2 Design.....	61
	3.3 Participants.....	61
	3.4 Materials.....	62
	3.5 Procedure.....	65
	3.6 Analysis.....	65

Chapter IV	Findings.....	66
	4.1 Introduction.....	66
	4.2 Results of the Application of the Method.....	66
	4.3 Descriptive Statistics of Main Variables	66
	4.3.1 Descriptive Statistics of the Personality Dimension Extraversion vs. Introversion.....	66
	4.3.2 Descriptive Statistics of the Personality Dimension Agreeableness vs. Antagonism.....	67
	4.3.3 Descriptive Statistics of the Personality Dimension Conscientiousness vs. Lack of Direction.....	67
	4.3.4 Descriptive Statistics of the Personality Dimension Neuroticism vs. Emotional Stability.....	68
	4.3.5 Descriptive Statistics of the Personality Dimension Openness vs. Closedness to Experience.....	68
	4.3.6 Descriptive Statistics of BMI.....	69
	4.3.7 Descriptive Statistics of Restrained Eating.....	69
	4.3.8 Descriptive Statistics of Emotional Eating.....	70
	4.3.9 Descriptive Statistics of External Eating.....	70
	4.4 Normality Assessment of Main Variables	71
	4.4.1 Normality Assessment of the Personality Dimension Extraversion vs. Introversion.....	72
	4.4.2 Normality Assessment of the Personality Dimension Agreeableness vs. Antagonism.....	72
	4.4.3 Normality Assessment of the Personality Dimension Conscientiousness vs. Lack of Direction.....	73
	4.4.4 Normality Assessment of the Personality Dimension Neuroticism vs. Emotional Stability.....	73
	4.4.5 Normality Assessment of the Personality Dimension Openness vs. Closedness to Experience.....	74
	4.4.6 Normality Assessment of BMI.....	74
	4.4.7 Normality Assessment of Restrained Eating.....	75
	4.4.8 Normality Assessment of Emotional Eating.....	75
	4.4.9 Normality Assessment of External Eating.....	76
	4.5 Test of Hypotheses.....	77
Chapter V	Discussion.....	84
	5.1 Discussion of Descriptive Analysis.....	84
	5.2 Discussion of Test of Hypothesis.....	85
Chapter VI	Conclusions.....	91
	6.1 Main Conclusions.....	91
	6.2 Implications.....	92
	6.3 Strengths and Limitations.....	94
	6.4 Suggestions for Future Research.....	94
	References.....	100
	Appendix A.....	121
	Appendix B.....	159
	Appendix C.....	160

Abstract

Onwuegbuzie and Wilsoon (2003) found that 80% of psychology undergraduate students report some level of statistics anxiety caused by self-perceived stress. Constant et al. (2018) found that one common way how young adults cope with experience of negative emotions is overeating. Rolls, Morris and Roe (2002) mentioned that there are overeating in response to external factors while Weirheim, Paxton & Blaney (2009) report that they overeat because of dieting. However, some researchers Heaven et al., (2001) or Elfhag and Morey (2008) mentioned that personality and body fat might play a role in these overeating styles. Therefore, are overeating eating styles influenced by personality traits and body fat? In the current study overeating was operationalized in terms of restrained, emotional and external eating styles and assessed via van Strien et al. 1986's Dutch Eating Behavior Questionnaire. Moreover, personality was operationalized in terms in of the Big Five personality dimension and assessed by John and Srivastava's (1999) Big Five Inventory. In addition, body fat was operationalized in terms of body mass index. This is a quantitative, non-experimental, cross-sectional study conducted with 216 students in a non-clinical study population at University of New York in Prague, Czech Republic. Regression analyses showed that Neuroticism and body fat significantly positively predicted emotional eating while higher scores on Neuroticism, Extraversion and higher weight were identified as significant predictors of higher scores on external eating. Moreover, none of personality traits nor body fat significantly predicted restrained eating. Practical implications, limitations of the study and suggestions for further research are outlined at the end of the study.

Introduction

Being in a college is a challenging experience. For some, it's a time of enjoyment and a chance to build long-life friendships for others it may cause a lot of stress. For instance, Onwuegbuzie and Wilsoon (2003) found that 80% of psychology undergraduate students report some level of statistics anxiety caused by self-perceived stress. One common way how young adults cope with experience of negative emotions is overeating. Bruch (1973) coined this specific overeating style as emotional eating. Recently, Constant et al. (2018) studied eating behaviors in 335 female university students with normal weight. Four to five respondents in ten reported that they overeat in response to negative emotions such as anxiety (51.3%), loneliness (45.1%) or sadness (44.8%) mostly during one to five days in the last 28 days. Laitinen, Ek and Sovio (2002) in epidemiological study with 2359 men and 2791 women found that 30 % of women and 25% of men report that they overeat when experiencing negative emotions – specifically stress. Previous research has linked emotional eating with various indicators of psychopathology such as depression, anxiety, negative self-concept, difficulties in interpersonal relationships, poor health outcomes and increased weight (Gibson, 2006; Wardle et al., 2006, van Strien, 1996).

Besides internal factors, eating behaviors can be affected by the environment. So called“ obesogenic environment” refers to all environmental cues that promote overconsumption while encourage reduction of energy expenditure (Hill, Wyatt, Reed & Peters, 2003). According to Hill et al. (2003) the environmental factors contributing to overconsumption are” wide variety of good-tasting, inexpensive, energy-dense foods and the serving of these foods in large portions” (pg. 853). Western society has replaced traditional food preparation and family dining for dining out , to save time. One popular

way how young adults deal with this “paradox of living in instant age” is going to fast food restaurants. Having lunch in McDonald’s takes just few minutes and is cheap. Indeed, Dingman et al. (2014) report that 23% of overall food intake of students came from fast food, while 50% of the students reported that they have at least three fast food meals per week. At this point, you may ask “So what?”. Of course, occasional consumption of fast food meals does not need to lead to health problems. However, palatable food (high in saturated fat, sugar) and bigger than normative portion size, coupled with smiling staff to make the eating atmosphere so pleasant and friendly may lead to overeating. Importantly, fast food consumption coupled with sedentary life style may lead to weight gain (Dingman et al., 2014). Regarding the portion sizes, research has showed that people eat more when the food is served in large portion. For instance, Rolls, Morris and Roe (2002) offered adults four different portion sizes of macaroni and cheese on different days. Rolls et al. (2002) observed significant positive correlation between portion size and food intake. Additionally, the participants rated each portion size of the meal with the similar ratings of fullness and hunger. Large portion sizes were also found to increase bite sizes or eating speed (Almiron-Roig et al., 2015). That increasing the portion size of a meal was significantly associated with increased food intake. In research, eating in response to all environmental cues has been labelled as external eating style (Schachter & Rodin, 1974).

Another challenge that young college students face and make them more vulnerable to developed unhealthy eating style is dieting. Internalizing weight stigma attitudes have been linked with higher exercise avoidance and overall lower levels of physical activity (Vartanian & Novak, 2011). Body thinness reflects the success (Brewis, 2011), being fat means being lazy, greedy and unmotivated (Puhl & Brownell, 2001).

Therefore, it is expectable to find young adults, especially young females dieting as a result of being dissatisfied with one's figure (Cooley & Toray, 2001). According to National Center on Addiction and Substance Abuse (2003), 58.6% of girls and 28.2% of young adults are actively dieting. Hence, it has been reported that one third of non-overweight girls are dieting (Weirheim, Paxton & Blaney, 2009).Paradoxically, 95% of dieters regain their weight in 1-5 years (Grodstein, Levine, Spencer, Colditz & Stampfer, 1996; Neumark-Sztainer, Hanes, Wall & Eisenberg, 2007). The notion that dieting leads to overeating and in turn increases one's susceptibility to become overweight has been outlined by Herman and Polivy (1974) who coined the term in their Restraint theory of overeating.

All three eating styles then can be dangerous as they can lead to overweight and later with obesity. Prior research has linked emotional and external eating styles various indicators of psychopathology such as depression, anxiety, negative self-concept, difficulties in interpersonal relationships, poor health outcomes, increased weights (Gibson, 2006; Wardle et al., 2006, van Strien, 1996; Elfhag & Linne, 2005; van Strien, Schippers & Cox; 1995)) and higher intake of palatable foods such as sweets (Striegel-Moore et al., 1999). However, research on restrained eaters suggest that they are more likely to eat healthier food (Beiseigel & Nickols- Richardson, 2004) and can have both higher (Provencher, Drapeau, Tremblay, Despres & Limieux, 2003) but also lower body weights (Boschi, Iorio, Margiotta, D'Orsi, & Falconi, 2001). Still, restrained eating has been found to be an important precursor of eating disorders such as anorexia nervosa, bulimia nervosa and binge eating disorder (Polivy & Herman, 2002).

Overeating seems to be a controversial topic as not all people who engage in excessive food intake will become overweight and later develop obesity. Obesity was

found to be associated with many noncommunicable diseases such as cardiovascular diseases especially hypertension (Halmi, 1988; Drenick, Gurunanjappa, Selzer & Johnson, 1980) ; diabetes mellitus Type 2 (Drenick et al., 1980; DeAngelo, Kalumuck & Adlin, 2013) , musculoskeletal disorders; especially arthritis and even some types of cancer (WHO, 2018;Kenchiah et al., 2002; Ogden, 2010; Halmi, 1988; Doll & Peto, 1981); elevated mortality (Frank, Hanson & Knowler, 2010); significant decreases in life expectancy (Peeterson et al., 2003)but also with mental disorders (Puhl & Heuer, 2010).

Because obesity is preventable(Cabbalero, 2007) and various unnoticed maladaptive eating practices may lead to eating disorders there is a principal responsibility of research trying to screen for possible factors that are regulating eating behaviors in young adults. Raynor and Levine (2009) noticed that personality traits are related to health outcomes, or indirectly to food choices (Keller & Siegrist, 2015). There is a sizeable amount of literature published on examining personality traits, body weight and eating styles in clinical (e.g. Elfhag & Morey, 2008) but also non-clinical population (e.g. Ellickson-Larew, Naragon-Gainey & Watson, 2013; Cebolla et al., 2014; Heaven et al., 2001; Adriaanse, Ridders & Evers, 2011. However, the prior research did not reach a firm agreement. Therefore , the aim of the study is to evaluate whether overeating styles such as emotional, external and restrained eating can be predicted by personality traits, body fat. In this research project, we understand overeating styles in terms of emotional eating, external eating and restrained eating. Moreover, we operationalized personality traits as a relatively enduring way to behave clustered in a taxonomy of five dimensions such as Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism

vs. Emotional Stability, Openness vs. Closedness to Experience. Additionally, we understand body fat in terms of the body mass index.

Literature Review

2.1 Eating

Eating has been conceptualized as an automatic behavior, that is, as behavior that operates without cognitive direction (Bargh, & Chartrand, 1999). We smile when amused, we sleep when tired, so we eat when hungry. Bargh (1994) outlined four characteristics of eating as automatic behavior: it occurs without awareness, it was initiated without intention, it continues once initiated without control and it operates efficiently or with little effort. This claim has received wide empirical support : humans are not aware about the amount of food they ate (Diliberti et al., 2004); they tend to eat any food that is in sight (Painter, Wansink & Hieggelke, 2002) as well as finding that people are more likely to eat just because it's meal time rather than feeling hungry and also are more likely to stop eating because of having no more food to eat, had finished watching television (Tuomisto, Tuomisto, Hetherington & Lapplainen, 1998). Therefore, in line with this argument, cessation of eating is harder and requires more self-control and effort compared to the initiation of eating.

Another way how research has discussed eating is through concepts as healthy eating, food choice, meaning of food, meaning of size, weight concerns, eating disorders and obesity (Ogden, 2010). All these complex topics are discussed by nutritionist and medical experts to explain what stands for healthy eating and how diet influences health. Literature on food choice focuses on psychological developmental theories of eating behavior such associative learning and the way how the human builds food preferences

through learning and exposure (Ogden, 2004). Cognitive approaches conceptualize eating in terms of intentions, decisions or attitudes in predicting eating behavior. For instance, Emmons (1996) proposed approach-avoidance conflict theory to predict human's ambivalence in decision making. In turn, anthropological and sociological approaches discuss the meaning of food on societal level, while research on meaning of size tackles mostly environmental influences on eating behavior such impact of the media on perception of body ideal, beauty and body satisfaction. To complete the circle, clinical psychologists and psychiatrists discuss topics as dieting, effects of internalized body ideals on self-perception and self-image and how all this relates to understanding of development and maintenance of eating disorders and obesity (Ogden, 2010; Ogden, 2004).

Any psychological approach to eating behavior starts with neurophysiology of eating regulation. In the broadest sense, it involves two systems : peripheral and central. While central system includes mainly hypothalamus and brain stem with all neurotransmitters regulating eating behavior , peripheral system refers to gastrointestinal system, pancreas and adipose tissue that secretes specific signaling hormones (Dovey, 2010). Dovey (2010) outlined four ways of appetite regulation within a framework of four phases. Firstly, Dovey (2010) differentiate between satiation and satiety, when satiety refers to “the fullness that exists within a meal while satiety comprises all the factors that restrict someone to continue eating” (pg. 19). Secondly, Dovey (2010) informs that hunger and satiety are controlled through neurotransmitter and hormonal signaling on two levels- first within a single meal (episodic) and over a longer periods of time (tonic). Third phase refers to phases of biological signaling pre- and post- absorption of secreted biochemicals. The last phase refers to cephalic phase which mainly includes drivers to

eat (in hypothalamus), taste perception (brainstem) and nutrient stage (gastrointestinal tract). The episodic signaling involves three stages , hunger – start eating that is mediated by secretion of two orexigenic signaling neurotransmitters responsible for initiation of eating (neuropeptide Y and agouti-related protein) which are in constant battle with two mirroring anorexic neurotransmitters such as cocaine and amphetamine responsible for inhibition of eating. In general, from evolutionary perspective orexigenic signals must be stronger than anorexigenic signals (Dovey, 2010) therefore it explains why eating disorders such anorexia bulimia are considered as disordered while overeating is not.

Another mechanism that happens simultaneously with cortical control is the peripheral system with all relevant hormones. In state of organism energy deficiency (physiological hunger), the stomach secretes ghrelin to signal the hypothalamus to release hormones responsible for appetite stimulation (orexin and neuropeptide Y) (Inui et al., 2004; Smeets, Erkner & de Graaf, 2010; Patterson, Bloom, & Gardiner, 2011). To cease the eating, pancreas releases insulin, intestinal peptide YY and leptin which is accumulated in adipose tissue. Importantly, low levels of leptin enhance desire to eat while high levels of leptin inhibit eating through satiety (Margetic, Gazzola, Pegg & Hill, 2002). Still, hunger is “ purely defined cognition” (Sibilia, 2010). To explain, there are two types of hunger-physiological and psychological. Through learning, individual learns to respond to internal cues of satiety to avoid hunger (Franck, 2013) This feeling, however, ranges on a spectrum. Therefore, beyond the reaction of internal cues, there is a “ zone of indifference” influenced by external cues which are unrelated to physiological signals. In research, it has been labelled as psychological hunger or appetite (Franck, 2013). For weight regulation, experimental studies done with animals found that there are homeostatic factors (nutritional needs) that are responsible for weight regulation (Woods,

2009) and nonhomeostatic mechanisms related to brain's reward system. Recently, the research suggests that previous focus on metabolic hormones such leptin and ghrelin and their regulatory effects on appetite are less central for understanding food intake regulation (Monteleone & May, 2013).

The last concept that is relevant to our discussion about overeating is reward mechanism in feeding defined by "liking" and "wanting" pathways. In eating research, liking refers to palatability of food- all foods which have intensive taste properties- e.g. sweets, high-fat food or salty food. Interestingly, sour and bitter tasting foods can only be "liked" through conditioned learning, while humans are inherently "wired" to like sweet, sour, and salty taste. According to Nishijo et al. (1998) amygdala (brain center responsible for emotions) is important cortical structure in taste preference. Therefore, liking can be modulated by many factors. In the line with Mela (2001) model of liking, environment (time, frequency, situation, culture), biology(genes, neurochemistry, hormones) and psychology(mood, reward sensitivity, experience) can reinforce or inhibits someone to experience hedonic pleasure from eating a food. Interindividual differences in taste preference and liking the food are also affected by dopamine. On the other side, wanting mechanism works through signaling effects of dopamine. According to Dovey (2010) wanting is more complex process and can exist outside of liking. Again, it may be because of evolutionary reasons as in time of starvation, it's important to still " want" to eat even when the food is not liked. Nevertheless, wanting and liking systems are closely interconnected and structurally hard to differentiate (Dovey, 2010).

2.1.1 Overeating

Physiological theories of overeating inform that people with higher weight have higher concentration of leptin hormones which should naturally suppress hunger. However, according to Lam and Ravussin (2016) overweight individuals are “leptin resistant” what decreases baseline metabolic rate (complicates weight loss) and also makes them feel constantly hungry. In addition, it has been proposed that obese individuals are less sensitive to dopamine because they have lower amount of brain dopamine receptors (Heshmat, 2011). Importantly, according to Stouffer et al. (2015) insulin reinforced by intake of high-calorie diet enhances production of dopamine what explains why people continue eating even after being satiated. Sensitivity to reward then is therefore interindividual difference. Consequently, chronically elevated levels of insulin combined with lowered amount of insulin receptors in obese people has been proposed a plausible explanation of overeating leading to increased weight (Stouffer et al., 2015).

Another distinction that has been found to make overweight people more vulnerable to overeating is maladaptive mechanism of ghrelin secretion. The explanation of this mechanism is based on work of physiologist Claude Bernard, who proposed that body weight is regulated behaviorally and physiologically toward maintenance of homeostasis (Franck, 2013; DeAngelo, Kalumuck & Adlin, 2013; Müller, Bosy-Westphal & Heymsfield, 2010). It had been proposed that body is “inherently programmed” to specific weight. This so called “set-point theory” also suggest that individuals with high weight are likely to restraint their food intake thanks to effect of social thinness standards or external influences. However, according to set-point theory, body will adjust to decreased weight in an overproduction of leptin in order to regain lost weight and reach

biological homeostasis. Thus, overweight people will feel constantly hungry and more sensitive to food related external cues, what in turn increases their vulnerability to overeat.

According to Prentice (2001) overeating refers to “the consumption of an energy intake that is inappropriately large for a given expenditure” (p. 234). Eating past the point of satiety refers also to counterregulatory process because the inhibitors of hunger are not internal but rather cognitive factors (Franck, 2013). In other words, human body can be considered as a system of constant energetic exchange. If we receive more energy than is exerted, the organism is in positive energy balance and increases the weight. This so called “ active” overeating needs always be considered relative to individual’s energy expenditure and body constitution. For instance, the woman with a sedentary job needs to eat less compared to a man who is a professional athlete, so she would actively overeat only when energy intake exceeds energy output. . In passive overeating, the energy equitation reverses, the person consumes as many calories as it would be appropriate under normal circumstances, but energy expenditure is lower (Prentice, 2001).

Prentice (2001) pointed out that overeating can be clustered based on time dimension. Prentice (2001) detailed short-term and long-term overeating. Short-term overeating has an adaptive value because of being associated with feasting and celebration but also valuable in societies “threatened by extreme environmental seasonality that imposes a feasting and fasting mode of survival” (Prentice, 2001, pg. 234) However, long-term overeating, when an individual consistently remains in positive energy balance, will “ always lead to body fat storage and obesity” (Prentice, 2001, pg. 234).

Despite the fact, that overeating can be adaptive and does not need to lead to overweight it is a far more complex process. There are three main psychological theories of overeating which will be discussed in the next section.

2.1.1.1 Psychological Theories of Overeating

Research on overeating

Pioneering studies on overeating date back to 1950s to the work of clinical psychologists and psychoanalysts. Kaplan and Kaplan (1957) and Bruch (1961) proposed Psychosomatic Model of Obesity, based on the concept of emotional eating. Early after them, Schacter and Rodin (1974) invented Externality theory of overeating with its core concept external eating. As the last contribution, Herman and Polivy (1975) embraced Restraint theory of overeating. These three theories were invented in chronological order, but later explanations worked with the idea of “combined effects” (Dovey, 2002). It means that there is interindividual difference in the extent to which an individual overeats as proposed by three main propositions. For instance, restrained eater may be more responsive to external cues but emotionally stable. Other restrained eater, who is more neurotic does not need to respond as strong as the first one to external cues. These styles are interrelated.

2.1.1.1.1 Psychosomatic Theory

Psychosomatic Theory grew up on concept of classical psychoanalysis and was rooted in clinical practice. The most central concept of psychodynamic model is that “overeating is a primary response to anxiety caused by unconscious conflict that may temporarily relieve affective states” (Slochower, 1987, pg. 145). This notion was based on finding a

parallel in physical response to arousal states. According to Carlson(1916) normal physiological reaction to heightened arousal is inhibition of appetite and thus restraint of eating. However, early psychoanalysts noticed that some individuals after experiencing stress or arousal do not stop eating (as would be normal response if they responded to internal cues of hunger and satiety) but instead overeat (van Strien, 1986). This so called “ emotional eating”. Emotional eating had been proposed to have different meanings : fixation at the oral stage during the childhood as suggested Bychowski (1950) that leads to adult’s conditioned response to food “ as a symbol of maternal care” (van Strien, 1986, pg. 6). Or as described by Kaplan and Kaplan (1957) who suggested “emotional eaters are emotionally disturbed persons who have learned to use overeating as a means of coping with their psychological symptoms”(pg.197). Kaplan and Kaplan’s (1957) interpretation got a wide support. For instance, Hamberger (1951) or Hockman (1938) also agreed that overeating is done to cope with anxiety. Or Bruch (1961) explained that emotional eating or “ fat of sorrow” can be interpreted in terms of developmental obesity and reactive obesity. Developmental obesity was a result of learning and early life experiences of a child with a mother. Because of maladaptive responses of mother to the child (giving the child the attention only when feeding) , the child learned to confuse the biological cues of hunger and satiety and later leads to deficits in hunger awareness. Thus, virtually any emotional arousal would trigger overeating (Bruch, 1957). Bruch (1964) suggested that reactive obesity is occurring in adults as a response to traumatic circumstances.

In sum , although the psychoanalysts did not agree about the meaning the food hold for the individual, this school contributed to the field of eating behavior by proposition that people overeat to cope with unpleasant emotional arousal (negative feelings).

Studies testing psychosomatic model of overeating were consistent in finding obese individuals more sensitive and responsive to negative affect however failed to support the notion that they overeat to decrease anxiety (e.g. Abramson & Wunderlich, 1972; Rodin, Elman & Schacter, 1974). For instance, no association between BMI and emotional eating was reported by Abramson and Wunderlich (1972) who in non-clinical student sample with 66 male participants, experimentally manipulated fear and anxiety in both normal and obese participants. In the light of psychosomatic theory of obesity, heavy participants - defined as 15% above the norm standards defined by Metropolitan Life Insurance Company (1959), were expected to continue eating crackers after the preload compared to normal weight counterparts. . The results showed that the correlation coefficients computed for percent overweight and number of crackers eaten were insignificant for all obese participants in three conditions (control , $r=-.27$, interpersonal anxiety $=.34$, shock $=-.15$, $p>.01$) (Abramson & Wunderlich, 1972).

2.1.1.1.2 Externality Theory

As another example, Schachter, Goldman and Gordon (1968) administered severe to middle electric shocks to two groups of participants that differed in weight. Then Schacter et al. (1968)-measured the amount eaten by those with obesity and those with normal weight in a bogus “ *taste test*” (Schacter et al. 1968). The results showed that those with obesity were unresponsive to fear manipulations but also to their hunger level and did not report any fear reduction following eating. In contrast, those with normal weight ate less due to feeling frightened. Therefore, Schacter et al. (1968) proposed *externality hypothesis* which states, that overeating is driven by external cues rather than inner states.

Many studies were run to test externality hypothesis converging on the notion that combination of low sensitivity to internal cues and hypersensitivity to palatable foods was more likely to appear in individuals with obesity than those with normal weight. Interestingly, high responsiveness to external cues while relatively unresponsiveness to internal visceral cues were also found to apply with non-food stimuli (van Strien et al., 1986). Rodin, Herman and Schachter (1974) measured reaction time on various perceptual tasks in people with obesity and those with normal weight. Rodin et al (1974) found faster reaction times, lower tachistoscopic recognition threshold and better immediate recall of previously briefly flashed items on the slide in group of participants with obesity compared to the controls.

In the same line, Rodin (1973) found that heavier participants compared to the lean counterparts were significantly more distracted by irrelevant stimuli while working on proofreading task. By testing, Rodin and Slochower (1974) found heavier individuals being more prone to comply with a confederate request indicating that individuals with obesity are more likely to be external *stimulus-bound*. Or Nisbett and Storms (1974) showed that presence of an eating partner who was instructed to eat in excess influenced participants with obesity while lean people remained unaffected. Similarly, other studies that manipulated portion size (Nisbett, 1968) or time of eating (Schachter & Gross, 1968) agree that effect of environmental cues does contribute to overeating in those with obesity but not in those with normal weight.

In sum, research on externality hypothesis found that external eaters are more responsive to external cues. Because it applied to both food-related but also non-food related stimuli, Rodin and Singer (1976) proposed that external eaters are *stimulus bound* what is just one aspect of externality as a personality trait.

2.1.1.1.3 Restraint Theory

Compared to Externality -and Psychosomatic theories that both claim that “*obese eating patterns*” precede dieting, Restraint theory claims that overeating is a direct consequence of dieting and “an intentional effort to maintain or achieve a desired weight through reduced caloric intake” (van Strien, 1986, pg. 24). It is based on concept of set-point hypothesis of weight regulation (Nisbett, Hanson, Harris, & Stair, 1973; Franck, 2013; DeAngelo, Kalumuck & Adlin, 2013; Müller, Bosy-Westphal & Heymsfield, 2010). In this line of argumentation, Herman and Polivy (1975) suggested that people who put an effort to restrict their food intake to maintain or achieve desired weight usually diet. However, because of body’s ability to resist weight loss, those dieters are constantly hungry so are more likely to overeat. In addition, Polivy, Herman and Warsh (1978) noted: “external orientation appears to be a trait of dieters in general, and is not confined to the obese, the vast majority of whom, of course, are chronic if unsuccessful dieters” (pg. 498). Van Strien (1986) further explains that self-control processes can be undermined also by substances such as alcohol but mainly energy dense food.

Later addition to the model, was the idea of *dietary boundary*. Herman and Polivy (1984) invented *The Boundary Model* to explain eating regulation in dieters. In short, the model suggests that food intake in dieters is regulated by two boundaries (satiety and hunger) which applies to zone of indifference. Herman et al. (1984) assumed that dieters have lower hunger and satiety levels compared to non-dieters (van Strien, 1986). Under normal circumstances then, dieters eat less than they would like even that they have higher appetite to eat. However, when the dieter starts to *think* that he/she already crossed “cognitively set boundary” the “what the hell effect” (dieting thinking- when I already crossed my dietary line by eating this cake, now it does not matter so I can eat more) the

individual overeats due to released boundary of satiety which is lower compared to those who don't diet.

Research studies testing restraint theory of overeating concentrate on flaws in measuring cognitive restraint. This discussion will be presented in the section labelled as “Measures of Overeating Styles ” on pg. 29.

2.1.1.2 Overeating Styles

2.1.1. 2.1.1.2.1 Emotional Eating

The idea that emotions influence eating behavior had been proposed long before it was conceptualized and operationalized by psychologists. The philosopher David Hume writes about stress-induced eating in the 18th century (Foy, 2000). Physiological models mostly explain how the experience of stress affects human organism. Willner, Muscat and Papp (1992) proposed that long-term mild stress leads to reduction of hedonic reactions (eating behavior) through decreased production of dopamine. Similarly, biological models predict that in stressful environment, the organism increases eating speed to ensure energy supply (Lima, 1987).

Another conceptualization of emotional eating can be found as a viable explanation for restrained eaters. For instance, van Strien and Ouwens (2003) studied moderating role of restrained, emotional and external eating on the relationship between food deprivation and food intake. The results supported the premise that instead of eating less after a preload, high emotional eaters ate more compared to low emotional eaters. Lastly, Pliner and Iuppa (1978) experimentally increased awareness in women with obesity (eating before a mirror) and found that their food intake decreased. Thus, the hypothesis that

emotional eaters engage in overconsumption because of lack of interoceptive awareness does seem to be related with increased body weight.

Another psychological model of emotion-induced changes of eating behavior refers to restrained eaters. Herman and Polivy (1984) refer to overeating as a copying mechanism to relieve stress by proposing masking theory. In this line of argumentation, excessive eating can be understood as an inadequate emotional copying strategy to decrease cognitive dissonance caused by elevated levels of self-perceived stress. In this case then, the discrepancy between feelings, cognitions and behaviors comes from individual differences in the extent to which one restricts food intake. Therefore, it has been proposed that in restrained eaters, increased food intake in response to emotions can be mediated by disinhibition (any stimulus that distracts eater's attention) (Herman & Polivy, 1984) or impaired cognitive capacity (Boon, Stroebe, Schutt & Ijntema, 2002).

Additionally, Heartherton and Baumeister (1991) also refer to emotional eating but compared to masking theory, these authors suggest negative self-awareness or rather escape from it explains overeating behaviors in restrained and those with bulimia nervosa. To explain, Heartherton and Baumeister (1991) speculate that the individual tends to overeat (binge) because of failure to cope with implications of the ego-threatening information. As a result, the individual exposed to threatening information attempts to " escape" by shifting an attention to immediate hedonic pleasure - the food. Thus, narrowing the attention that further leads to overconsumption is believed to be driven by negative self-awareness in the first place (Roy, 2000). Similar premise can be found in work of Lehman and Rodin (1989) who suggest that the individual tends to overeat in attempt to fight negative affect by increase in positive emotional experience. As food is

biologically related to activation of brain reward pathways and increase of serotonin, the individual chooses food based on its qualities (Lehman & Rodin, 1989) or enjoyment from eating of “restricted type of foods” (Fairburn & Cooper, 1982).

So far, we outlined different psychological models that had been proposed of emotion-induced changes in eating behavior. Experimental studies with normal eaters (normal-weight persons categorized into low emotional eaters based on self-reported measures) provide contradictory results. Increase (Lowe & Mayrock, 1988), decrease (Willner et al., 1998) but also no effect of negative emotions (Telch & Agras, 1996) on subsequent food intake had been found in laboratory studies. Similar increase (Pine, 1985); decrease (Schacter et al., 1968; Herman & Polivy, 1975) and no effect (Heatherton et al., 1991) had been reported regarding self-reported fear. Similarly, in studies measuring emotional eating in terms of scores on self-reported questionnaires, the results linked emotional stress with both increased (Weinstein, Shide & Rolls, 1997) but also decreased (Popper, Smits, Meiselman & Hirsch, 1989) food intake.

Concept of emotional eating as primarily driven by negative emotions had been extended to apply also for positive emotions. Cardi, Leppanen and Treasure (2015) in a meta-analytical study identified thirty-three studies including 2491 participants that compared negative or positive mood with neutral mood in studies with experimental design. Positive mood was repeatedly found to be associated with increased food intake in healthy participants (Cardi et al., 2013; Cardi et al., 2015). In addition, review of prior research revealed that in addition to differences in eating behaviors (decrease, increase or no difference) based on the weight, the differences also exist based on the participant's sex. Decrease in eating after preload due to experimentally induced stress have been reported in males (Ambramson & Wunderlich, 1972; Reznick & Balch, 1977; Schachter,

Goldman & Gordon, 1968) but also females (Leon & Chamberlain, 1973; Slochower et al., 1981; Shachter et al., 1955).

Consequently, in relatively recent review Macht (2008) noticed that overeating seems to be far more complex than pure behavioral characteristic of obese individuals who “eat in response to negative emotions such as boredom, guilt or fear” (Kaplan & Kaplan, 1975; Bruch, 1968). Macht (2008) proposed a 5-way model of how emotions affect eating. In short, this model incorporates number of factors that “contribute to emotion-induced changes in eating behavior : arousal/intensity, valence and food relatedness of emotions; emotional and restrained eating” (Macht, 2008, pg. 4).

First way how emotions can affect eating behavior is related to mechanism of food choice. In some individuals continuous pairing of emotion and food may lead to enhanced eating (Booth, 1994). Humans are evolutionary driven to seek high- energy and full taste types of food – high in fat and sugar and reject those with bitter taste (Rosenstein & Oster, 1988). Thus those who are likely to use food as a coping strategy to regulate their mood when in highly stressful situation are more susceptible to overeat when around highly palatable foods (Dovey, 2010). Similarly, high self-perceived stress also alters eating behaviors in those who restrict their food intake. Specifically, necessity to cope with stress overrides one’s ability to control self-imposed dietary rules and thus leads to disinhibition (Herman & Polivy, 1984). Second, emotions high in arousal or intensity suppress eating (decrease food intake) because it seems to be more biologically and evolutionary appropriate. Third way how emotions affect eating behavior according to Macht (2008) model refers to emotions that are moderate in arousal and intensity. These then differently affect the individual based on the motivations to eat: in restrained eating positive but also negative emotions increase food intake; in emotional eating, just

negative emotions enhance intake of sweet and high fat foods. Lastly, Macht (2008) proposed that in normal eating, negative emotions decrease food intake through decreased pleasantness of food while positive emotions increase food intake through increased pleasantness of food. Although this model is pure theoretical hypothesis, Macht's (2008) contributed to the field of eating behavior by attempt to classify inconsistent research findings into a rational model that matches specific emotion with specific individual.

Macht's (2008) model is further supported by view of Vainik, Neseliler, Konstabel, Fellows and Dagher (2015) who suggest alternative conceptualization of emotional eating as measured by self-report questionnaires. First, Vainik et al. (2015) correlated emotional eating scores with scores on the five traits related to eating: power of food, eating impulsivity, disinhibition, binge eating and emotional eating. The authors conclude that emotional eating reflects with the remaining four closely contingent traits underlying low perceived self-control and motivation to eat, which they named "uncontrolled eating" (Vainik et al., 2015). As a result, Vainik et al. (2015) suggested that scales measuring emotional eating should be renamed to "concerned eaters" as they measure "the way how an individual think about the relationship between food and negative emotions as opposed to actual food intake" (Bongers & Jansen, 2016, pg. 7.) Secondly, emotional eating can also refer to a tendency to attribute overeating to negative affect (Adriaanse, de Ridder & Evers, 2011); or learned cued reactivity (Jansen et al., 2011).

In sum, the review of literature found six ways how emotional eating has been conceptualized. Either as tendency to eat in response to affect – negative (Kaplan & Kaplan, 1975; Bruch, 1973; Herman & Polivy, 1984; Heatherton & Baumeister, 1991) or

positive (Cardi et al., 2015). Recently, four new alternative conceptualizations emerged: general eating concerns (Vainik et al., 2015); tendency to attribute eating to negative affect independently of actual food intake (Adriaanse, 2016). In fact, these newer conceptualizations converge on that both reflect cognitive aspects of eating behavior while the remaining two – learned food reactivity (Booth, 1994; Bongers & Jansen, 2016) and uncontrolled eating (Vainik et al., 2015) taps actual eating behavior.

2.1.1.2.2 External Eating

There are many ways how society and environment can influence eating behavior. Construct of external eating usually refers to external/internal theory proposed by Schachter and Rodin (1974) postulating that some individuals eat in response to external food related stimuli regardless of internal feelings of hunger and satiety.

For instance, Deliens, Clarys, De Bourdeaudhuij and Deforche (2015) found that university students with higher self-perceived behavioral control and confidence who were exposed to modelling influences (parents and friends who did not consume soft drinks) were less likely to consume soft drink themselves. Another important factor is food accessibility. White (2007) found that free availability of energy dense foods in shops and at home combined with benevolent household rules positively contribute to overeating in children and adolescents.

2.1.1.2.3 Restrained Eating

Restrained eating can be conceptualized as” a persistent pattern of eating-related cognitions and behaviors with intention to reduce or maintain body weight” (Herman & Mack, 1975 as cited in Macht, 2008, pg. 2). However, another way how to define

restrained eating is having a history of unsuccessful dieting (Heatherton, Herman, Polivy, King & McGree, 1988). In this line then, Lowe (1993) proposed classification of restrained eaters into: those who are well below their set-point weight (weight suppressors); then those who are currently on diet (current dieters) and those who have repeatedly engaged in dieting (frequent dieters and overeaters).

Another way how restrained eating has been defined in research is division of restrained dieters into those with intentions and actual behaviors. However, Larsen et al. (2007) who promoted this idea was empirically tested just with people who have high concern about their weight. Larsen et al. (2007) who examined psychometric properties of a two-factor intention-versus-behavior structure of DEBQ in weight-concerned population with different weight categories. The study showed two-factor structure- one related to behavioral restraint and one related to intentions to restrict food intake. Interestingly, regression analysis showed that restrained behavior predicted less external eating ($\beta = -.38$, $p < .01$) and emotional eating ($\beta = -.08$, $p < .01$) and lower BMI ($\beta = -.12$, $p < .01$). On another hand, high restrained intentions (excluding restrained behaviors) predicted more emotional eating ($\beta = .14$, $p < .01$) and more external eating ($\beta = .27$, $p < .01$) with no relationship with BMI (Larsen et al., 2007). Therefore, Larsen et al. (2007) conclude that this “intention-behavioral gap” (pg. 106) can be attributed to the inter-individual differences in eating behaviors. For instance, those high in restrictive intentions but low dieting lack good planning skills or enough self-efficacy (Larsen et al., 2007). As a result, high intentions to restrict food intake and higher weight are associated indirectly through mediational effect of external and emotional eating styles.

2.1.1.2.4 Measures of Overeating Styles

There are two basic ways how researchers have assessed emotional, external and restrained eating styles- directly and indirectly. In the former case, the researchers usually conduct an experiment in which various factors which are assumed to have effect on food choice or food intake are manipulated (valence of mood, type of mood, cognitive tasks with food-related stimuli, levels of hunger, stress levels). In this case then, the relationship between various factors -food choice (intake) link is found through moderation analysis of the eating styles. In the latter case, the eating styles are measured directly through scores on self-report questionnaires.

In research, there are measures that contains only one specific scale to measure a eating style but there are two measures containing scales able to access all three eating styles in one questionnaire.

For assessing emotional eating separately, there are measures such as Emotional Eating Scale (Arnow, Kenardy & Abras, 1995) and its extended version – Emotional Eating Scale II (Kenardy, Butler, Carter & Moor, 2003) then Emotional Appetite Questionnaire (Gebliedter & Aversa, 2003) and Emotional Overeating Questionnaire (Masheb & Grilo, 2006). Each scale is similar in design, usually includes number of statements rated on Likert Scale as an indicator of the extent to which the participant feels urge to eat following specified emotion - Emotional Eating Scale with three factor analytically derived subscales : 11 items tapping anger and frustration, 9 items tapping anxiety and 5 items tapping depression (Arnow et al, 1995). Similarly, updated version of Emotional Eating Scale developed by Kenardy et al. (2003) assesses desire to eat after negative emotions (depression-12 items; anger-6 items and anxiety-5 items). However, compared to the original version, this tool includes scales for assessment of positive mood not further specified (n=11 items). Lastly, Emotional Appetite Questionnaire includes 4

subscales each assessing positive or negative emotions and situations. The responses are measured from 1 (much less) to 9 (much more) (Buttler et al., 2003). The only self-report measure that assesses frequency of emotional eating within one test is Emotional Overeating Questionnaire which is a 6-items measure asking the participant to indicate how many days out of the past 28 days have eaten an unusually large amount of food in response to feelings of both negative and positive feelings (Masheb & Grilo, 2006). According to Bongers and Jansen (2016) review of research findings from both experimental and naturalistic studies revealed methodological inconsistencies as the fact if the participant scores high and low on emotional eating measures do not consistently differ in relationship to food intake.

Regarding external eating, there is no single self-report questionnaire contacting scale just for this eating style. Instead, the scale of external eating is usually part of measures with scales for all three eating styles.

Lastly, a single measure that assesses restrained eating is called Restrained Scale-RS (Herman & Polivy, 1980). It is a 10 items self-report questionnaire that is conceptually rooted in Nisbett's (1972) set-point hypothesis and Schachter and Rodin's (1974) externality theory on factors controlling food intake.) Original conceptualization of restrained eating by Herman and Polivy (1975) was to "identify normal weight individuals who attempt to limit their food intake in an effort to resist biological pressures toward weight gain" (Lowe & Thomas, 2009, pg. 143). Consequently, the RS includes two subscales Weight fluctuation (5 items measure instability in dieting; e.g. "What is the maximum amount of weight you have ever lost within 1 month?") and The Concern for Dieting (includes items more related to cognitive aspects of dieting and restraint eating such attitudes about preoccupation with food, overconcern about eating and

overeating tendencies, 5 items, e.g. “ How often do you diet?” (van Strien, Herman, Rutger, Larsen & van Leeuwe, 2007, pg. 112).

Undoubtedly, measuring all three eating styles with a single research tool seems more practical. There are two most commonly used- Three Factor Eating Questionnaire- TFQ (Stunkard & Messick, 1985) has 51 items that are includes three subscales called Cognitive restraint (21 items, e.g. “ Life is too short to worry about dieting”); Disinhibition (16 items, e.g. “ When iam with someone who is overeating, I usually overeat too”) and Hunger (14 items, e.g. “ I am usually so hungry that I eat more than three times a day”). TFQ was developed mainly to improve predictive validity of Herman and Polivy’s Restrained Scale (1980), as there were inconsistencies in results between research studies compared to clinical practice. Van Strien (1986) explains that TFQ was constructed to overcome this problem: that obese individuals may restrict their food intake regardless of current body weight. The Questionnaire was developed from Fragenbogen fur Latente Adipositas (Pudel, Meatdorff & Oetting, 1975) that aimed to identify two kinds of obese eaters: those who were normal weight but showed “ obese eating patterns “as a result of conscious restriction of food intake- “ latent obese” (van Strien, 1986, pg. 44). Even though TFQ was consistently found to be an improvement of previous scales, it still measures centrally restrained eating style; cognitive restraint, disinhibition of cognitive restraint and susceptibility to hunger (Stunkard & Messick, 1985). Importantly, according to Fray and Knaper (2017) TFQ Disinhibition scale measures internal disinhibition which is not the same as construct of emotional eating. TFQ is therefore rather multidimensional measure and does not contain scales assessing emotional and external eating behaviors separately. Additionally, TFQ was developed primarily for clinical population. Stunkard and Messick (1985) suggest that patients who

score high on (Cognitive restraint) should be treated through education about how to control their food intake. Those scoring high on Disinhibition scale of TFQ, were implicated to benefit from behavioral management techniques and emotional techniques to deal with negative affect which disinhibit conscious control of food intake. Lastly, the patients highly susceptible to hunger should in first place be treated by delivery of appetite-suppressant medications (Stunkard, 1982). Lastly, the only scale developed for measuring overeating tendencies independently of weight status is Dutch Eating Behavior Questionnaire (van Strien, Fridjers, Bergers & Defares, 1986) .

2.1.1.2.4.1 The Dutch Eating Behavior Questionnaire

The Dutch Eating Behavior Questionnaire- DEBQ (van Strien, et al., 1986) is a commonly used measure to assess three eating styles in clinical but also non-clinical population. The scale had been consistently found having good psychometric properties and adequate three scales internal structure, satisfactory reliability and predictive validity (Bozan, Bas & Asci, 2011; van Strien & van de Laar, 2008; Wardle, 1987b; Brunalt et al., 2015). DEBQ has been translated to several languages, for example Turkish (Bozan et al., 2011); Spanish (Cebolla et al., 2014) or French (Lluch et al., 1996).

In the original validation study, van Strien and colleagues (1986) found three scales measuring emotional, external and restrained eating behaviors. However, scale for emotional eating was found to be bidimensional- 9 items with clearly labeled emotions and 4 items reflecting diffuse emotions. According to van Strien et al. (1986) the revealed multidimensionality of emotional eating scale is not surprising, and it supports Slochower (1983) notion that only diffuse emotions trigger excessive food intake, while clearly labelled emotions do not. The rationale behind this recommendation reflects research

findings that obese individuals have harder time to differentiate between diffuse and clearly labeled emotions (Slochower, 1983). Consequently, the authors of DEBQ suggest, that for studies done with obese subjects DEBQ emotional scale should be further divided into 2 dimensions. However, for general population the authors recommend using just one scale for all 13 items (van Strien et al., 1986).

2.1.1.2.4.1.1 Emotional Eating

Emotional eating subscale of DEBQ contains 13 items that reflect “one’s tendency to overeat in response to negative emotions , such as anxiety or irritability “ (van Strien et al., 2007, pg. 106). However, van Strien et al. (1986) report that factor analysis had shown that the items on emotional eating have two dimensions : one dealing with clearly labeled emotions (9-items, e.g. “ Do you have a desire to eat when you are irritated?”) and the other dealing with diffuse emotions (4-items, e.g. “ Do you have a desire to eat when you have nothing to do?”). The issues with cross-loadings in internal factor structure were also found by Cebolla et al. (2014). In their study with sample of female Spanish women, it was found that items associated with boredom and idleness presented cross-loading problems on scales for emotional and external eating (Cebolla et al., 2014). Indeed, the previous research converge on finding medium-high overlap between emotional and external eating behaviors (Cebolla et al., 2014; Slochower, 1983, van Strien, 1986). The two dimensionality of items on emotional eating scale can be interpreted as the notion that “only diffuse emotional states trigger the overeating response while clearly labeled emotions do not” (Slochower, 1983). According to Heatherton and Baumeister (1991) the high correlation between emotional and external eating can be interpreted as the notion that negative feelings or stress cause the individual to increase the self-awareness. Thus, the individual becomes more sensitive to influences of immediate external food

environment (Newman, O'Connor, & Conner, 2008). Similar multifactorial composition was found in DEBQ restrained eating scale.

2.1.1.2.4.1.2 External Eating

DEBQ external eating scale contains 10 items that relate to environmental cues contingent to food intake. High scorers on external eating scale are thus assumed “to overeat as a result of elevated responsiveness to food related cues in the immediate environment” (van Strien, Herman & Verheijden, 2009, pg. 381). The scale asks the respondent to indicate frequency of increased food intake signaled by perceptual stimuli-visual, olfactory or gustatory.

2.1.1.2.4.1.3 Restrained Eating

Relationship between DEBQ restrained scale and two other measures of restrained eating (Restrained Scale and TFQ) has been tested by Allison et al. (1992). These authors studied overlap between the scales of each measure and concluded that all three scale share a common variance, however just TFQ restrained scale measures behavioral restraint and RS is only one measuring weight fluctuation. Interestingly, DEBQ restrained eating scale has been suggested to measure both behavioral and cognitive aspects of weight control. Compared to previous measures of restrained eating, DEBQ restrained eating scale includes “items pertaining to deliberate, planned weight control” (Lowe & Thomas, 2009, pg. 170). The DEBQ restrained scale assesses 3 items measuring intentions to restrict food and 7 items measuring actual restrictive behavior (Larsen et al., 2007). Thus, unlike other measures of dietary restraint, this scale includes both aspects of restrained- actual dieting and intentions to restrict food intake. To explain, in DEBQ validation study, van Strien et al. (1986) found significant relationship between

emotional and restrained eating scales in samples with obese but also normal weight individuals. The authors suggested that one of the negative psychological side effects of dieting may be stress that results in emotional instability and subsequent increased emotionality which drive an individual to overeat (Polivy, Herman & Warsh, 1978). According to van Strien, Frijters, Van Staveren, Defares and Daurenberg (1986), the nature of restrained eating behavior is eating less than desired. In their study van Strien et al. (1986) showed that high scorers on DEBQ restrained scale are more likely to consume less ($r = -0.47$, correlation between DEBQ restrained scale and food intake). However, the authors warn that when interpreting the results, one should consider the fact that restrained eaters were consistently found to underreport their food intake compared to unrestrained eaters (Stice et al. as cited in Lowe & Thomas, 2009). To explain DEBQ restrained eating scale does not intend to measure dieting behaviors as it was not found to predict weight loss but rather weight gain (French, Jeffery & Wing, 1994). Thus, high scorer on DEBQ restrained eating scale differs from the one who engage in dieting (restrict food intake) in motivation. While high restrained eaters attempt to prevent weight gain and rather are overconcerned about weight maintenance, dieters are motivated to decrease weight. Consequently, even normal weight individuals may still score high in cognitive restraint as measured by DEBQ restrained scale.

2.2 Health

The individual's health status is closely linked with body composition. While body fat is mainly important for certain body functions, excessive body fat can increase a person's risk to develop obesity and other serious diseases. For instance, development and maintenance of Diabetes mellitus Type 2 is associated with excessive intake of saturated fats (Ogden, 2010). Specifically, the total level of cholesterol ester in blood serum is

composed of two parts: half is biosynthesized in liver and the other half comes from diet. Therefore, excessive intake of animal fat directly increases cholesterol levels that narrows the arteries. Narrowing of arteries then leads to thrombosis, which if superimposed on the atherosclerotic plaque leads to sudden death, heart attack or angina (Truswell, 1999). Thus fat intake determines cholesterol levels in blood serum that consequently leads to atherosclerosis (Ogden, 2010). Another negative consequence of excessive adiposity also negatively affects individual's mobility and appearance. However, not just excessive but also little body fat negatively affects a person's health as it may lead to compromised immune system, hair-loss or anemia (Mazzei, 2015).

2.2.1 Body Fat

Body composition is the proportion of body fat to lean body mass when body fat stands for all lipids and nonessential fats accumulated in adipose tissue while lean body mass refers to bones, organs, water and muscles (Müller et al., 2010). Dietary fats are essential parts of human diet, as they are not just source of energy but also function as structural building blocks for many body tissues, carry fat-soluble vitamins but also are important for hormonal regulation (European Food Safety Authority, 2017). There are considerable individual differences in stating how big the proportion of body fat mass should be relative to body lean mass.

2.2.1.1 Measures of Body Fat

The most commonly known way how to conceptualize body fatness is reliance on Body Mass Index. However, according to Nuttall (2015), BMI is rather inaccurate measure of body fat mass as it fails to differentiate between body lean mass and body fat mass and does not capture body fat location information. Risk for development of

diseases related to obesity are in fact related to excessive accumulation of adipose deposits in abdominal area (android) rather than in lower body segments- peripelvic area and thighs (gynecoid) (Nuttall, 2015). As a result, there have been developed many more precise measures that calculates the percentual proportion of free body fat mass relative to body lean mass. As the most accurate and precise direct measures of body fat mass nowadays are a dual-energy ex-ray absorptiometry (DEXA) can which provides a 3-dimensional scan of body organ densities; air displacement plenthysmography or so called “ BodPod” and bioelectric impedance methods. As a simpler and more affordable indirect measures, body fat percentage can be estimated with skinfold calipers; body circumference measurements; hydrostatic weighting which estimates body composition based on the density of lean and fat tissues (Wells & Fewtrell, 2006).

Proportion of body fat mass to overall body weight is commonly calculated in percentage. Thresholds for normal , overweight and obese categories differ based on the respective authority (source). For instance, The American Council on Exercise (ACE,n.d) published a guide with specific body fat guidelines for males and females of all levels of activity. ACE recommends that optimal body fat percentages for males should oscillate in range between 2 – 25% while for females the optimal range of body fat percentage interval is from 10 to 32%.

2.2.1.1.1 The Body Mass Index

The body mass index (BMI) is “the metric currently in use for defining anthropometric height/weight characteristics and classifying them into groups” (Nuttal, 2015, pg. 117). Nuttal (2015) suggests that BMI represents not just index of individual’s fatness but also a risk factor for development of obesity and other severe health issues and main

determinant of public health policies. BMI replaced Weigh/ Height (Body Build) Index that was an independent determinant of life expectancy and was based on life insurance data from 1935 to 1953 from more than 4 million adults (Nuttal, 2015). In 1959, the Metropolitan Life Insurance Company published tables of average body weights for heights (Wt/Ht) by gender and wide age ranges (Metropolitan Life Insurance Company, 1959). However soon, Keys, Fidanza, Karvonen, Kimurea and Taylor (1972) rejected published normative tables and instead popularized Quetelet Index that refers to body weight (in kilograms) divided by height squared (meters). By replacing measurement of body fatness in terms of simple weight-height ratio, BMI was suggested to reduce the effect of a variance in height in the relationship of weight to height (Nuttal, 2015).

BMI can be classified in many ways. Garrow's classification (Garrow & Webster, 1985) recognizes 4 categories as follows: BMI lower than 25 – desirable, if BMI ranges from 25 to 29.9 the individual belongs to category called grade I obesity; if BMI ranges from 30-40 the category is called Grade II obesity and lastly, if BMI equals or is more than 40, it belongs to Grade III category. World Health Organization (1995) developed four uniform categories of BMI as a determinant of obesity. An individual with BMI in range from 15 to 19.9 was considered as underweight, with BMI ranging from 20 to 24.9 would belong to normal weight category; as overweight were classified all those with BMI above 25 up to 29.9 and people with BMI greater than 30 were classified as obese. In 1997, the International Obesity Task Force (WHO, 2018) expanded WHO's classification for change in subclassification of weight categories. According to latest update, people with BMI in range from 25 up to 29.9 belong to category called “preobese” rather than “overweight”.

According to Prentice and Jebb (2001) socio-demographic variables such as age, race and muscle mass can significantly skew BMI what leads to inaccurate calculations. However, BMI is the most reported formula to determine obesity in social research (Kuczmarski & Flegal, 2000; Ogden, 2010).

2.3 Personality

Even after eighty years of personality research, the definition of personality still seems to be fuzzy as the researchers are not able to assert and communicate effectively its proper meaning (Mayer, 2007). In fact, Allport (1937) suggested two approaches how personality shall be studied: nomothetic and idiographic. First approach assumes that biological and psychological processes such as development, consciousness, perception, thinking, motivation or emotions are those that make one person like the other. Nomothetic approach to personality thus attempts to find common characteristics present in all people and results in generalizations and laws applicable to everyone. In addition, nomothetic perspective is often focus of experimental psychology. In contrary, the applied psychology prefers idiographic approach which argues that the way how the common characteristics are expressed differs as everyone possesses distinct abilities, attitudes, opinions, beliefs, emotions and motivations often because of complex interaction of genetic, biological, social and cultural influences (Flett, 2008). Consequently, the various theoretical approaches (the psychoanalytic, behaviorist, humanistic, trait, cognitive and evolutionary) each had adopted specific theoretical assumptions about human nature, definition of pathology and subsequent assessment tools to understand personality. Still, the main aim of personality research dwells in description, explanation and prediction of behavioral outcomes that can be derived from

gathered knowledge. This principle applies to both level of human analysis- idiographic or nomothetic.

Depending on the perspective then, personality psychologists have generated wide range of ways how to define personality. For instance, Allport (1937), proponent of humanistic view of personality, describes personality as “the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment” (p. 48). Or Cattell (1950) sees personality as “that which permits a prediction of what a person will do in a given situation” (p. 2). More recently, personality has been defined also as ”relatively stable individual differences in characteristic patterns of thought, emotion and behavior that are believed to be present early in life and involves characteristics that generalize across time and situations” (Flett, 2008, p. 4). In addition, Mayer (2007) notices that all personality definitions that have been generated by various researchers converge into following characteristics:” a personality is a psychological system; composed of a group of parts; that interact; and develop; and impact behavioral expression” (p. 1).

2.3.1 Personality Traits

Allport (1937) as a father of trait psychology defines trait as “generalized and focalized dynamic neuropsychic system” (p. 295). In addition, this system enables an individual to behave in equivalence- means, regardless of nature of external stimuli, one’s perception and functional behavioral reaction to external stimuli remains similar. In other words, Allport (1937) refers to personality trait as one’s general behavioral and perceptual tendency that is empirically testable, dynamic, discriminative, different from habit, moral or social judgement (features cross-situational consistency) .In addition, Allport (1937)

addressed distinction between genotype and phenotype personality dispositions (traits) when the former explain a fundamental “person’s core”:, while the latter refers to description of one’s behavior as observed in particular situation. Alternatively, Cattell (1947) understands personality traits as collections of responses and reactions that are bounded by unity which is established by “their moving- i.e., appearing, changing, disappearing) together, by their exercising an effect together, and by an influence on one being an influence on all” (p. 71). Similar definition, expressing personality coherence through personality traits, provides Costa and McCrae (1992) who refer to personality traits as “descriptions of relatively stable emotions, behaviors and thoughts” (p.655).

2.3.1.1 Measures of Personality Traits

Conceptualization of personality in terms of personality traits had generated extensive research. Because personality construct combines both, abstract and overt characteristics, each researcher used different methodology. Currently, the most prevalent and widely accepted model of personality is Big Five. Mapping historical development of Big Five model of personality is extensive. Basically, the initial sparkle came from work of Allport and Odbert (1936) who built upon the work of Galton’s (1884) lexical hypothesis. Lexical hypothesis assumes that most of the socially relevant and salient personality characteristics have become encoded in the natural language (Goldberg, 1993; John, Naumann & Soto, 2008; Flett, 2008). As a result, Allport and Odbert (1936) consulted English dictionary and found 4500 trait-descriptive terms which were later organized into cardinal, central and secondary dispositions. In their view, personal dispositions stand for clusters of most prominent personality traits that belong to one person. With this hypothesis, Allport and Odbert (1936) can be considered as first scientist who recognized that personality traits are hierarchically organized. Similarly, Norman (1967) empirically

tested how many personality-descriptive terms can adequately reflect personality structure. Both Allport and Odbert (1936) and Norman (1967) classified the trait descriptive terms from dictionary into mutually exclusive categories and thus their inspection clearly showed that the terms overlap. As a critical response, Chaplin, John and Goldberg (1988) suggested that rather than mutually inclusive categories, each category should be defined by clear cases (prototypal exemplars) instead of category boundaries (allowing for continuous membership of each case). Application of prototypal conception of personality traits brought clarity to differentiate between prototypal personality states vs. prototypal personality traits, in which former referred to temporary, brief and externally caused while latter were more stable, internally caused and needed to be observed more frequently and in wide range of situations (John et al., 2008). Reflecting on work of mentioned personality researchers, one may conclude, that personality can be conceptualized on different levels- depending on which order of personality structure lies the center of analysis.

Chaplin et al. (1988) stimulated second main research tradition that is based on statistical analysis. Specifically, Thurstone (1934) analyzed 60 common personality descriptors evaluated by 300 raters. The results were analyzed by multiple factor methods. As a result, Thurstone (1934) found “five factors sufficiently accounting for the all sixty personality traits coefficients” (p. 13). Later, Cattell (1956) reduced Allport’s original 4500 traits into 35 variables and after several oblique rotation procedures identified 15 factors best established by the data plus general intelligence. These factors were incorporated into development of his 16-item Personality Factor Questionnaire. Lexical research that operationalized personality traits in terms of sets of factor markers was followed by many others such as Tupes and Christal (1961), Borgatta (1964) and Norman (1963). Finally,

Goldberg (1981) was the first who coined the term “Big Five”. Those big five factors were as follows: I. Extraversion or Surgency, II. Agreeableness, III. Conscientiousness, IV. Emotional Stability vs. Neuroticism and V. Culture (Norman, 1963). Importantly, those Big Five factors were meant to represent “personality at a very broad level of abstraction” (John & Srivastava, 1999 pg. 119). In addition, Eysenck (1952) independently suggested own model of personality, known as Psychoticism, Extroversion, Neuroticism (PEN) model. Importantly, Eysenck’s (1982) 3- factor personality model posits that personality and intelligence are inherited therefore all his work attempted to find parallels of PEN model in other animal species. Therefore, for Eysenck (1952), neuroticism referred to one’s emotional stability vs instability. In addition, Kelland (2015) explains that Eysenck pointed to neuroticism as an elevator of intensity of emotional reactions which is necessarily function of autonomous nervous system and its reactivity. For psychoticism, Eysenck (1952) postulated that it includes traits as sensation seeking, dominance-leadership versus dominance-submission and lack of superego. Lastly, Eysenck’s perception of extroversion could be verbalized as complex mix of sociability (reaction to environmental stimuli), impulsiveness (a temperamental trait that is hereditary), frivolity, general activity and overt sexuality (Kelland, 2015). Building upon Eysenck’s personality model, Zuckerman (1997) invented alternative model of personality in which he proposed that sensation seeking trait is comprised of four facets- thrill and adventure seeking, experience seeking, disinhibition and boredom susceptibility. Both, Eysenck and Zuckerman converge on evolutionary perspective on personality development (Kelland, 2015).

Up to 1980’s then, there were two personality models: one represented by Costa and McCrae (1985) and operationalized in questionnaire called Neuroticism-Extraversion,

Openness Personality Inventory (NEO-PI). Originally, the NEO-PI included just three broad domains of personality structure. The lexical research generated another model operationalized in sets of factor markers. Goldberg (1993) compared two measures from each research tradition- Big Five-Dimensional Circumplex (Hofstee, de Raad & Goldberg, 1992) and NEO-PI (Costa & McCrae, 1985) and noticed two important differences. Specifically, the facet of Extraversion factor in the NEO-PI was in lexical model placed as a facet of Agreeableness. Second difference that Goldberg (1993) noticed was different labels for Factor V: Openness to Experience in the NEO-PI while Intellect or Imagination in the lexical model (p.30). As such, Goldberg (1993) addressed a problem if examination of personality in terms of the five broad domains seems to be enough precise and sufficient for prediction of behavioral correlates. John, Hampson and Goldberg (1991) posit that each Big Five domain possesses high bandwidth but low fidelity. To explain, if each broad domain is further differentiated into lower-order levels- characteristics that were later named as facets (Costa & McCrae, 1992), great wealth of information useful for psychological prediction, description and explanation may be lost (Soto & John, 2009). In fact, the debate of bandwidth-fidelity dilemma (Cronbach & Gleser, 1957) was resolved by invention of hierarchical measures that assesses both, broad Five domains and simultaneously "more specific traits within those domains" (Soto & John, 2009, pg. 84). Fortunately, Costa and McCrae (1992) were enough open-minded to find opposing arguments as relevant and updated Neo- Personality Inventory by adding Agreeableness and Conscientiousness into the original version. In addition, McCrae and Costa (1996) view the Big Five as a casual personal dispositions or basic tendencies which in interaction with environment reflect characteristic adaptations or states. According to John et al. (2008) the five-factor theory is then "a general trait theory that provides and explanatory interpretation of the empirically derived Big Five Taxonomy" (p. 146).

The final self-report questionnaire is called NEO-PI-R. This measure consists of 240-items that assesses the Big Five Domains (neuroticism, extroversion/introversion, openness to experience, agreeableness/antagonism and conscientiousness) as well as 6 more specific facets within each domain. For instance, domain of Conscientiousness includes facets called achievement striving, competence, deliberation, dutifulness, order and self-discipline (Costa & McCrae, 1992). Another derivative of NEO-PI-R also developed by duo Costa and McCrae is shorter version called NEO Five Factor Inventory (NEO-FFI) that comprises 60 items (12 items per each domain) and is conceptually rooted in Five Factor Theory. Another personality measure that followed the same theoretical conceptualization of personality as a hierarchical taxonomy of inherited basic tendencies is International Personality Item Pool (Goldberg, 1999) that includes over 3000 items. As both measures are low in practicality for researchers, this project refers to Big Five Inventory (John, Danahue & Kentle, 1991; John & Srivastava, 1999; John et al., 2008). This measure follows prototypical approach to personality assessment, all within 44 items. Compared to NEO PI-R (Costa & McCrae, 1992) and International Personality Item Pool (Goldberg, 1999), BFI is much shorter, easy-to-understand but still meets criteria for hierarchical assessment of personality i.e. on domain as well as facet levels. In comparison to NEO PI-R, BFI relies on short phrases instead of descriptive adjectives and thus prevent possible misunderstanding. Still, self-report questionnaires developed by Costa and McCrae (NEO-PI and NEO-PI-R) represent the best validated Big Five measures in the questionnaire tradition (John, Naumann & Soto, 2008). Nevertheless, NEO-PI-R, NEO-FFI and BFI are very similar. Soto and John (1999) studied psychometric characteristics of BFI and NEO-FFI in sample of 462 students (61% females) at the University of California in Berkeley. Both measures showed high reliability ($\alpha = .83$ for BFI and $\alpha = .79$ for NEO-FFI). Also, the measures showed high

convergent validity across all five factors, the mean of the convergent validity across NEO-FFI and BFI equals to $r=.73$ (Soto & John, 1999, pg. 25).

Although most of personality theory and research concentrates on description of dimensional hierarchy of personality traits, interesting ideas came from research on personality types. For instance, Sheldon and Stevens (1942) developed somatotype theory that finds link between physical body types and associated personality characteristics. More contemporary research done by Block and Block (1980) who came with classification of personality types into four categories based on having high versus low levels of ego control and ego resiliency. Unfortunately, the evidence of the validity of general personality types resilient, overcontrolling and under controlling as proposed by Block and Block (1980) and further tested by Robins, John, Caspi, Moffitt, and Stouthamer-Loeber (1996) underwent lot of criticism and further replication detected other types reflecting variations in these personality types. The type versus trait debate has provided comparative analysis especially about predictive power of personality traits and personality types. Interestingly, there is a promising attempt to integrate both, e.g. investigating personality types using cluster analysis of identified personality traits. Still, according to Sava and Popa (2011), it seems that dimensional approach as used in Five-Factor Model allows for more predictors compared to categorical approach assessing personality types with.

2.3.1.1.1 The Big Five Inventory

The Big Five Inventory (BFI) measures the core features of Big Five model of personality with short phrases. This measure strongly resembles Revised Neuroticism-Extraversion Openness Personality Inventory- Revised (NEO PI-R). BFI represents

“prototype definitions as a result of expert ratings combined with factor analytic verification in observer personality ratings” (John & Srivastava, 1999, p.21). The rationale behind including short phrases instead of single adjectives lies in the notion that short phrases are answered more consistently than single descriptors. Each scale of five domains includes eight to ten items. Additionally, BFI’s short phrases are based on trait adjectives that are known as prototypical markers of the Big Five (John et al., 2008, p. 130). In comparison to NEO PI-R, BFI relies on short phrases instead of descriptive adjectives and thus prevent possible misunderstanding. For instance, Agreeableness scale includes 9-items that resemble five of six facets of NEO-PI-R facets:” trust (forgiving; trusting); altruism (helpful and unselfish); compliance (not quarrelsome); modesty (not finding fault with others) and tender-mindedness (considerate and kind)” (John & Srivastava, 1999, pg. 22).

2.3.1.1.1 Extraversion vs. Introversion

According to John and Srivastava (1999) domain of Extraversion vs. Introversion or domain I can be defined as extraversion, energy and enthusiasm. In BFI this domain includes six domain facets captured by 7- items that each correlates with trait adjectives. Those facets are Gregariousness -sociable; assertiveness-forceful; activity-energetic; excitement-seeking-adventurous; positive emotions-enthusiastic and warmth-outgoing. High scores on this dimension reflects one’s characteristics as being talkative, dominant, forceful, adventurous, noisy or body. Low scores reflect one’s tendency to be quiet, reserved and silent (John & Srivastava, 1999). According to Srivastava, John, Gosling and Potter (2003) extraversion vs. introversion tends to decrease by age- from average score of 3.25 at the age of 21 to average mean 3.10 at the age of 60 (Srivastava et al. 2003).

2.3.1.1.1.2 Agreeableness vs. Antagonism

In BFI, II. domain may be defined as Agreeableness, Altruism and Affection and included six facets : trust (forgiving) , straightforwardness (not demanding), altruism (warm), compliance (not stubborn), modesty (not show-off) and tender-mindedness (sympathetic) (John & Srivastava, 1999). As such, these facets were found to have a strong converge validity with corresponding facets postulated by Costa and McCrae (1992) in NEO PI-R. High scores in this domain reflect one's tendency to be kind, appreciative, soft-hearted, generous, friendly, sensitive , and friendly to others. In opposite, those scoring low on this personality domain can be characterize as fault-finding, cold, unfriendly, unkind even cruel. Based on the comparison sampled data from Srivastava et al. (2003), Agreeableness tends to increase by age. Srivastava et al. (2003) compared the mean scores of people in various age categories. The results showed that the mean score at the age of 21 referred to 3.64, whereas mean score of a person who was 60 years old was 3.99.

2.3.1.1.1.3 Conscientiousness vs. Lack of Direction

Third broad domain in BFI includes following facets: competence, order, dutifulness, achievement striving, self-discipline and deliberation with corresponding adjectives efficient, organized, not careless, thorough, not lazy and not impulsive. In addition, people who score high in conscientiousness are likely to follow socially prescribed norms for impulse control, are task and goal directed, planful and tend to delay gratification. (John & Srivastava, 1999). With relationship to healthy behaviors, lack of conscientiousness was found to overlap with disinhibition as the temperamental core of this trait domain (Bogg & Roberts, 2004). Such interpretation is based on Clark and Watson (1999) who argue that

“disinhibited individuals are impulsive and reckless; oriented primarily toward the feelings and sensations of the immediate moment. In opposite, constrained individuals plan carefully, and avoid risky behaviors” (Clark & Watson, 1999, pg. 403). People scoring low in this dimension have tendency to be careless, disorderly, and forgetful (Soto & John, 1999). Importantly, Srivastava et al. (2003) report that Conscientiousness tends to increase by age (mean score of 21 years old person =3.45 compared to mean score of 60 years old person=3.86).

2.3.1.1.1.4 Neuroticism vs. Emotional Stability

Neuroticism versus Emotional Stability stands for third broad personality domain and is represented by facets of anxiety, angry hostility, depression, self-consciousness, impulsiveness and vulnerability. This domain is represented in BFI by 8 items and specific facets converge with adjectives as follows: tense, irritable, not contented, shy, moody and lastly not self-confident (John & Srivastava, 1999). High scores reflect tendency to behave, feel and think calmly and unemotionally while low scores on this dimension reflect one’s disposition to be full of worries and self-pity, temperamental and even self-punishing (John & Srivastava, 1999). Based on the comparative sample data published by Srivastava et al. (2003), Neuroticism tends to decrease by age (M=3.32 at the age of 21 compared to M=2.92 at the age of 60).

2.3.1.1.1.5 Openness vs. Closedness to Experience

The prototypical definition of Factor V seems to be the most confusing. Reflecting on prior research, this domain has been called either Culture (Tupes & Christal, 1961), Intellect (Goldberg, 1990) or Openness. In development of BFI, some items loaded on both, Factor V but also on Factor III- conscientiousness. According to John and colleagues,

the reason of substantial loadings dwells in a fact, that the items included both “intellectual” characteristics such as intelligent, insightful, sophisticated (as cited in Digman & Inouye, 1986) and “open “characteristics such -artistic, curious original and wide interests proposed in Costa and McCrae’s model. Finally, inventors of BFI derived to the consensus that Openness factor shall be represented by facets called ideas (curious), fantasy(imaginative), aesthetics (artistic), actions (wide interests), feelings (excitable), and values (unconventional) (John & Srivastava, 1999). High scorer on this dimension is more likely to have wide range of interests, is curious, with positive attitude toward artistic experience while low scorer can be expected to resist change. Interestingly, based on the data collected from people at various age Agreeableness tend to decrease by age (mean score at the age 21=3.92 compared to mean score at the age 60=3.80 (Srivastava et al., 2003).

2.4 Personality Traits, BMI and Overeating Styles

2.4.1 Personality Traits and Overeating Styles

Before outlining the studies, which examined relationship between personality traits and overeating styles, it is useful to comment on one study that examined how personality (measured by NEO-PI-R) influenced eating styles (measured by DEBQ) and food choices (assessed by the alternative version of Hartmann et al.’s (2013) version of Food Frequency Questionnaire. The results showed that Conscientiousness prevented consumption of sweet and savory foods, and sugar-sweetened drinks by promoting restrained eating. Neuroticism was found to promote consumption of sweet and savory foods by promoting emotional and external eating. Keller and Siegrist (2015) conclude that higher sociability in extraverted people, which is health beneficial personality

disposition showed to have aversive effects on food choice through emotional and external eating.

Studies assessing relationship between personality traits and eating styles in non-clinical samples are rare. To best of our knowledge, no studies examined relationship between personality traits and eating styles using BFI and DEBQ. Most of the previous studies used either samples that differs from the one used in this project (clinical population, different age etc) or assessed eating styles by measures that are conceptually differed from DEBQ (such TFQ etc.).

Still, Heaven, Mulligan, Merrilees, Woods and Fairouz (2001) examined relationship between personality, assessed by International Personality Item Pool (Goldberg, 1999) and eating styles, measured by DEBQ in students (n= 167, 51.66% females, Mean age=37). Importantly, International Personality Item Pool is a freely available research instrument that assesses five major personality domains. Each domain is further divided into specific facets that mirror those of the NEO Inventory (Goldberg, 1999). In this study, Heaven and colleagues (2001) used following facets- for Neuroticism domain (Self-consciousness, Depression, Anxiety and Immoderation that is labeled as Impulsiveness in NEO-PI-R). The mean reliabilities for each facet in the study ranged from .67 (immoderation) to .87(depression). Personality domain of Conscientiousness was assessed by facets such Cautiousness (Deliberation in NEO-PI-R), Self-discipline, Achievement Striving, Dutifulness, Orderliness (Order in NEO-PI-R) and Self-efficacy (Competence in NEO-PI-R). For these scales, the Cronbach alpha reliabilities were satisfactory ranging from .71 (Dutifulness) to .89 (Self-discipline). In addition, Heaven et al. (2001) also used one facet of Openness to Experience domain called Emotionality that corresponds to Feelings in NEO-PI-R ($\alpha=.65$).

The Pearson product moment coefficients for emotional eating and personality after controlling for gender and BMI were as follows: negative relationship with facets of Conscientiousness (Cautiousness, $r=-.21$, $p<.01$; Self-discipline, $r=-.30$, $p<.01$; Self-efficacy, $r=-.21$, $p<.01$ and Achievement striving, $r=-.19$, $p<.05$) and positive relationships with facets of Neuroticism (Depression, $r=.25$, $p<.01$; Immoderation, $r=.41$, $p<.01$; Self-consciousness, $r=.16$, $p<.05$ and Anxiety, $r=.15$, $p<.05$). Thus, the average correlational indices for these personality domains equaled to $r=-.22$ and $r=.24$ respectively. Further, external eating related to one facet of Neuroticism domain Immoderation, $r=.51$, $p<.01$ and inverse associations were found with two facets of Conscientiousness (Mean for the domain equals to $r=-.18$, $p<.05$; Self-discipline, $r=-.17$, $p<.05$ and Cautiousness, $r=-.21$, $p<.05$). Lastly, restrained eating positively correlated only with one facet of Neuroticism (Depression, $r=.18$, $p<.05$) and facet of Openness to Experience (Emotionality, $r=.15$, $p<.05$). To sum up, this study showed that highly conscientious and emotionally stable individuals are less susceptible to emotional and external eating behaviors. Additionally, more depressive individuals who are also emotional are more likely to engage in restrained eating behavior.

Recently, Momoi and associates (2016) examined the relationship between eating behavior, effortful control and personality traits in Japanese students ($n=576$, Mean age=18.5, 422 males). Eating behaviors were assessed by Japanese version of DEBQ while personality was assessed by Big Five Personality Inventory developed by Muramaki & Muramaki (1997). The results showed that Extraversion was significantly positively associated with external eating in males ($r=.187$, $p<.05$) but non-significantly in females ($r=.121$, $p>.05$); Agreeableness showed significant negative relationship with emotional eating in males ($r=-.105$, $p<.05$) but not in females ($r=-.018$, $p>.05$). For

males, significant associations were also found between Conscientiousness and restrained eating ($r = -.139$, $p < .05$); emotional eating ($r = -.124$, $p < .05$) and external eating ($r = -.103$, $p < .05$) but the associations in females did not reach statistical significance. With respect to Neuroticism, significant negative relationships were found in both genders with relationship to emotional eating (average $r = -.208$, $p < .05$) and external eating (average $r = -.174$, $p < .05$). Interesting finding is reported for Openness which related to emotional eating positively ($r = .002$, $p > .05$) in males but negatively in females ($r = -.144$, $p > .05$). However, in both cases the association did not reach statistical significance.

Another study but with clinical population was conducted by Elfhag and Morey (2008). The authors examined the relationship of personality and eating styles in 442 obese adult patients at Obesity Unit in Karolinska University Hospital in Sweden (Mean age = 43.7, Mean BMI $40.5 \pm 5.3 \text{ kg/m}^2$). Eating styles were assessed by DEBQ (van Strien et al., 1986) and personality by NEO-PI-R (Costa & McCrae, 1992). The results of partial correlational analysis controlling for age and gender revealed that emotional eating was significantly associated with Neuroticism ($r = .48$, $p < .001$) and all its facets- Anxiety ($r = .35$, $p < .001$); Hostility ($r = .28$, $p < .001$); Depression ($r = .45$, $p < .001$); Self-Consciousness ($r = .35$, $p < .001$); Impulsiveness ($r = .49$, $p < .001$) and Vulnerability ($r = .32$, $p < .001$). Further emotional eating was also significantly inversely related to Extraversion ($r = -.14$, $p < .01$) and its facets (Assertiveness, $r = -.14$, $p < .01$ and Positive emotions, $r = -.13$, $p < .01$). Lastly, significant negative associations of emotional eating were found with Conscientiousness ($r = -.26$, $p < .001$) and four of its facets (Competence, $r = -.17$, $p < .001$, Dutifulness, $r = -.18$, $p < .001$, Self-discipline, $r = -.33$, $p < .001$ and Deliberation, $r = -.16$, $p < .01$).

Regarding external eating, significant associations were found with Neuroticism ($r=.36$, $p<.001$) and all its facets – Anxiety ($r=.36$ $p<.001$); Hostility($r=.24$, $p<.001$) ;Depression,($r=.29$, $p<.001$); Self-Consciousness ($r=.25$, $p<.001$); Impulsiveness ($r=.51$, $p<.001$) and Vulnerability ($r=.23$, $p<.001$). In addition, external eating also significantly but inversely correlated with domain of Conscientiousness ($r=-.17$, $p<.001$) and one of its facets labelled as Self-discipline ($r=-.24$, $p<.001$).

Interestingly, compared to emotional and external eating behaviors that were primarily negatively associated with Conscientiousness while positively with Neuroticism, the direction of associations reversed with respect to restrained eating style. Specifically, negative direction of association was found with Neuroticism domain ($r=-.18$, $p<.001$) and three of its facets – Anxiety ($r=-.20$ $p<.001$); Depression ($r=-.14$ $p<.01$) and Vulnerability ($r=-.20$, all $p<.001$) while positive with Conscientiousness ($r=.22$, $p<.001$) and five of its facets- Competence ($r=.13$ $p<.01$); Order ($r=.12$ $p<.01$); Dutifulness ($r=.16$ $p<.01$); Achievement-Striving ($r=.22$ $p<.001$) and Self-Discipline ($r=.19$ $p<.001$). In addition, restrained eating style was also found in significant positive relationship with Extraversion ($r=.15$, $p<.01$)- specifically with its facet called Warmth ($r=.18$, $p<.001$).and Openness ($r=.13$, $p<.001$), specifically with facets Aesthetics ($r=.14$, $p<.01$); Feelings ($r=.13$, $p<.01$) and Actions ($r=.14$, $p<.01$). In sum, the similar trend as seen in former studies- high Neuroticism and low Conscientiousness seem to be important for emotional and external eating behaviors while the opposite direction of associations of these two personality domains were observed in relationship to restrained eating.

Lastly, in a recent study done with general population, Keller and Siegrist (2015) examined direct and indirect effects of personality that was measured by German version

of NEO- Five Factor Inventory (Borkenau& Ostendorf, 1993; Costa & McCrae, 1992) on eating styles (measured by DEBQ; van Strien et al., 1986) and food choices in 951 university students (468 males; Mean age=55, SD=15) in Switzerland. The results showed that Neuroticism was significantly positively related to both external ($r=.25$, $p<.0001$) and emotional eating ($r=.30$, $p<.0001$) but unrelated to restrained eating. Conscientiousness was also found significantly related to emotional and external eating but in opposite direction ($r=-.20$, $p<.0001$; $r=-.16$, $p<.001$) respectively. In addition, Conscientiousness also significantly related to restrained eating ($r=.09$, $p<.001$). Agreeableness was found to be protective with respect to external eating ($r=-.12$, $p<.0001$) and Extraversion was found to buffer emotional eating ($r=-.09$, $p<.001$). Lastly, higher scores on Openness, increased one's vulnerability for emotional ($p=.07$, $p<.05$) and restrained ($r=.10$, $p<.001$) eating behaviors.

2.4.2 Body Fat Differences on Emotional Eating

Previous research on link between body weight and emotional eating provide an inconsistent empirical evidence.

Ellickson-Larew, Naragon-Gainey and Watson (2013) report that in non-clinical student sample with 286 participants(mean age=18.96), BMI and emotional eating were not associated ($r= .02$, $p >.01$). Similar non-significant correlational coefficients for relationship between BMI and emotional eating ($r=.07$, $p>.05$) is reported by Adriaanse, Rider and Evers (2001) with just female undergraduate students ($n=154$, Mean age= 20.53, Mean BMI= 21.48, SD=2.34). Emotional eating was also found unrelated to BMI ($p=.11$, $p>.05$) in study with clinical population ($n=442$, Mean BMI $40.5 \pm 5.3\text{kg/m}^2$) (Elfhag & Morey, 2008).

Still, there are studies suggesting that BMI and emotional eating are related. For instance, Cebolla et al. (2014) report that in non-clinical student female sample ($n=593$, Mean age=25.5, and mean BMI=22.12, SD=2.96) emotional eating showed increasing trend as BMI increases ($r=.23$, $p<.05$). Similarly, Keller And Siegrist (2015) found positive associations of BMI and emotional eating in 951 mixed-sex undergraduate students ($r=.12$, $p<.0001$). Convergent results are also reported by van Strien , Herman and Verheijden (2009) when in cross-sectional study with Dutch representative sample ($n= 1342$, mean age= 33.6, SD=9.4, mean BMI=25.4) emotional eating was found significantly positively correlate with BMI ($r=.27$, $p <.01$).Further empirical support comes from the study with Swiss general population ($n=2781$, 46% males, Mean age=59 years, SD=14) in which Keller, Hartmann and Siegrist (2016) in a sample with 951 males and females (Mean BMI=24.63, SD= 4.0, Mean age= 55, SD=5.5) found small positive and statistically significant association between BMI and self-reported emotional eating ($r= .12$, $p<.001$).Similarly, Brunault et al. (2016) in a sample of 74 adults with mean BMI 21.75 ($SD=1.3$) found small significant correlation between BMI and emotional eating ($r=.21$, $p<.05$).

2.4.3 Body Fat Differences on External Eating

Ellickson-Larew, Naragon-Gainey and Watson (2013) found small negative relationship between BMI and DEBQ external eating scale ($r= -.12$), however the correlation was not statistically significant. Therefore, the results suggest , that in their sample ($n= 286$) that consisted of university student with mean age 19 years, BMI does not seem to be related to external eating. Similar finding report Cebolla et al. (2014) in a study with female university students ($n=593$, mean age=25.55, mean BMI=22.12, SD=2.96) indicating that BMI does not relate to external eating – as measured by DEBQ

($r=-.013$, $p>.05$). Similarly, van Strien and associates (2009) found statistically non-significant associations between DEBQ external eating scale and BMI ($r=.05$, $p>.01$) indicating that BMI and external eating are not related. Also, in a study with only obese patients, Elfhag and Morey (2008) in a clinical sample, found no relationship of BMI and external eating behavior as measured by DEBQ emotional eating scale. No significant associations are reported also by Adriaanse et al. (2011) in sample composed of female university students with normal BMI.($r=-.06$, $p>.05$).

Still, Keller, Hartmann and Siegrist (2016) had to reject the null hypothesis indicating no relationship between BMI and external eating because in their study with 2781 participants from general population (Mean age= 59), they found small positive but statistically significant association between BMI and DEBQ external eating scale ($r=.07$, $p<.001$). Similarly, Keller and Siegrist (2015) found significant relationship between external eating (measured by DEBQ) and self-reported BMI ($r=.18$, $p<.0001$). Significant but negative association between BMI and external eating was also reported by Brunault et al. (2015).

2.4.4 Body Fat Differences on Restrained Eating

Interestingly, no relationship between BMI and self-reported restrained eating style (as measured by DEBQ) was found in obese patients (Elfhag& Morey, 2008).

In general population, just few studies have examined relationship between restrained eating and BMI. For instance, Ellickson-Larew, Naragon-Gainey and Watson (2013) examined the bivariate and multivariate associations of personality traits and BMI and several eating behavior questionnaires (including DEBQ) in sample of 289 Iowa University students (mean age of 18.98 years, $SD=1.5$). The authors report statistically

significant small positive association between Restrained scale of DEBQ and BMI ($r = .21, p < .01$). This finding also agrees with Adriaanse et al. (2011), who found significant positive associations between BMI and DEBQ restrained eating scale ($r = .29, p < .001$) in a sample of 154 female university students with normal BMI. In parallel, van Strien and colleagues (2009) assessed relationship between restrained eating and BMI in large cross-sectional Dutch representative study with 1342 adult participants of both genders (mean age = 33.6, $SD = 9.4$, mean BMI = 25.4). The results showed small but statistically significant positive correlation between restrained eating and BMI ($p = .22, p < .01$). Similarly, Keller and associates (2016) also found positive statistically significant relationship between restrained eating and BMI ($r = .09, p < .01$) in 2781 participants (Mean age = 59, 46% males) from general Swiss population. Consistent finding report Keller and Siegrist (2015) who found significant positive relationship between self-reported BMI and DEBQ restrained eating scale scores ($r = .012, p < .001$) in general population ($n = 936$, Mean age = 55). Convergently, Brunault et al. (2015) in sample with 78 adults found significant positive association between BMI and restrained eating as measured by DEBQ restrained scale ($r = .47, p < .001$).

2.5 Hypotheses

The purpose of the study was to evaluate whether overeating styles such as restrained eating can be predicted by personality traits and BMI. We aimed to answer the following research question: Are overeating styles such as restrained eating influenced by personality traits and BMI? We intended to answer the research question hypothesizing the following:

H₀1: None of the predictors (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI) is useful in predicting restrained eating

H_a1: At least one of the predictors (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI) is useful in predicting restrained eating

H₀2: Extraversion vs. Introversion does not contribute to the model

H_a2: Extraversion vs. Introversion contributes to the model

H₀3: Agreeableness vs. Antagonism does not contribute to the model

H_a3: Agreeableness vs. Antagonism contributes to the model

H₀4: Conscientiousness vs. Lack of Direction does not contribute to the model

H_a4: Conscientiousness vs. Lack of Direction contributes to the model

H₀5: Neuroticism vs. Emotional Stability does not contribute to the model

H_a5: Neuroticism vs. Emotional Stability contributes to the model

H₀6: Openness vs. Closedness to Experience does not contribute to the model

H_a6: Openness vs. Closedness to Experience contributes to the model

H₀7: BMI does not contribute to the model

H_a7: BMI contributes to the model

Furthermore, we intended to assess whether overeating styles such as emotional eating can be predicted by personality traits and body fat. We aimed to answer the following research question: Are overeating styles such as emotional eating influenced by personality traits and BMI? We intended to answer the research question hypothesizing the following:

H₀8: None of the predictors (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI) is useful in predicting emotional eating

H_a8: At least one of the predictors (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI) is useful in predicting emotional eating

H₀9: Extraversion vs. Introversion does not contribute to the model

H_a9: Extraversion vs. Introversion contributes to the model

H₀10: Agreeableness vs. Antagonism does not contribute to the model

H_a10: Agreeableness vs. Antagonism contributes to the model

H₀11: Conscientiousness vs. Lack of Direction does not contribute to the model

H_a11: Conscientiousness vs. Lack of Direction contributes to the model

H₀12: Neuroticism vs. Emotional Stability does not contribute to the model

H_a12: Neuroticism vs. Emotional Stability contributes to the model

H₀13: Openness vs. Closedness to Experience does not contribute to the model

H_a13: Openness vs. Closedness to Experience contributes to the model

H₀14: BMI does not contribute to the model

H_a14: BMI contributes to the model

Additionally, we planned to evaluate whether overeating styles such as external eating can be predicted by personality traits and BMI. We aimed to answer the following research question: Are overeating styles such as external eating influenced by personality traits and BMI? We intended to answer the research question hypothesizing the following:

H₀15: None of the predictors (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI) is useful in predicting external eating

H_a16: At least one of the predictors (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI) is useful in predicting external eating

H₀17: Extraversion vs. Introversion does not contribute to the model

H_a17: Extraversion vs. Introversion contributes to the model

H₀18: Agreeableness vs. Antagonism does not contribute to the model

H_a18: Agreeableness vs. Antagonism contributes to the model

H₀19: Conscientiousness vs. Lack of Direction does not contribute to the model

H_a19: Conscientiousness vs. Lack of Direction contributes to the model

H₀20: Neuroticism vs. Emotional Stability does not contribute to the model

H_a20: Neuroticism vs. Emotional Stability contributes to the model

H₀21: Openness vs. Closedness to Experience does not contribute to the model

H_a21: Openness vs. Closedness to Experience contributes to the model

H₀22: BMI does not contribute to the model

H_a22: BMI contributes to the model

Method

3.1 Introduction

This study aimed to investigate the relationship between personality and body fat with three overeating styles. It is based on exploratory analysis that quantify the effects of predictors on criterions. The predictors were five personality domains (Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience) and BMI. The criterion variables were three eating styles: restrained, emotional and external eating.

3.2 Design

It's a quantitative non-experimental correlational research study. It's an assessment of overeating styles such as emotional, external and restrained eating based on personality traits and body mass index.

3.3 Participants

. We planned to get a representative sample from a study population of 599 students. Using a 95% confidence level, 5% margin of error with an inclusion probability of 39%, we calculated that the representative sample must contain 230 participants. Nonetheless, we sampled 216 participants - 78 males (36.1%) and 138 females (63.89%) (See Figure 1). The mean age of the participants was 22.58 years (SD=4.244). The most frequent age was 20 while median age equaled to 21 years. The youngest participant was 21 years old while the oldest was 38 years old. Most students that is 116 (53.7%) reported to have European origin, 57 students (26.39%) reported to have Asian origin, 39 (18.06%) reported to have an origin in America and 4 students (1.85%) reported other origin (See

Figure 2). The participants were students studying at University of New York in Prague that is a multinational academic institution. There were 250 booklets distributed with 86.4% return rate (n= 216).

3.4 Materials

There were two questionnaires compiled into one booklet followed by the section asking about socio- demographic information (age, weight in kg, height in cm, gender and nationality) (See APENDIX). Personality was assessed by Big Five Inventory-BFI (John & Srivastava, 1999) and eating styles were measured by a single measure called Dutch Eating Behavior Questionnaire- DEBQ (van Strien et al., 1986) Furthermore, body fat was operationalized in terms of calculation of body mass index-BMI.

3.4.1. Big Five Inventory (BFI)

Personality traits were assessed by self-report 44-items big five inventory (John et al., 2008) that consist of short phrases that each related to specific facet of broader personality domain (Extraversion –8 items, 3 of which are coded reversed, e.g. “ I see myself as someone who is talkative”; Agreeableness – 9 items, 4 of which are coded reversed, e.g. “ I see myself as someone who is helpful and unselfish with others”; Conscientiousness- 9 items, 4 of which are coded reversed, e.g. “ I see myself as someone who does a throughout job”; Neuroticism – 8 items, 3 of which are coded reversed, e.g. “ I see myself as someone who is depressed and blue”; and lastly Openness scale includes 10 items, 2 of which are coded reversed, e.g. : “ I see myself as someone who is original, comes up with new ideas” (John et al., 2008). The participant is asked to indicate the extent to which he/she agrees or disagrees with a given characteristic on a 5-point ordinal scale from “ 1- disagree strongly to 5- agree strongly). Higher scores on each domain indicate

higher presence of given characteristic - for instance, in domain assessing Extraversion versus BFI is long enough to be reliable but at the same time short enough (can be completed in 5-10 minutes) to prevent participant's fatigue. BFI domain scales had showed to have high reliability, clear factor structure and strong convergence with longer Big Five measures such NEO-PI-R (Benet-Martinez & John, 1998; John et al., 2008). Soto and John (2009) report that in validation study of scales developed to assess 10 specific facet traits in student sample (N=829), alpha reliabilities for the domain scales ranged from .81 to .88. In this study we obtained following Cronbach Alpha indices: Extraversion/ Introversion ($\alpha = .79$) ; Agreeableness/Antagonism ($\alpha = .68$); Conscientiousness/ Lack of Direction ($\alpha = .68$); Neuroticism/ Emotional Stability ($\alpha = .57$) and Openness/ Closedness to Experience ($\alpha = .44$).

3.4.2. The Dutch Eating Behavior Questionnaire

The Dutch Eating Behavior Questionnaire(DEBQ; van Strien et al., 1986) is a 33-items widely used self-report questionnaire with three scales for assessing Emotional Eating understood as eating in response to negative affect (13 items; e.g. " Do you have a desire to eat when you are irritated?"); External Eating understood as eating in response to external food stimuli (10 items; e.g. " If you see others eating, do you eat more than usual?") and Restrained Eating understood as overconsumption followed by dieting when the cognitive resolve to eat less than desired is abandoned (10 items; e.g. " How often do you refuse food or drink offered because you are concerned about your weight?"). The responses are measured on ordinal 5-point Likert scale in range from 1 (never) to 5 (very often). In this study we used English version of original DEBQ published in Dutch language (van Strien, 2002). All three scales were found to have a high internal consistency and reliability. For instance, van Strien et al., (1986) report

Cronbach's alpha for restrained eating scale .95, emotional eating scale .94 and external eating scale .80 in sample consisting of people with obesity but also non-obese people. In addition, the same high coefficients ($\alpha = .80-.95$). were found in males and females (van Strien et al., 1986). Similarly, Cebolla, Barrada, van Strein , Oliver and Banos (2014), Cronbach's Alpha were high for all three subscales: External Eating ($\alpha = .84$); Emotional Eating ($\alpha = .94$) and Restraint eating ($\alpha = .93$). Also, Brunault et al. (2015) support a three-factor structure of DEBQ for people with normal weight but also with obesity. (emotional and external eating scales - $\alpha \geq .90$; restraint scale- $\alpha \geq .81$). In this project all three scales proved to be reliable – restrained eating scale ($\alpha = .86$); emotional eating scale ($\alpha = .84$) and external eating scale ($\alpha = .75$). Responses on three scales are usually summed separately for each subscale and then divided by the total number of items for that scale to derive a mean subscale score (Frayn & Knäuper, 2017). Even there are norms originally developed by the authors of DEBQ measure (van Strien et al., 1986) in this project we treated scores as continuous and did not use sample medians for categorization of participants into low and high external, emotional or restrained eaters.

3.4.3. Body Mass Index

Body Mass Index (BMI) was calculated as dividing one's self-reported weight (in kilograms) by height (in centimeters) squared (Bray, 1986). The formula for computation: $BMI = \text{weight in kilograms} / (\text{height in centimeters})^2$. Even though measurement of body fat percentage seems to be most relevant measure of total body fat, it was highly impractical to use it in this study. Indeed, self-reported weight and height was found to be highly correlated with actual measurement ($r > .90$; Sutin, 2013). In addition, the correlation between BMI and more precise laboratory measures of body fat were found to be correlated in interval from .70 to .80 (Bray, 1986).

Furthermore, all BMI indexes were categorized into weight categories according to World Health Organization (WHO, 2000) guidelines: underweight (BMI<18.5), normal weight (BMI between 18.5-24.9), overweight (BMI between 25-29.9) and obese (BMI \geq 30).

3.5 Procedure

This study utilized cross-sectional design. The participants were recruited personally. In cooperation with the professors, the participants were invited to be part of the research at the beginning of regular classes. After signing the informed consent (see Appendix A), all participants received the questionnaire booklet with separate answer sheets to guarantee study's anonymous character. The data were collected in period from 1. – 20. October 2018. All participants received the same general information about the purpose of the study that was assessment of the relationship between self-perception and eating styles. Importantly, no mention was made about obesity or clinically significant disordered eating to prevent possible fake-good responses due to demand characteristics. All participants were allowed to read informed consent carefully and decide if they want or not to participate. All 207 answer sheets returned with informed consent.

3.6 Analysis

All variables were inspected for normality, skewness, kurtosis and normality. In addition to descriptive statistics, there were three multiple regression analysis carried out in order to see if personality and BMI could predict eating styles. In order to meet all assumptions for carrying out a multiple regression analysis, linearity, independence of errors, homoscedasticity and collinearity including normality of residuals were assessed in all variables.

Findings

4.1 Introduction

The section of the results entails the outcome after applying the method to empirically evaluate the research questions, the report of descriptive statistic indices, normality assessment of the predictors and criteria, and the test of hypotheses.

4.2 Results of the Application of the Method

This research project implied carrying out multiple regression analyses to assess whether overeating styles can be predicted by personality traits and BMI. The quantitative method employed to empirically assess the research questions was suitable because the study was non-experimental, correlational and cross-sectional.

4.3 Descriptive Statistics of Main Variables

The report of the descriptive statistic indices involves the ones that belong to the predictors and criterion in the multiple regression analysis. The predictors were the personality traits Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability and Openness vs. Closedness to Experience and Body Mass Index, while criterions were emotional, external and restrained eating styles.

4.3.1 Descriptive Statistics of the Personality Dimension Extraversion vs.

Introversion

In the personality trait Extraversion vs. Introversion, there were 213 subjects who were considered in the computation of the descriptive statistic indices. There were three

subjects with missing data in this personality trait. The results indicated that the Extraversion vs. Introversion mean and median were very similar ($M = 25.31$; $Mdn = 25.00$). In addition, there were two modes in the distribution such as 24 and 25. The scores ranged from 14 to 40. Although the scores ranged widely, their variability was moderate. The moderate standard deviation and variance were 5.45 and 29.66 respectively (See Table 1)

4.3.2 Descriptive Statistics of the Personality Dimension Agreeableness vs.

Antagonism

215 participants were taken into account in the calculation of the descriptive statistics of personality trait Agreeableness vs. Antagonism. There was one subject with missing responses. After computing the descriptive indices, it was found that the Agreeableness vs. Antagonism mean score ($M = 31.21$) was slightly higher than its median and most frequent scores ($Mdn = 30.00$; $Mo = 30.00$). Although the scores ranged less ($Min = 21.00$; $Max = 43.00$), the variability was moderate. It was observed a moderate standard deviation and variance in the distribution of scores ($SD = 4.87$, $S^2 = 23.75$). (see Table 1)

4.3.3 Descriptive Statistics of the Personality Dimension Conscientiousness vs.

Lack of Direction

In the personality trait Conscientiousness vs. Lack of Direction, there were 215 participants whose scores were used in the computation of the descriptive statistic indices. One subject was excluded since he presented missing data in this personality trait. The findings showed that the Conscientiousness vs. Lack of Direction mean, median and mode scores were very similar ($M = 28.59$; $Mdn = 28.00$; $Mo = 28.00$). Although the scores ranged from 19 to 44, there was not considerable spread in the distribution. The

Conscientiousness vs. Lack of Direction scores varied moderately with a standard deviation of 4.58 and variance of 20.96. (See Table 1)

4.3.4 Descriptive Statistics of the Personality Dimension Neuroticism vs. Emotional Stability

There were considered 214 subjects in the calculation of the descriptive statistics of the personality trait Neuroticism vs. Emotional Stability. Two subjects were excluded since they presented missing responses. Concerning the descriptive statistics indices, the Neuroticism vs. Emotional Stability mean score ($M = 24.14$) was slightly higher compared to the median ($Mdn = 24.00$) and mode scores ($Mo = 23.00$). The scores ranged from 12 to 33. As regards the spread of scores, it was found a moderate standard deviation and variance in the distribution ($SD = 3.76$, $S^2 = 14.10$). (see Table 1)

4.3.5 Descriptive Statistics of the Personality Dimension Openness vs. Closedness to Experience

In the personality trait Openness vs. Closedness, data from 213 participants were included in the computation of the descriptive statistic indices. Three subjects were excluded since missing data was found in their responses for this personality trait.

The results showed that the Openness vs. Closedness mean, median and mode scores were very similar ($M = 32.62$; $Mdn = 33.00$; $Mo = 33.00$). The scores ranged widely. The minimum score was 24 and the maximum one was 45. Despite the fact that the scores ranged widely, the variability was moderate. It was found a moderate standard deviation of 4.10 and variance of 16.85. (See Table 1)

4.3.6 Descriptive Statistics of BMI

As regards BMI, all the 216 sampled participants were considered when computing the descriptive statistic indices. There were no missing data. The results showed that the BMI mean ($M = 25.78$) was slightly lower than the median one ($Mdn = 26.40$) Concerning the most frequent score, there were several ones such as 21.97 and 27.17.

The scores ranged from 15.78 to 39.45. The spread of scores was large. In the distribution of BMI scores, it was observed a large standard deviation of 5.60 and variance of 31.36. (See Table 1)

4.3.7 Descriptive Statistics of Restrained Eating

All the sampled 216 subjects were included in the calculation of the descriptive statistics of Restrained Eating. There were no missing responses in this criterion. As regards the typical scores, the Restrained Eating mean score ($M = 30.90$) was slightly lower than the median ($Mdn = 31.00$) and most frequent scores ($Mo = 32.00$) in the distribution. The minimum and maximum scores were 13 and 49 respectively. Although the scores varied a bit, there was not considerable spread. It was found a moderate standard deviation and variance in the distribution ($SD = 7.00$, $S^2 = 48.94$). (see Table 1)

4.3.8 Descriptive Statistics of Emotional Eating

In Emotional Eating, there were 215 participants who were considered in the computation of the descriptive statistic indices. One subject presented missing responses in this variable. The findings showed that the Emotional Eating mean ($M = 38.92$) was lower than the median ($Mdn = 41.00$) and mode scores ($Mo = 42.00$). The scores ranged widely ($Min = 13.00$; $Max = 60.00$). Nonetheless, it was observed a moderate variability of the scores in the distribution. It was found moderate standard deviation of 7.55 and variance of 57.04. (See Table 1)

4.3.9 Descriptive Statistics of External Eating

With respect to External Eating, all the sampled 216 subjects were included in the calculation of the descriptive statistics indices. There were no missing responses in this criterion. As regards the typical scores, the External Eating mean score ($M = 32.43$) was slightly lower than the median ($Mdn = 33.00$) and most frequent scores ($Mo = 33.00$). The minimum and maximum scores were 17 and 46 respectively. Although the scores varied a bit, there was not considerable spread. It was found a moderate standard deviation and variance ($SD = 5.84$, $S^2 = 34.14$). (see Table 1)

Table 1

Descriptive Statistics of Personality Traits, BMI and Overeating Styles

	<i>n</i>	<i>M</i>	<i>Mdn</i>	<i>Mode</i>	<i>SD</i>	<i>S</i> ²	<i>Min</i>	<i>Max</i>
Extraversion vs. Introversion	213	25.31	25	24	5.45	29.66	14	40
Agreeableness vs. Antagonism	215	31.21	30	30	4.87	23.75	21	43
Conscientiousness vs. Lack of Direction	215	28.59	28	28	4.58	20.96	19	44
Neuroticism vs. Emotional Stability	214	24.14	24	23	3.76	14.10	12	33
Openness vs. Closedness to Experience	213	32.62	33	33	4.10	16.85	24	45
BMI	216	25.78	26.40	21.97	5.60	31.36	15.78	39.45
Restrained Eating	216	30.90	31	32	7.00	48.94	13	49
Emotional Eating	215	38.93	41	42	7.55	57.04	13	60
External Eating	216	32.43	33	33	5.84	34.14	17	46

Notes. *n* = sample size; *M* = Mean; *Mdn* = median; *SD* = standard deviation; *S*² = variance; *Min* = minimum; *Max* = maximum

4.4 Normality Assessment of Main Variables

A normality assessment was conducted on each predictor such as Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI. Moreover, the three criteria Restrained Eating, Emotional Eating and External Eating were assessed evaluating its normality distribution.

4.4.1 Normality Assessment of the Personality Dimension Extraversion vs.

Introversion

Regarding the personality dimension Extraversion vs. Introversion, the Shapiro Wilk's test indicated that the scores were not normally distributed ($p = .01$). (See Table 2)

Moreover, it was observed that the Extraversion vs. Introversion scores were not normally distributed showing positive skewness ($\gamma_1 = 0.32$, $SE = 0.17$) and a leptokurtic distribution ($\beta_2 = 0.09$, $SE = 0.34$) (see Table 3)

Furthermore, the visual inspection of histograms and normal Q-Q plots in the personality dimension Extraversion vs. Introversion suggested that the scores were not normally distributed. (See Figure 3 and 4)

4.4.2 Normality Assessment of the Personality Dimension Agreeableness vs.

Antagonism

Concerning the personality dimension Agreeableness vs. Antagonism, the scores were not normally distributed as shown by the Shapiro Wilk's test ($p < .001$). (See Table 2)

Additionally, the Agreeableness vs. Antagonism scores, that were not normally distributed, presented positive skewness ($\gamma_1 = 0.29$, $SE = 0.17$). Nonetheless, it was observed negative kurtosis in their distribution ($\beta_2 = -0.87$, $SE = 0.34$) (see Table 3)

With respect of the visual inspection of histograms and normal Q-Q plots in the personality dimension Agreeableness vs. Antagonism, it was observed that the distribution of scores was not normal. (See Figure 5 and 6)

4.4.3 Normality Assessment of the Personality Dimension Conscientiousness vs.

Lack of Direction

Based on the Shapiro Wilk's test, the scores of the personality dimension Conscientiousness vs. Lack of Direction were not normally distributed ($p < .001$). (See Table 2)

After have evaluated the Conscientiousness vs. Lack of Direction scores that were not normally distributed, it was observed positive skewness ($\gamma_1 = 0.93$, $SE = 0.17$) and positive kurtosis ($\beta_2 = 0.81$, $SE = 0.34$) (see Table 3)

Moreover, the visual inspection of histograms and normal Q-Q plots in the personality dimension Conscientiousness vs. Lack of Direction showed that the distribution of scores was not normal. (See Figure 7 and 8)

4.4.4 Normality Assessment of the Personality Dimension Neuroticism vs.

Emotional Stability

After carrying out a Shapiro Wilk's test, it pointed out that Neuroticism vs. Emotional Stability scores were not normally distributed ($p = .001$). (See Table 2)

Concerning the shape of the distribution, it was observed negative skewness ($\gamma_1 = -0.45$, $SE = 0.17$) and leptokurtosis ($\beta_2 = 0.67$, $SE = 0.34$) in the Neuroticism vs. Emotional Stability scores (see Table 3)

Additionally, it was observed that the Neuroticism vs. Emotional Stability scores were not normally distributed after visually inspecting the histograms and normal Q-Q plots (See Figure 9 and 10)

4.4.5 Normality Assessment of the Personality Dimension Openness vs. Closedness to Experience

In respect of the normality assessment of Openness vs. Closedness to Experience, the Shapiro Wilk's test showed that the scores in this personality dimension were not normally distributed ($p = .01$). (See Table 2)

With regards to skewness and kurtosis, the distribution of Openness vs. Closedness to Experience scores presented positive skewness ($\gamma_1 = 0.34$, $SE = 0.17$) and platykurtosis ($\beta_2 = -0.18$, $SE = 0.34$) (see Table 3)

Furthermore, it was observed that the scores, in the personality dimension Openness vs. Closedness to Experience, were not normally distributed after visually inspecting the respective histograms and normal Q-Q plots (See Figure 11 and 12)

4.4.6 Normality Assessment of BMI

In respect of the normality assessment of BMI, the Shapiro Wilk's test showed that the scores were not normally distributed ($p < .001$). (See Table 2)

With regards to skewness and kurtosis, the distribution of Body Mass Index scores presented positive skewness ($\gamma_1 = 0.14$, $SE = 0.17$) and platykurtosis ($\beta_2 = -0.96$, $SE = 0.34$) (see Table 3)

Furthermore, it was observed that the scores, in BMI were not normally distributed after visually inspecting the respective histograms and normal Q-Q plots (See Figure 11 and 12)

4.4.7 Normality Assessment of Restrained Eating

Regarding the evaluation of normality in Restrained Eating, the Shapiro Wilk's test indicated that the scores were normally distributed ($p = .67$). (See Table 2)

With regards to skewness and kurtosis, the normal distribution of Restrained Eating scores presented negative skewness ($\gamma_1 = -0.09$, $SE = 0.17$) and negative kurtosis ($\beta_2 = -0.25$, $SE = 0.34$) (see Table 3)

Furthermore, it was observed that the scores in Restrained Eating were normally distributed after visually inspecting the respective histograms and normal Q-Q plots (See Figure 13 and 14)

4.4.8 Normality Assessment of Emotional Eating

Regarding the evaluation of normality in Emotional Eating, the Shapiro Wilk's test indicated that the scores were not normally distributed ($p < .001$). (See Table 2)

With regards to skewness and kurtosis, the distribution of Emotional Eating scores that was not normal presented negative skewness ($\gamma_1 = -0.72$, $SE = 0.17$) and leptokurtosis ($\beta_2 = 1.13$, $SE = 0.34$) (see Table 3)

Furthermore, it was observed that the scores in Emotional Eating scores were not normally distributed after visually inspecting the respective histograms and normal Q-Q plots (See Figure 15 and 16)

4.4.9 Normality Assessment of External Eating

Regarding the evaluation of normality in External Eating, the Shapiro Wilk's test indicated that the scores were normally distributed ($p = .06$). (See Table 2)

With regards to skewness and kurtosis, the normal distribution of External Eating scores presented negative skewness ($\gamma_1 = -0.17$, $SE = 0.17$) and platykurtosis ($\beta_2 = -0.06$, $SE = 0.34$) (see Table 3)

Table 2

Test of Normality of Personality Traits, Body Fat and Overeating Styles

	<i>Shapiro-Wilk</i>	
	<i>Statistic</i>	<i>df</i>
Extraversion vs. Introversion	.982**	206
Agreeableness vs. Antagonism	.965***	206
Conscientiousness vs. Lack of Direction	.940***	206
Neuroticism vs. Emotional Stability	.975***	206
Openness vs. Closedness to Experience	.983*	206
BMI	.968***	206
Restrained Eating	.995	206
Emotional Eating	.957***	206
External Eating	.987	206

Note. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 3

Skewness and Kurtosis in the Distribution of Personality Traits, Body Mass Index and Overeating Styles

	γ_1	SE_{γ_1}	β_2	SE_{β_2}
Extraversion vs. Introversion	0.32	0.17	0.09	0.34
Agreeableness vs. Antagonism	0.29	0.17	-0.87	0.34
Conscientiousness vs. Lack of Direction	0.93	0.17	0.81	0.34
Neuroticism vs. Emotional Stability	-0.45	0.17	0.67	0.34
Openness vs. Closedness to Experience	0.34	0.17	-0.18	0.34
BMI	0.14	0.17	-0.96	0.34
Restrained Eating	-0.09	0.17	-0.25	0.34
Emotional Eating	-0.72	0.17	1.13	0.34
External Eating	-0.17	0.17	-0.06	0.34

Notes. γ_1 = skewness; SE_{γ_1} = standard error of skewness; β_2 = kurtosis; SE_{β_2} = standard error of kurtosis

Furthermore, it was observed that the scores in External Eating were normally distributed after visually inspecting the respective histograms and normal Q-Q plots (See Figure 17 and 18)

4.4 Test of hypotheses

A first multiple regression analysis was performed to predict Restrained Eating based on the personality dimensions Extraversion vs. Introversion, Agreeableness vs. Antagonism,

Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI. Concerning the assumptions to carry out the multiple regression analysis, it was observed linear relationships between all the personality traits and body mass index with Restrained Eating (see Figures 21 and 26). Furthermore, the assumption of independence of errors was met since the Durbin-Watson index was 2.25. In addition, heteroscedasticity was not observed with no unusual points. Moreover, there was not multicollinearity since the tolerance values of the personality traits and BMI were higher than 0.1. Additionally, the residuals were normally distributed. The predictors Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and BMI did not statistically significantly predict Restrained Eating, $F(6, 200) = 0.91$, $p = .49$, adj. $R^2 = 0$. Therefore, the first null hypothesis cannot be rejected. (see Table 4)

As regards the personality traits, the predictor Extraversion vs. Introversion did not add statistically significantly to the prediction, $\beta = 0.04$, $p = .68$. Hence, the second null hypothesis cannot be rejected. In addition, the predictor Agreeableness vs. Antagonism did not reach statistical significance to the prediction of Restrained Eating, $\beta = -0.05$, $p = .55$. Thence, the third null hypothesis cannot be rejected. Moreover, the predictor Conscientiousness vs. Lack of Direction did not increase statistically significantly to the prediction, $\beta = 0.14$, $p = .12$. Thus, the fourth null hypothesis cannot be rejected. Concerning the personality dimension Neuroticism vs. Emotional Stability, the predictor did not add statistically significantly to the prediction, $\beta = -0.03$, $p = .72$. Therefore, the fifth null hypothesis cannot be rejected. Additionally, the predictor Openness vs. Closedness to Experience did not reach statistical significance to the prediction of

Restrained Eating, $\beta = 0.05$, $p = .52$. Thence, the sixth null hypothesis cannot be rejected. Furthermore, the predictor BMI did not add statistically significantly to the prediction, $\beta = 0.12$, $p = .10$. Therefore, the seventh null hypothesis cannot be rejected. (see Table 4)

Table 4

Summary of Multiple Regression Analysis Predicting Restrained Eating based on Personality traits and Body Fat

Variable	Model 1		
	<i>B</i>	<i>SE B</i>	β
Intercept	20.75	7.15	
Extraversion vs. Introversion	0.04	0.11	0.04
Agreeableness vs. Antagonism	-0.07	0.12	-0.05
Conscientiousness vs. Lack of Direction	0.21	0.13	0.14
Neuroticism vs. Emotional Stability	-0.05	0.14	-0.03
Openness vs. Closedness to Experience	0.08	0.13	0.05
Body Mass Index	0.15	0.09	0.12
<i>Adjusted R²</i>		0	
<i>F</i>		0.91	

Note. * $p < .05$ ** $p < .01$ *** $p < .001$; $N = 207$; B = unstandardized regression coefficient, $SE B$ = Standard error of the coefficient; β = standardized coefficient

A second multiple regression analysis was performed to predict Emotional Eating based on the personality dimensions Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and Body Mass Index. Concerning the

assumptions to carry out the multiple regression analysis, it was observed linear relationships between all the personality traits and body mass index with Emotional Eating (see Figures 27 and 32). Furthermore, the assumption of independence of errors was met since the Durbin-Watson index was 2.10. In addition, heteroscedasticity was not observed and there were no unusual points. Moreover, there was not multicollinearity since the tolerance values of the personality traits and body fat were higher than 0.1. Additionally, the residuals were normally distributed. The predictors Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and Body Mass Index statistically significantly predicted Emotional Eating, $F(6, 199) = 3.84$, $p = .001$, adj. $R^2 = 0.08$. Therefore, the eighth null hypothesis can be rejected and the eighth alternative hypothesis can be accepted. (see Table 5)

With respect to the personality traits, the predictor Extraversion vs. Introversion did not add statistically significantly to the prediction, $\beta = 0.03$, $p = .74$. Hence, the ninth null hypothesis cannot be rejected. In addition, the predictor Agreeableness vs. Antagonism did not reach statistical significance to the prediction of Emotional Eating, $\beta = -0.08$, $p = .32$. Thence, the tenth null hypothesis cannot be rejected. Moreover, the predictor Conscientiousness vs. Lack of Direction did not increase statistically significantly to the prediction, $\beta = -0.11$, $p = .18$. Thus, the eleventh null hypothesis cannot be rejected. However, the predictor Neuroticism vs. Emotional Stability added statistically significantly to the prediction, $\beta = 0.16$, $p = .03$. Therefore, the twelfth null hypothesis can be rejected and the twelfth alternative hypothesis can be accepted. Nonetheless, the predictor Openness vs. Closedness to Experience did not reach statistical significance to the prediction of Emotional Eating, $\beta = -0.11$, $p = .15$. Thence, the thirteenth null hypothesis cannot be rejected. Nevertheless, the predictor Body Mass Index added

statistically significantly to the prediction, $\beta = 0.14$, $p = .04$. Therefore, the fourteenth null hypothesis can be rejected and the fourteenth alternative hypothesis can be accepted.

(see Table 5)

Table 5

Summary of Multiple Regression Analysis Predicting Emotional Eating based on Personality traits and Body Mass Index

Variable	Model 1		
	<i>B</i>	<i>SE B</i>	β
Intercept	40.73	7.44	
Extraversion vs. Introversion	0.04	0.11	0.03
Agreeableness vs. Antagonism	-0.12	0.12	-0.08
Conscientiousness vs. Lack of Direction	-0.18	0.14	-0.11
Neuroticism vs. Emotional Stability	0.32	0.15	0.16*
Openness vs. Closedness to Experience	-0.19	0.13	-0.11
Body Mass Index	0.19	0.09	0.14*
<i>Adjusted R²</i>		0.08	
<i>F</i>		3.84***	

Note. * $p < .05$ ** $p < .01$ *** $p < .001$; $N = 206$; *B* = unstandardized regression coefficient, *SE B* = Standard error of the coefficient; β = standardized coefficient

A third multiple regression analysis was performed to predict External Eating based on the personality dimensions Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and Body Mass Index. Concerning the assumptions to carry out the multiple regression analysis, it was observed linear relationships between all the

personality traits and body fat with External Eating (see Figures 33 and 38). Furthermore, the assumption of independence of errors was met since the Durbin-Watson index was 1.99. In addition, heteroscedasticity was not observed and there were no unusual points. Moreover, there was not multicollinearity since the tolerance values of the personality traits and body fat were higher than 0.1. Additionally, the residuals were normally distributed. The predictors Extraversion vs. Introversion, Agreeableness vs. Antagonism, Conscientiousness vs. Lack of Direction, Neuroticism vs. Emotional Stability, Openness vs. Closedness to Experience and Body Mass Index statistically significantly predicted External Eating, $F(6, 200) = 3.41, p = .003, \text{adj. } R^2 = 0.07$ Therefore, the fifteenth null hypothesis can be rejected and the fifteenth alternative hypothesis can be accepted. (see Table 6)

As regards the personality traits, the predictor Extraversion vs. Introversion added statistically significantly to the prediction, $\beta = 0.22, p = .01$. Hence, the sixteenth null hypothesis can be rejected and the sixteenth alternative hypothesis can be accepted. In addition, the predictor Agreeableness vs. Antagonism did not reach statistical significance to the prediction of External Eating, $\beta = 0.05, p = .57$. Thence, the seventeenth null hypothesis cannot be rejected. Moreover, the predictor Conscientiousness vs. Lack of Direction did not increase statistically significantly to the prediction, $\beta = -0.04, p = .59$. Thus, the eighteenth null hypothesis cannot be rejected. However, the predictor Neuroticism vs. Emotional Stability added statistically significantly to the prediction, $\beta = 0.15, p = .04$. Therefore, the nineteenth null hypothesis can be rejected and the nineteenth alternative hypothesis can be accepted. Additionally, the predictor Openness vs. Closedness to Experience did not reach statistical significance to the prediction of External Eating, $\beta = 0.002, p = .98$. Thence, the twentieth

null hypothesis cannot be rejected. Nonetheless, the predictor Body Mass Index added statistically significantly to the prediction, $\beta = 0.16$, $p = .02$. Therefore, the twenty-first null hypothesis can be rejected, and the twenty-first alternative hypothesis can be accepted. (see Table 6)

Table 6

Summary of Multiple Regression Analysis Predicting External Eating based on Personality traits and Body Mass Index

Variable	Model 1		
	<i>B</i>	<i>SE B</i>	β
Intercept	16.38	5.78	
Extraversion vs. Introversion	0.23	0.09	0.22**
Agreeableness vs. Antagonism	0.05	0.10	0.05
Conscientiousness vs. Lack of Direction	-0.06	0.11	-0.05
Neuroticism vs. Emotional Stability	0.24	0.11	0.15*
Openness vs. Closedness to Experience	0.00	0.10	0.00
Body Mass Index	0.17	0.07	0.16*
<i>Adjusted R²</i>		0.07	
<i>F</i>		3.41**	

Note. * $p < .05$ ** $p < .01$ *** $p < .001$; $N = 207$; B = unstandardized regression coefficient, $SE B$ = Standard error of the coefficient; β = standardized coefficient

Discussion

The section includes the discussion of descriptive analysis and tests of hypotheses.

5.1 Discussion of Descriptive Analysis

The mean BMI score of the current sample was 25.78 (SD=5.6). Consistent with this finding, Keller and Siegrist's (2015) and van Strien et al.' (2009) reported a mean BMI of 24.63 and 25.4 from their subjects. Nonetheless, the BMI of subjects in the current study is not consistent with empirical evidence provided by other researchers such as Brunault et al. (2015), Adriaanse et al. (2001), Cebolla et al. (2014), and Elfhag and Morey (2008). Specifically, Brunault et al. (2015), Adriaanse et al. (2001) and Cebolla et al. (2014) reported a lower mean BMI of 21.75, 21.48 and 22.12 respectively. Moreover, Elfhag and Morey (2008) indicated a higher mean BMI of 40.5.

The current study showed that subjects had a restrained eating mean score of 30.90. This finding is not consistent with evidence provided by Momoi et al. (2016) who reported a lower mean score of 25.95. Additionally, the results showed that participants had an emotional eating mean score of 38.93. This finding is not consistent with what Momoi et al. (2016) reported. Momoi et al. (2016) reported a lower mean score of 27.85. Concerning emotional eating, the current study indicated that subjects had a mean score of 32.43. This result is consistent with evidence provided by Momoi et al. (2016) who reported a similar mean score 32.25.

Although age and sex were not variables studied within the scope of the current study, its worthy to mention that Elfhag & Morey (2008), Keller & Siegrist (2015) and Keller et al. (2016) conducted their studies with much older participants (41 years; 55 years; 59 years respectively) compared to the ones in the current study whose mean age equalled to 26 years. Additionally, Adriaanse et al. (2015) and Cebolla et al. (2014) studied just females.

5.2 Discussion of Test of Hypothesis

Previous research on eating behaviors in general population provide an inconsistent evidence. The current study aimed to further clarify how personality and weight contribute to potentially problematic eating behaviors in non-clinical population of young adults.

First regression analysis model did not reveal any of personality traits as significant predictors of restrained eating. Concerning the association between Extraversion vs. Introversion and emotional eating, the current study found that the association was not significant and positive. This finding is consistent with Keller and Siegrist (2015) and Momoi et al. (2016). Nevertheless, it is inconsistent with Elfhag and Morey (2009) as in their study positive association was significant. In the current study the result showed that Agreeableness vs. Antagonism was negatively related to restrained eating. This finding agrees with Keller and Siegrist (2015) Momoi et al. (2016) and Elfhag and Morey (2008). Contrary to our expectations, Conscientiousness vs. Lack of Direction was found to be weakly and positively associated with restrained eating in the sample. Regarding the positive association, his finding is consonant with Heaven et al. (2001) , Elfhag and Morey (2008) , Keller and Siegrist (2015) and Momoi et al. (2016). Nevertheless, Momoi et al. (2016) found non-significant positive relationship between Conscientiousness and restrained eating in females, but significant negative correlation in males. This discrepancy can probably be explained by existing sex-related differences in in eating behaviours as suggested by Kiefer, Rathmanner and Kunze (2005). Kiefer et al. (2005) found males more pleasure oriented; less informed about nutritional content of the food and more satisfied with the weight status compared to females. Thus at least for Japanese males, higher restrained eating behaviors may relate to more careless approach towards nutrition with controlling their food intake primarily for health and not

socio-cultural reasons (Kiefer et al., 2005). The predictor Neuroticism vs. Emotional Stability was found in inverse relationship with restrained eating but in regression model, this personality trait was not useful. The obtained result converges with Elfhag and Morey (2008). However, this finding is inconsistent with Heaven et al. (2001) who found a negative and statistically significant associations between restrained eating and Neuroticism- specifically with Anxiety and Depression as the most significant facets of the Neuroticism personality domain. Indeed, the result for this predictor in restrained eating is surprising. It could be that the sample in Elfhag and Morey (2008) study was specific in that the participants could have extra concern about their weight that led them to use service of institutionalized weight-reduction program. Thus, social interaction with people with similar weight-related perceptions could decrease unpleasant feeling or shame for having higher weight compared to the general population – students who daily interact with pressure to be thin. This speculation is based on the higher scores on Conscientiousness domain that Elfhag and Morey (2009) found in their participants. Unfortunately, subsequent weight gain was not assessed therefore this suggestion is just speculation. Regarding our sample, the students' average weight was in normal range what rules out a possibility to be under special tension to diet.

With respect to Openness vs. Closedness to Experience, this predictor was positively associated with restrained eating. This finding is consistent with Elfhag and Morey (2008), Keller and Siegrist (2015) and Heaven et al. (2001) who identified Openness facet- Emotionality as extra influential.

The current study also found that BMI is a correlate but not significant predictor of restrained eating. The obtained results converge only with Elfhag & Morey (2008) whereas diverge with Ellickson-Larew et al. (2013), van Strien et al. (2009), Adriaanse

et al. (2011), Keller et al. (2016), Keller and Siegrist (2015) and Brunault et al. (2015). Taking into consideration issues with the reliability of the personality measure, sampling and lack of local validation study, the obtained lack of significant results is not surprising. But still it partially supports Boundary model (Herman & Polivy, 1975) of overeating that proposes that high cognitive restraint leads to counterregulatory processes when exposed to attractive food related external cues. As BMI was also positively associated with emotional and external eating, positive association between BMI and restrained eating does not rule out the possibility that the participants held intentions to restrict their food intake but did not diet and did not overeat. Even though high concerns about own weight may lead to increased susceptibility for emotional eating and external eating but there are not further reflected in weight status. This speculation is consistent with study conducted by Larsen et al. (2007).

As regards the association between Extraversion vs. Introversion and emotional eating, the current study found that the association was not significant and positive. This result is consistent with Momoi et al. (2016). Nevertheless, it's not consistent with both Elfhag and Morey (2008) and Keller and Siegrist (2015) who reported significant negative associations of Extraversion/Introversion and emotional eating.

.For Agreeableness vs. Antagonism, the results showed negative association with emotional eating. This finding converges with Siegrist (2015); Elfhag and Morey (2009) and Momoi et al. (2016).

As expected, the predictor Conscientiousness vs. Emotional Stability was also found negatively but not statistically significantly associated with emotional eating. This result partially converges with Heaven et al. (2001) because the direction of association is the same. However, in the current study this predictor did not add statistically significantly

to the prediction. Interestingly, Heaven et al. (2001) found all facets of Conscientiousness significantly negatively related to emotional eating (self-discipline, self-efficacy). Thence, there is converging evidence only concerning the negative association in the current study as well as in findings reported by Heaven et al. (2001), Keller and Siegrist (2015) and Momoi et al. (2016)

Like Heaven et al. (2001) and the current study both Keller and Siegrist (2015) and Momoi et al. (2016) agree. Potentially, the discrepancy between the finding of the current study (lack of significant result) can be attributed to similar issues as already mentioned in association between BMI and restrained eating style.

With respect to the personality dimension Openness vs. Closedness to Experience it was found to be negatively related to emotional eating. However, this predictor did not add significantly to the prediction. This finding is consistent with Heaven et al. (2001), Elfhag and Morey (2009) and Momoi et al. (2016). However, in Momoi (2016) study, even though there was lack of significant relationship, the direction of the association differs (positive in males, negative in females) indicating gender differences. Only Keller and Siegrist (2015) reported non-consistent result as they found a statistically significant positive and not negative association between Openness and emotional eating.

Moreover, Neuroticism vs. Emotional Stability significantly predicted emotional eating which converges with Heaven et al. (2001), Elfhag and Morey (2009) and Keller and Siegrist (2015). However, it diverges with Momoi et al. (2016) who found Neuroticism to be protective with respect to emotional eating. However, Momoi et al. (2016) also found that higher Neuroticism was related to lower inhibitory control. Giving that personality and temperament converge theoretically and empirically (Rothbart, 2012), inhibitory control has been recognized as a facet of regulative factor called Effortful control/ Conscientiousness/Constraint (Hill et al., 2013). Because of missing

information about participants' BMI, it can be the case that the participants did not perceive emotional eating as a problematic and felt in control over their eating behaviors.

In addition, the current study found BMI positively and statistically significantly related to emotional eating. The finding is consistent with Cebolla et al. (2014), Keller & Siegrist (2015), van Strien et al. (2009) and Keller et al. (2009) and Brunault et al. (2015). However, the finding is not consistent with Ellicson-Larew et al. (2013), Adriaanse et al. (2001) and Elfhag & Morey (2008) who report did not find BMI associated with emotional eating.

With respect to the prediction of external eating, Extraversion vs. Introversion was identified as significant predictor of external eating. This finding supports the view, that increased tendency to be overresponsive to external cues may be attributed to externality as a general personality trait. (Schacter, 1968). In addition, it's consistent with Momoi et al. (2016) and partially consistent with Keller and Siegrist (2015) who did not find significant results. Nonetheless, our results are not consistent with Elfhag and Morey (2008). However, closer look on sample personality profile scores reveals that the participants in Elfhag and Morey (2008) scored high on Neuroticism and low on Conscientiousness what is a personality pattern like the one found in emotional eating. This observation supports the view that emotional and external eating are interrelated and thus have combined effects on one's eating behavior.

Moreover, the predictor Agreeableness vs. Antagonism was not identified as useful although we positively and statistically non-significantly associated external eating. This finding converges with Keller and Siegrist (2015) but diverges with Elfhag and Morey(2008). The following personality dimension trait that was not useful in predicting external eating and was found in negative relationship is Conscientiousness vs. Lack of Direction. This finding is consistent with Siegrist and Keller (2015) and

Elfhag and Morey (2008) However, our finding partially contradicts Momoi et al. (2016) because they found significant positive correlation between Conscientiousness and external eating.

Neuroticism vs . Emotional stability was the following personality dimension that the current study identified as a significant predictor of external eating. This finding is consistent with Heaven et al. (2001) especially Immoderation, Elfhag and Morey (2008) and Keller and Siegrist (2015). However, this result is inconsistent with Momoi et al. (2016). The discrepancy between the result of this study and the one obtained by Momoi et al. (2016) can be potentially attributed to cultural differences. According to Hofstede et al. (1992), Japan is ranks high on uncertainty avoidance while low on individualism what could have an effect when measuring Neuroticism and external eating. It could be the case that Japanese youth differs from the one in the participants in this study in that that they are more culturally reinforced to avoid social gathering, thus having less opportunities for external eating. However, this reasoning is just speculation.

With respect to prediction of external eating based on Openness vs . Closedness to Experience, we found that these variables are unrelated. This finding contradicts Elfhag and Morey (2008), Keller and Siegrist (2015) and Momoi et al. (2016). The anomaly in our result can probably accounted for by lower internal consistency in scores for this personality domain (Cronbach alpha obtained for this scale was just .44).

Finally, in the current study BMI positively and statistically significantly contributed to explanation of scores in external eating. It means that external eating is weight-related. This finding agrees with Keller et al. (2016), Keller and Siegrist (2015) and Brunault et al. (2015). However, the finding is inconsistent with Ellicson-Larew et al. (2013), Cebolla et al. (2014), Elfhag and Morey (2008) and Adriaanse et al. (2011). The discrepancy between the finding of this study and those with contradictory evidence

may be explained by different characteristics of the sample. Specifically, two studies tested just females (Cebolla et al., 2014; Adriaanse et al., 2001), Elfhag and Morey (2008) tested just obese patients and the negative association found by Ellicson-Larew was insignificant.

Conclusions

6.1 Main Conclusions

The current study found that weight positively and significantly relates to emotional and external eating while non-significantly to restrained eating. In other words, this study showed that emotional and external eating behaviors are problematic as they are linked with higher weights. Although the association of weight and restrained eating style styles did not reach a statistical significance, the association was positive suggesting that it affects weight status. Moreover, this study found higher Agreeableness, Conscientiousness and Openness to Experience are protective while higher Neuroticism are risky factors with respect to emotional eating. For external eating, the current study found higher Conscientiousness as protective personality trait, while higher Extraversion and Neuroticism as personality traits increasing one's susceptibility to overeat because of external food related cues. The finding that both emotional and external eating were predicted by weight and neuroticism is in line with Keller and Siegrist (2015) who found indirect effects of Neuroticism on sweet and saury food choices via emotional and external eating styles. Lastly, higher Extraversion, Conscientiousness and Openness to Experience were found as risky while higher Agreeableness and Neuroticism as protective personality factors regarding restrained eating. All these findings help us to understand more about the complexity of eating behaviors in young adults.

Considering the evidence in the current study supported by evidence in previous studies, it can be concluded that personality traits and body fat are related to overeating styles. Nonetheless, not all the personality dimensions were related to all overeating styles. It's possible to say that there is converging evidence that Agreeableness vs. Antagonism is negatively related to restrained eating while Openness to Experience/ Closedness to Experience is consistently found to be positively associated with restrained eating. Moreover, there is also a converging evidence that Agreeableness vs. Antagonism is negatively related to emotional eating. However, regarding external eating and personality traits there no converging evidence. In addition, there is no converging evidence that body fat relates to overeating styles.

6.2 Implications

We found that individuals who score higher on Neuroticism and have higher weights are more prone to be emotional eaters. Because personality is hard to change (Bogg & Roberts, 2004) it seems easier to address maladaptive eating behaviors. The individuals with poor affective regulation because of maladaptive way to deal with anxiety may better respond to weight management intervention that are focused on adaptive emotional coping skills. In other words, the individual would benefit the most from the therapy which works on psychological factors rather than weight per se. Similarly, for the individuals who are more extroverted and less emotionally stable there is high probability that they overeat because of being more sensitive to external cues. Effective therapeutic interventions then would be teaching the individual to gain more control over environmental cues – such as portion size, media, press or peer pressure. The current study has implication for clinical practice and counselling, in that, that it helps to tailor and improve weight management program in those who struggle with weight but also for

those who wish to maintain their weight in healthy range in the long-term. Specifically, as body weight tends to change through the life span, maintaining rather than reducing weight seems to be even more important.

6.3 Strengths and Limitations

The main strength of the current study is providing better understanding about how personality and current weight contribute to eating behaviors in non-clinical population. Unlike most of the studies focusing on clinical population, this study helps to screen for specific factors that increase or decrease susceptibility to develop health problems. Also, this study differs from the other in that it included BMI as a predictor rather than control variable in examination of relation with eating styles. Lastly, this study used well respected, valid and reliable measures to assess personality and eating behaviors.

Nevertheless, there are also limitations that needs to be acknowledged. The study entitled cross-sectional design what limits the ability to draw inferences about direction of the effects. Another one is small sample size what limits generalization of the results to wider than UNYP population. Additionally, the composition of the participants based on sex was not equal (78 males vs. 138 females). Next, the current study relied on self-reported questionnaires which are confronted with response sets – especially acquiescence and social desirability (Cronbach, 1959; Paulhus, 1984). Questioning students about their weight and height may be perceived as sensitive, especially for those who are overweight. In my sample, BMI ranged from 15.78 to 39.45 thus possible response set biases could be expected. Acquiescence or “ the tendency to be agreeable in a rather submissive way, that is a desire to say what is expected” (Rorer, 1965, pg. 134) could be expected in the individuals with normal weight, while social desirability that is one’s tendency to

dissemble self-report because of attempt to make a good impression on the researcher (Riecken, 1962) could be expected in overweight individuals. In addition, the individuals with higher than socially approved weights have been found to be more concerned about self-presentation (Rodin & Slochower, 1974). Indeed, the researcher personally know most of the participants and the students were not alone but in presence of classmates. The high odds of response bias occurring in the current study is also supported by the lower internal consistency indices obtained in personality measure (Neuroticism/Emotional Stability, $\alpha=.57$; Openness/Closedness to Experience- $\alpha=.44$; Conscientiousness/Lack of Direction- $\alpha=.68$; Agreeableness/Antagonism, $\alpha=.68$).

6.4 Suggestions for Future Research

Future research should firstly run a validation study for a measure to assess personality. Then, it would be desirable to include in testing battery also independent response-set marker scales to improve the general limitations of data derived from self-report measures assessing eating styles. Given the limitations of BMI as a measure of body fat, future studies shall seek for more objective ways to assess body fatness. In addition, we did not screen for clinical symptoms of eating disorders or any other pathologies thus future study replications shall do so. It would help to identify the individuals with extreme scores which affect the results. Additionally, longitudinal research capturing changes in BMI and personality traits in relationship with eating styles would be beneficial. According to Srivastava, John, Gosling and Potter (2003) personality traits are dynamic and thus changing through lifespan as well as BMI. Because the current study discovered Neuroticism and body weight in significant positive association with both external and emotional eating, future research should examine where these two types of behavior mediate the relationship between Neuroticism and body weight.

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Appendix A

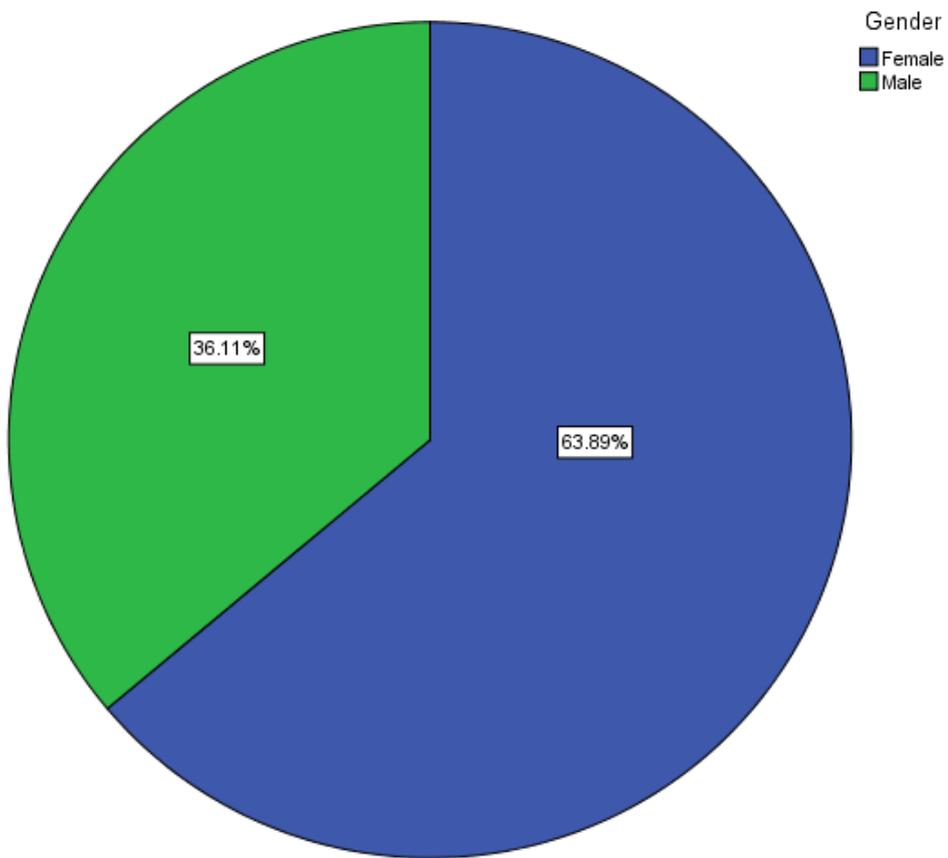


Figure 1. Gender of participants

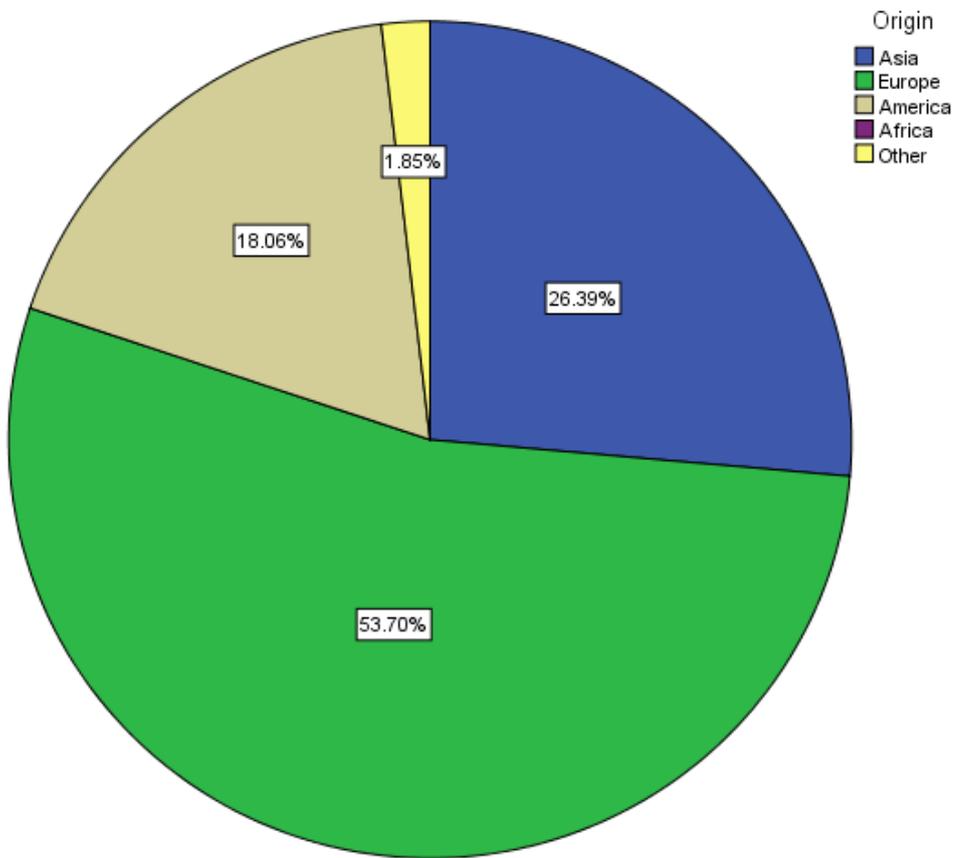


Figure 2. Origin of participants

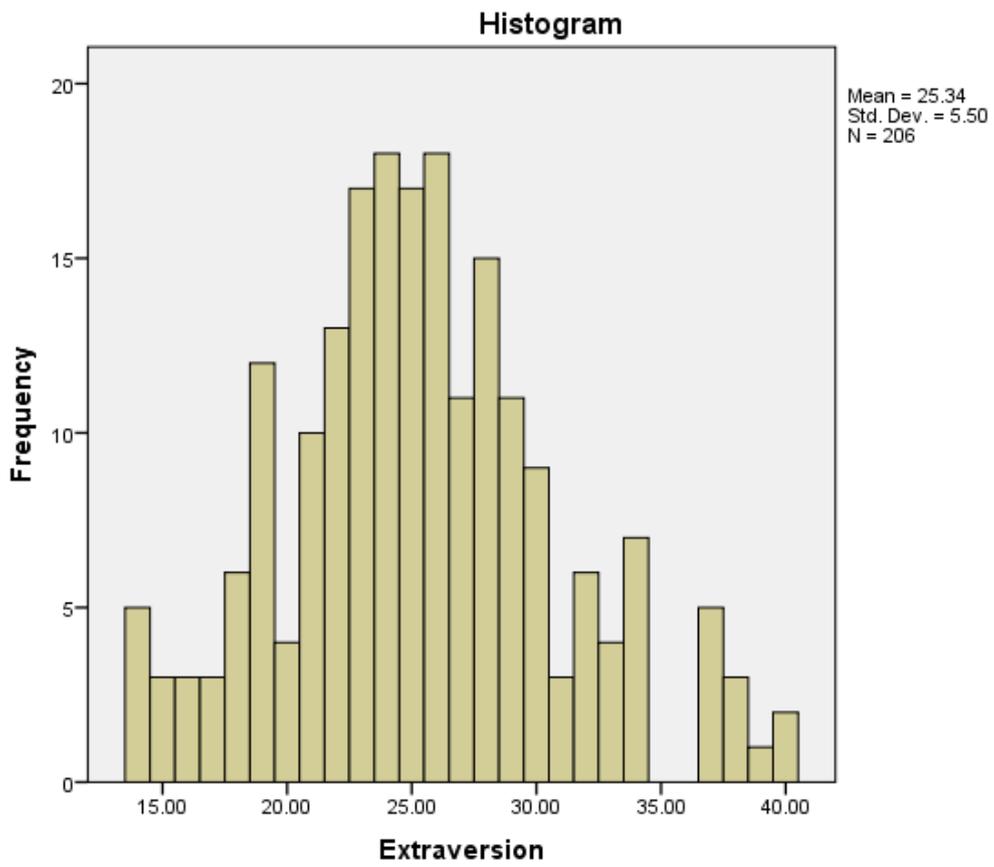


Figure 3. Histogram of the personality trait Extraversion vs. Introversion

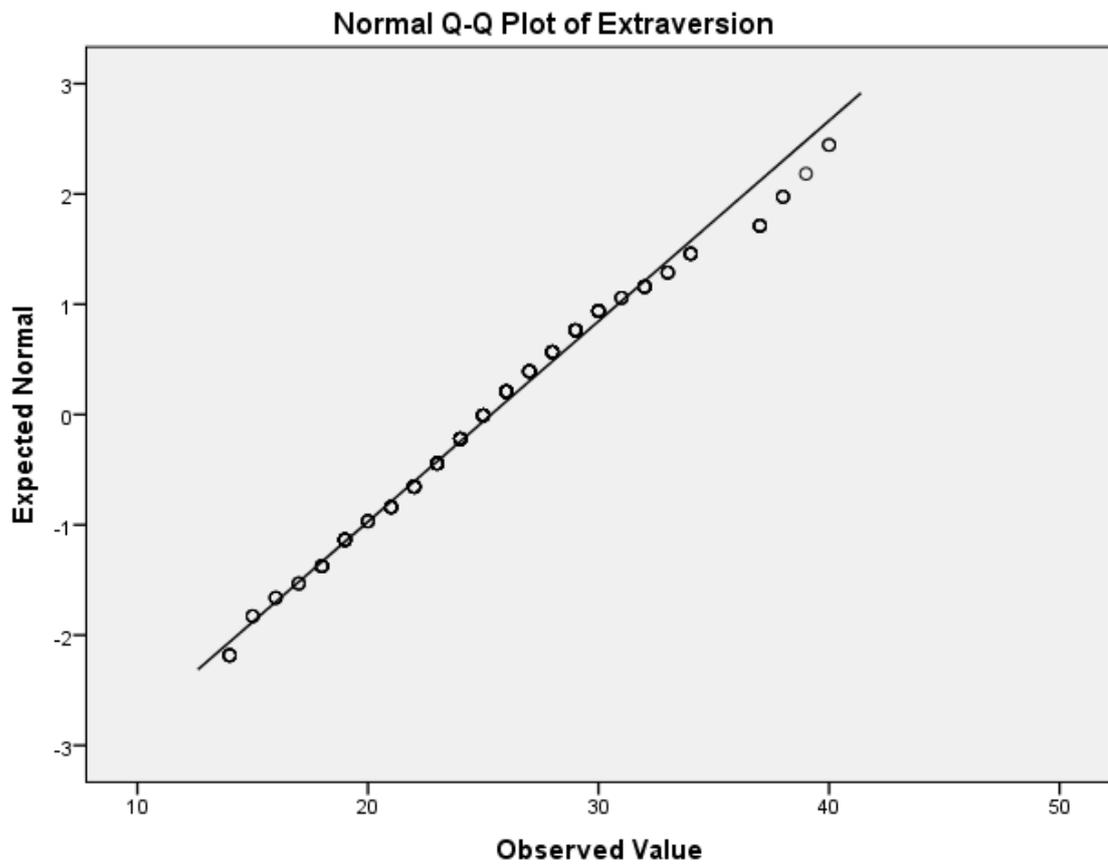


Figure 4. Q-Q plot of the personality trait Extraversion vs. Introversion

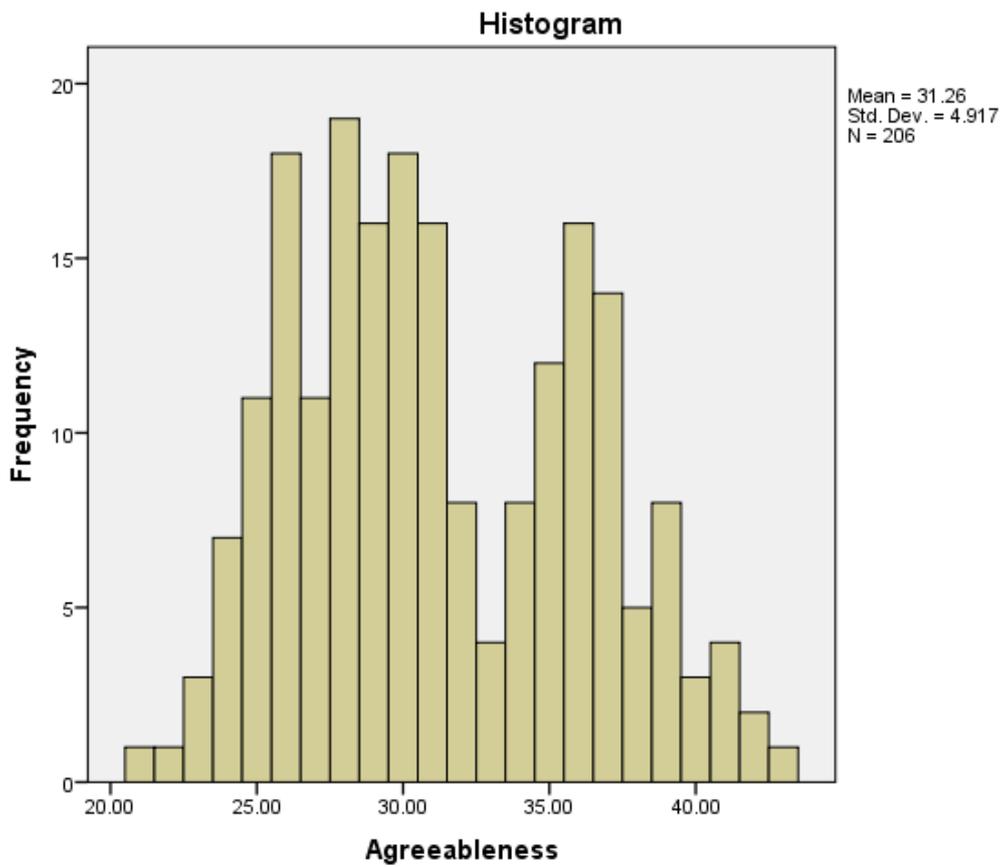


Figure 5. Histogram of the personality trait Agreeableness vs. Antagonism

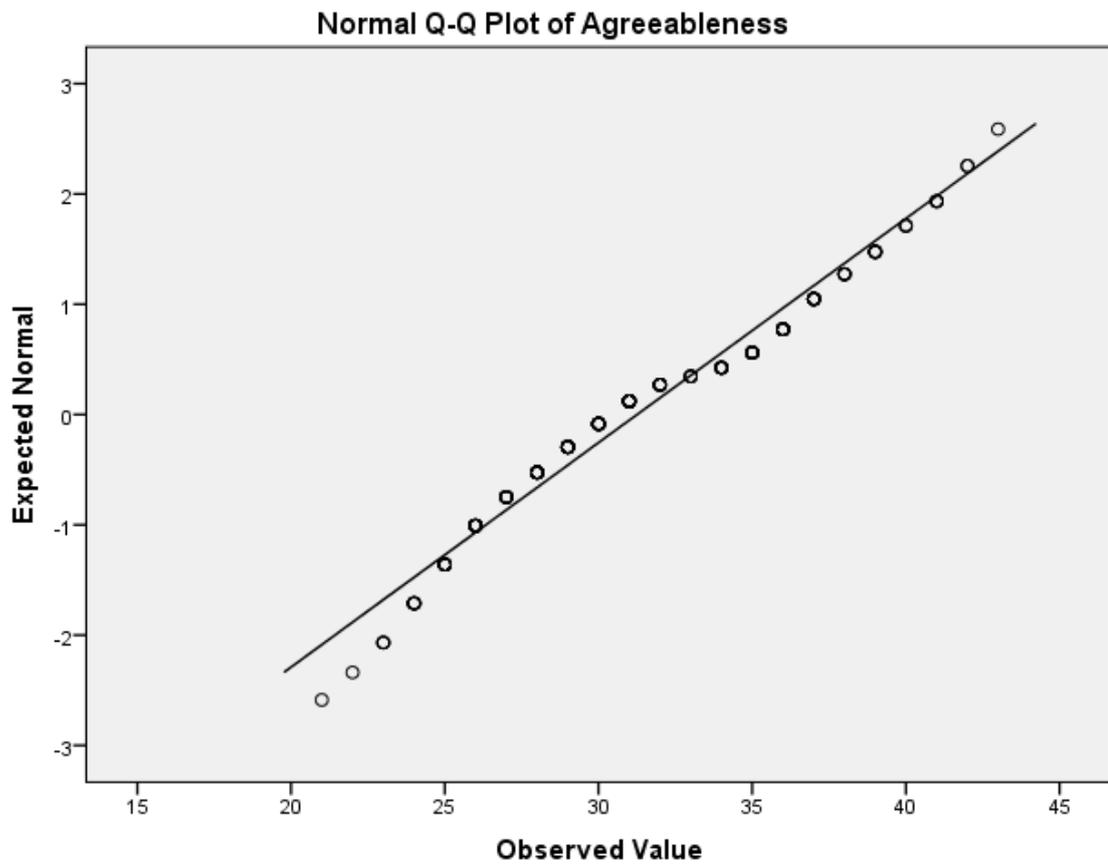


Figure 6. Q-Q plot of the personality trait Agreeableness vs. Antagonism

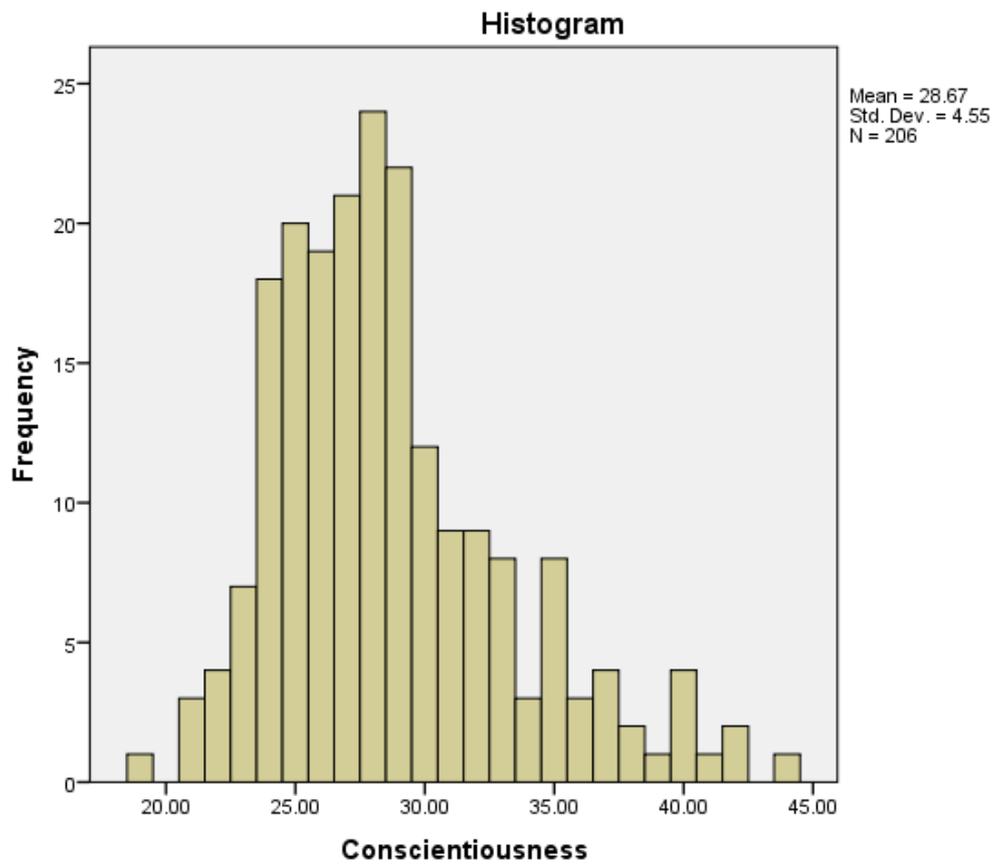


Figure 7. Histogram of the personality trait Conscientiousness vs. Lack of Direction

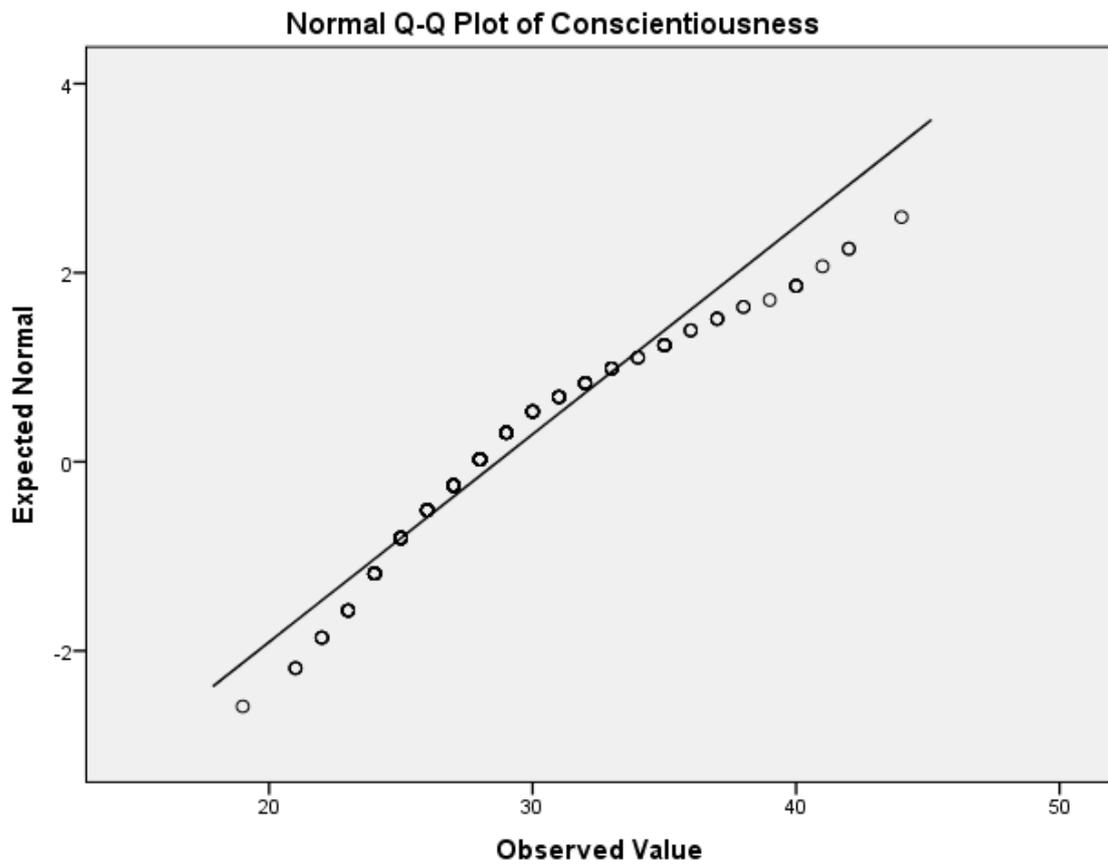


Figure 8. Q-Q plot of the personality trait Conscientiousness vs. Lack of Direction

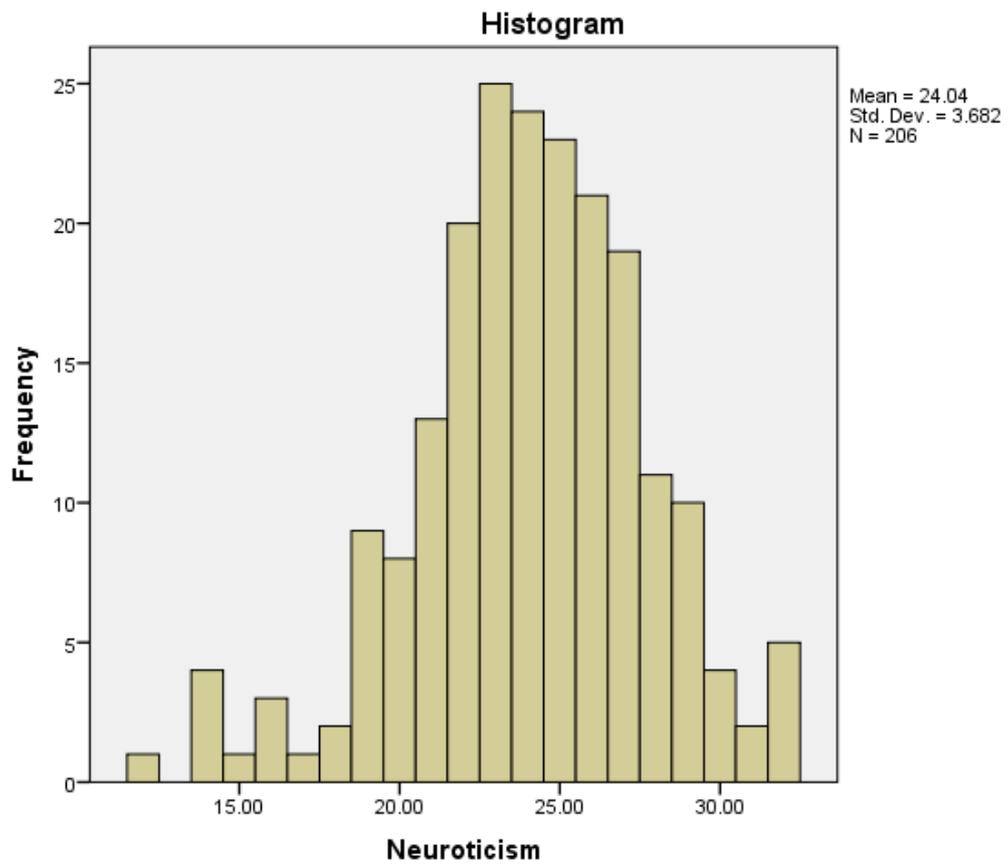


Figure 9. Histogram of the personality trait Neuroticism vs. Emotional Stability

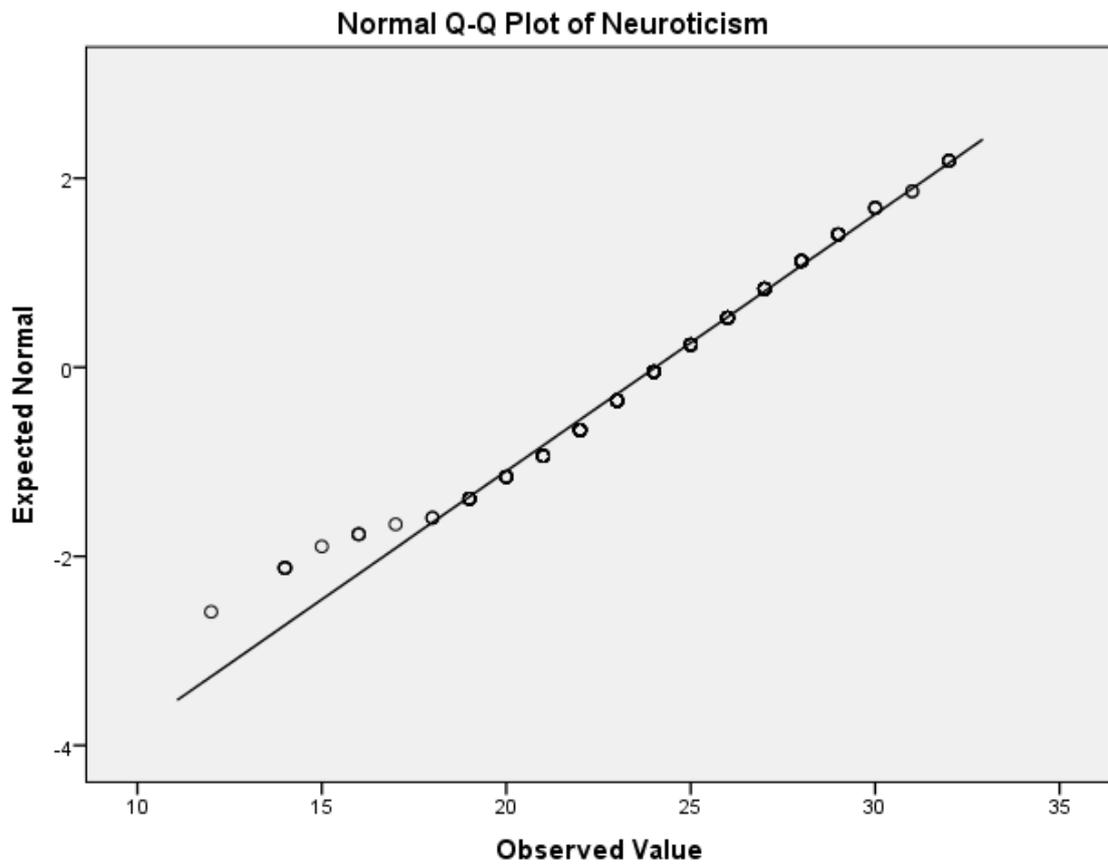


Figure 10. Q-Q plot of the personality trait Neuroticism vs. Emotional Stability

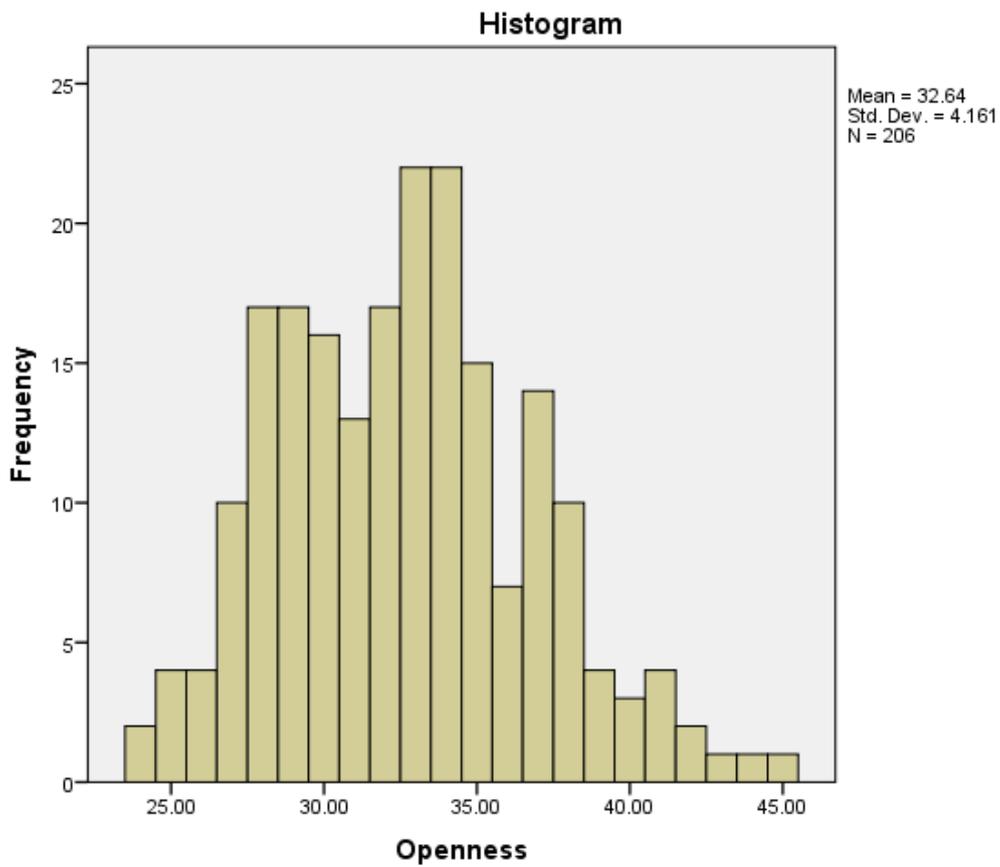


Figure 11. Histogram of the personality trait Openness vs. Closedness to Experience

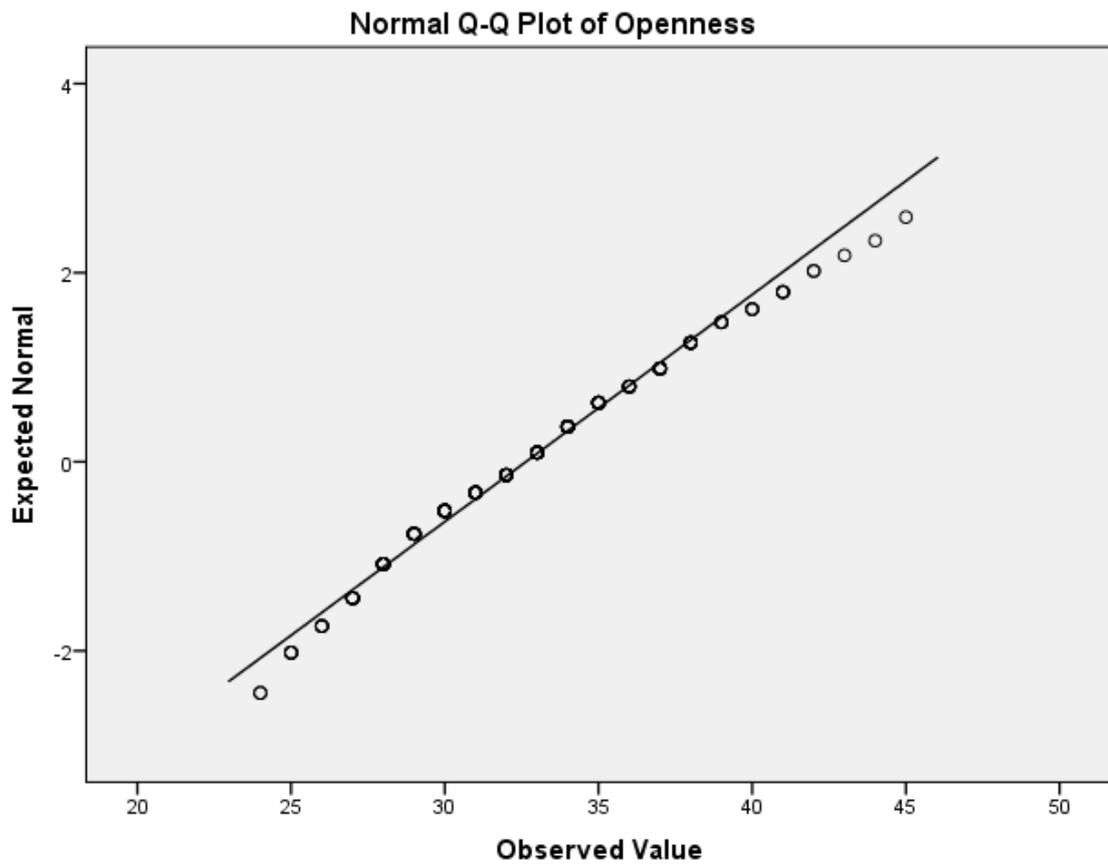


Figure 12. Q-Q plot of the personality trait Openness vs. Closedness to Experience

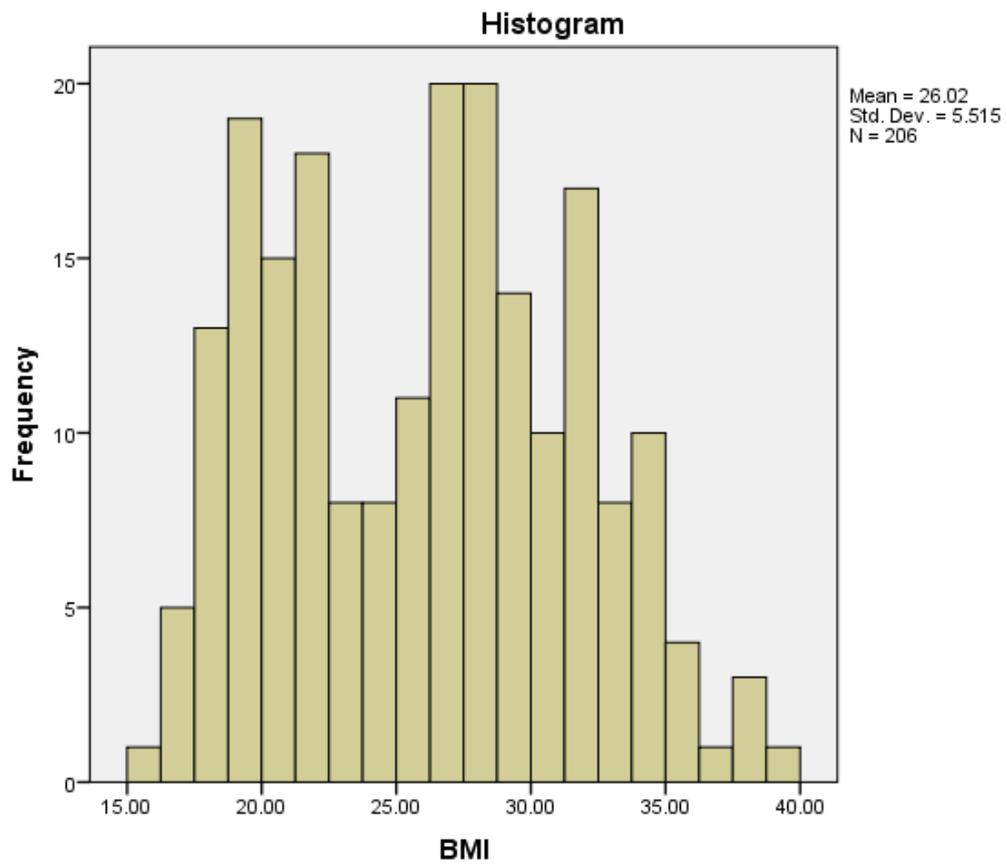


Figure 13. Histogram of body mass index

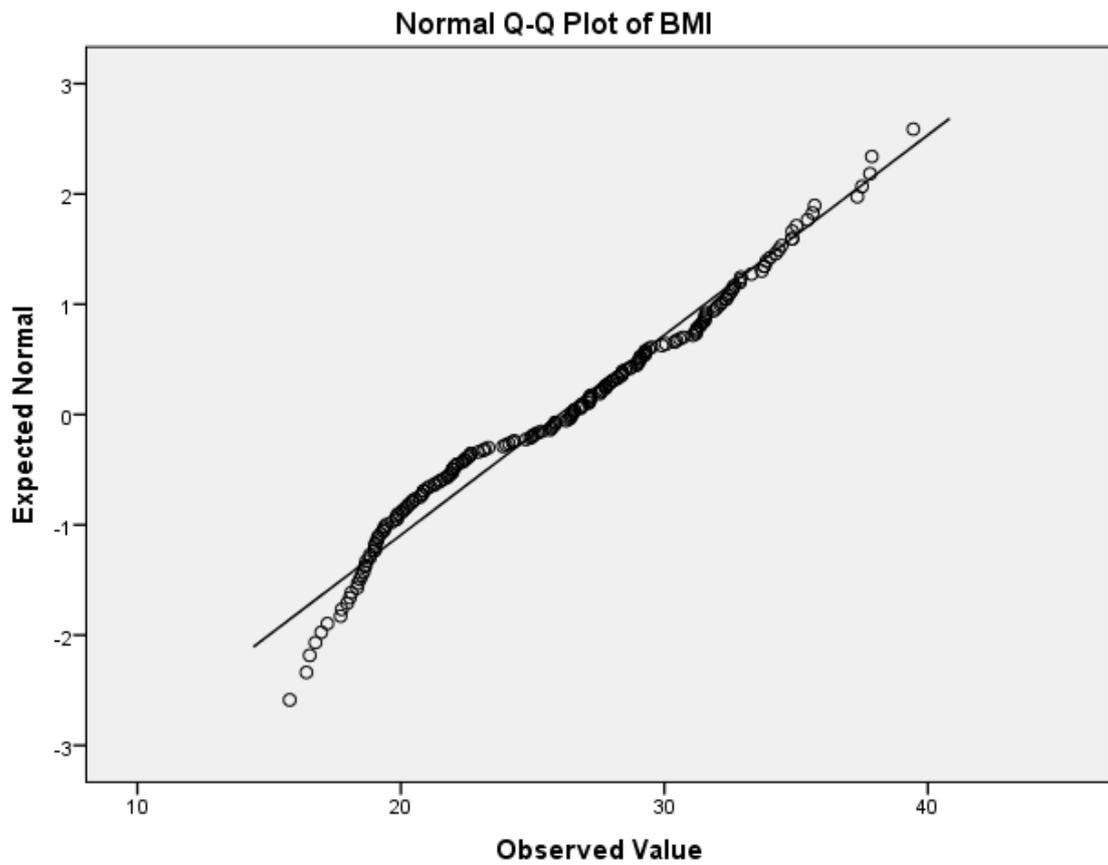


Figure 14. Q-Q plot of body mass index

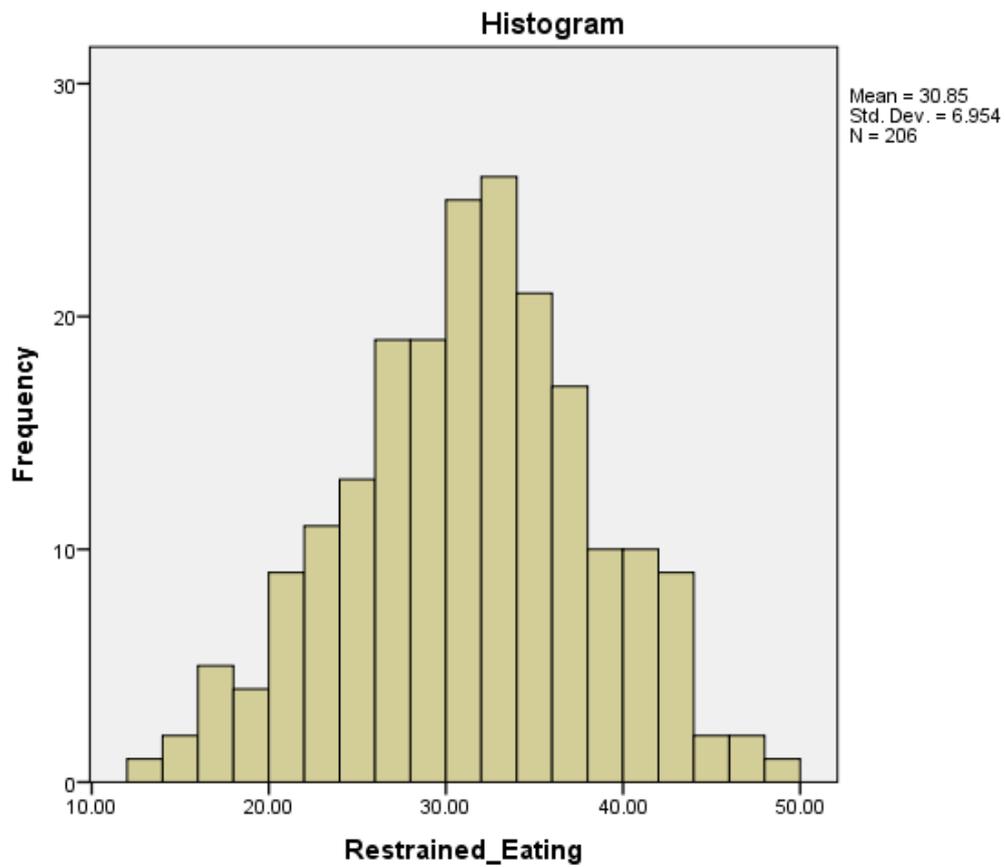


Figure 15. Histogram of the distribution of scores of restrained eating

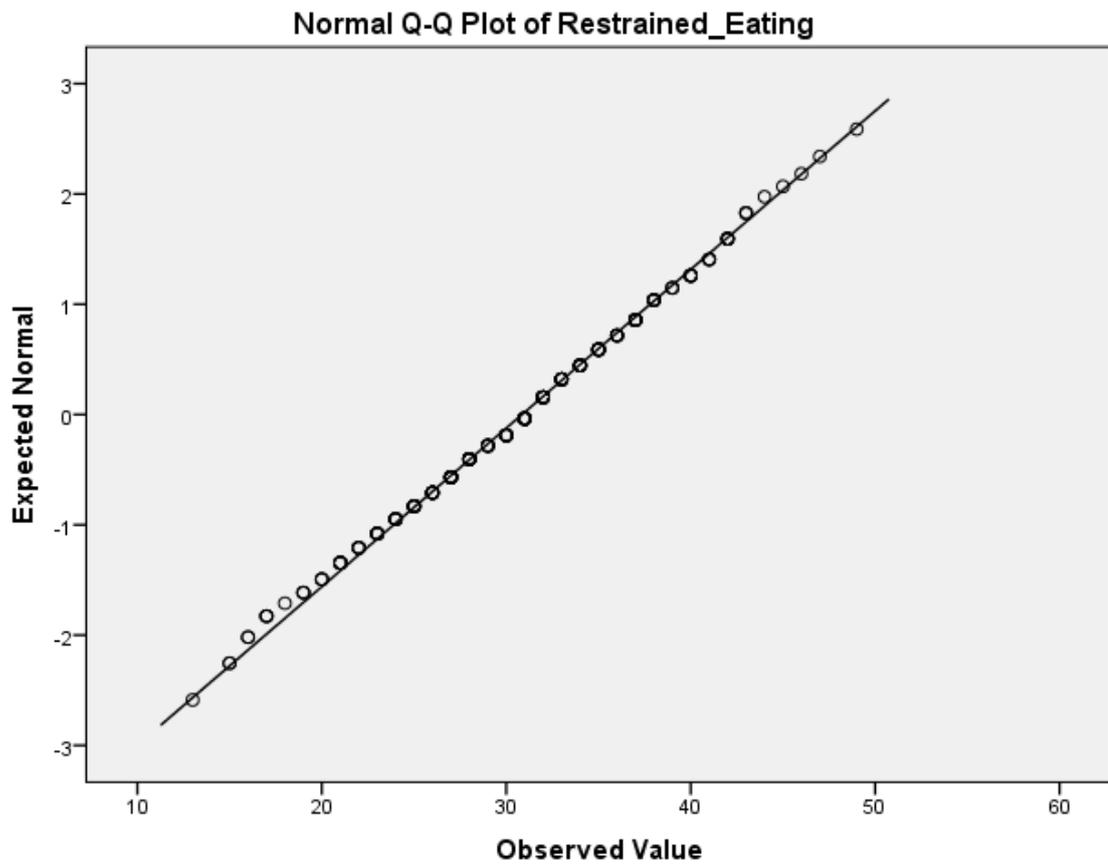


Figure 16. Q-Q plot of restrained eating

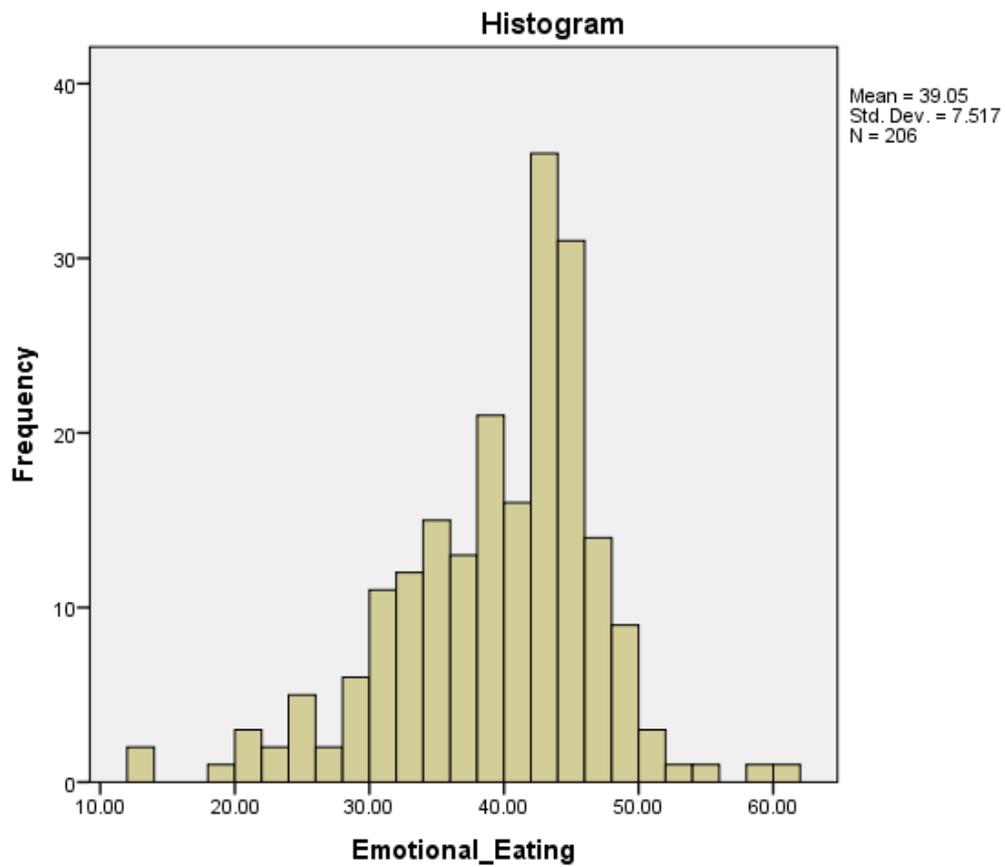


Figure 17. Histogram of the distribution of scores of emotional eating

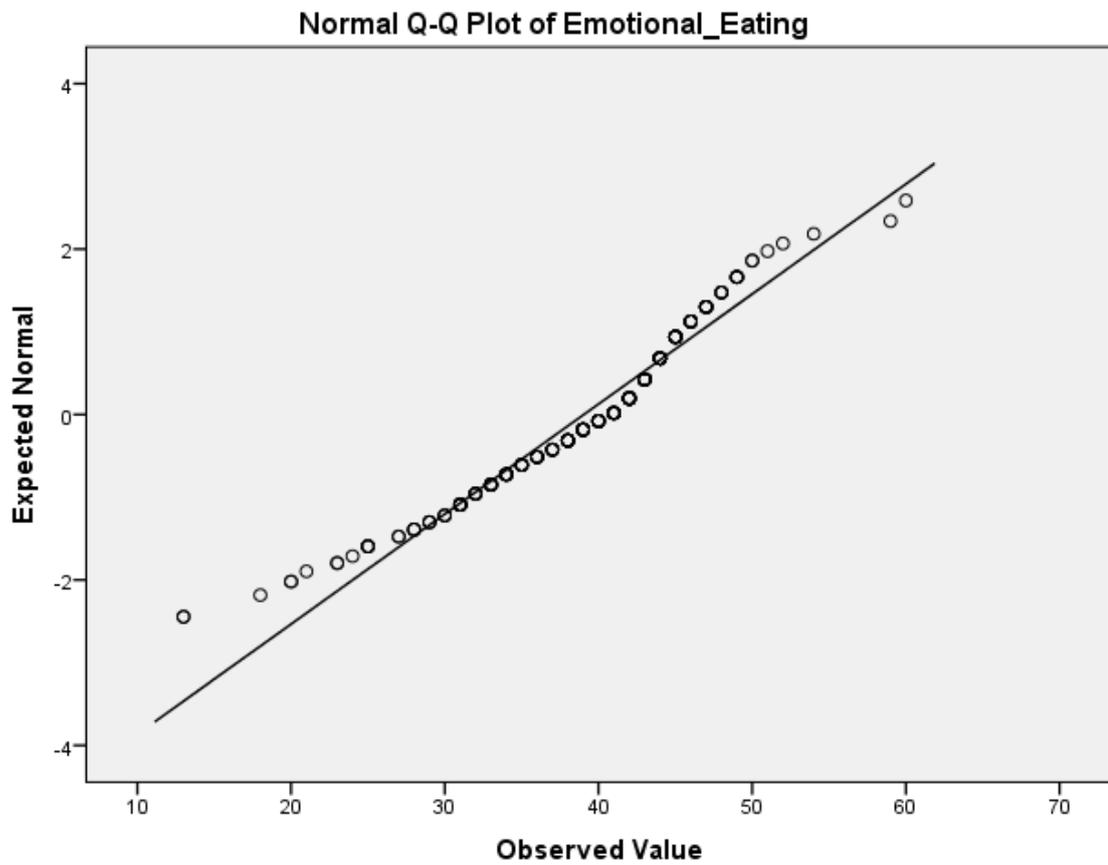


Figure 18. Q-Q plot of emotional eating

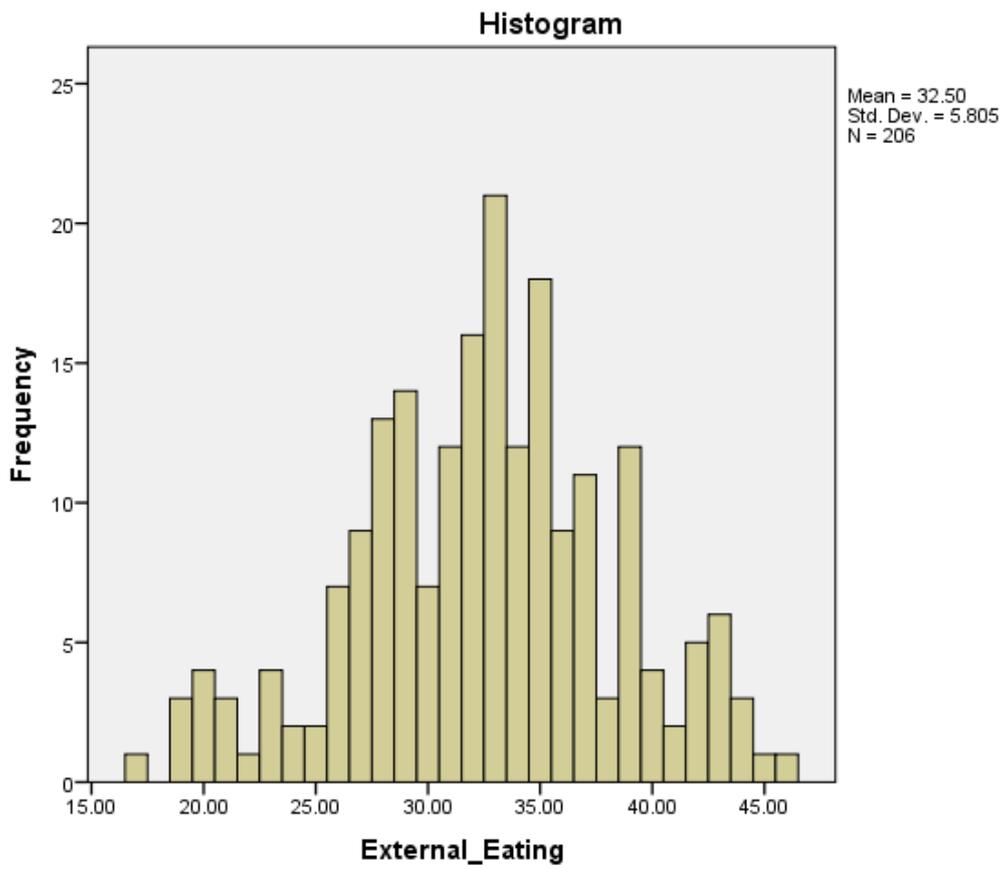


Figure 19. Histogram of the distribution of scores of external eating

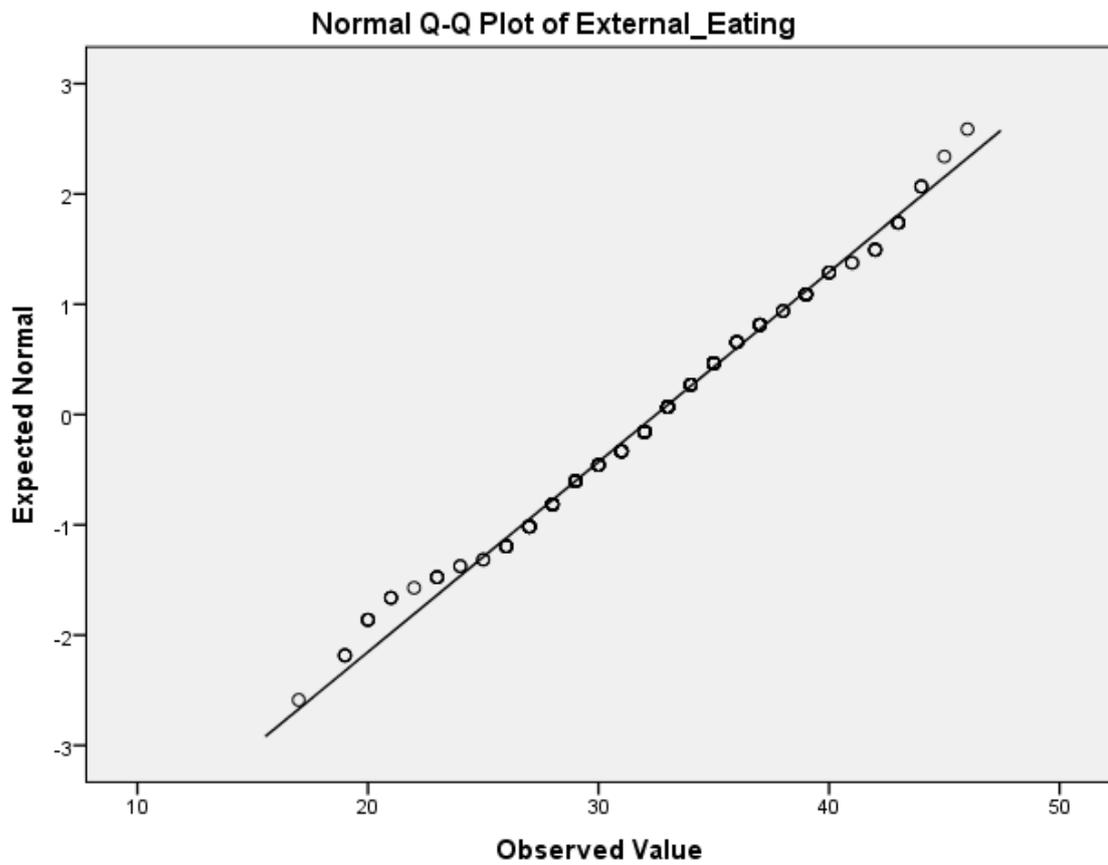


Figure 20. Q-Q plot of external eating

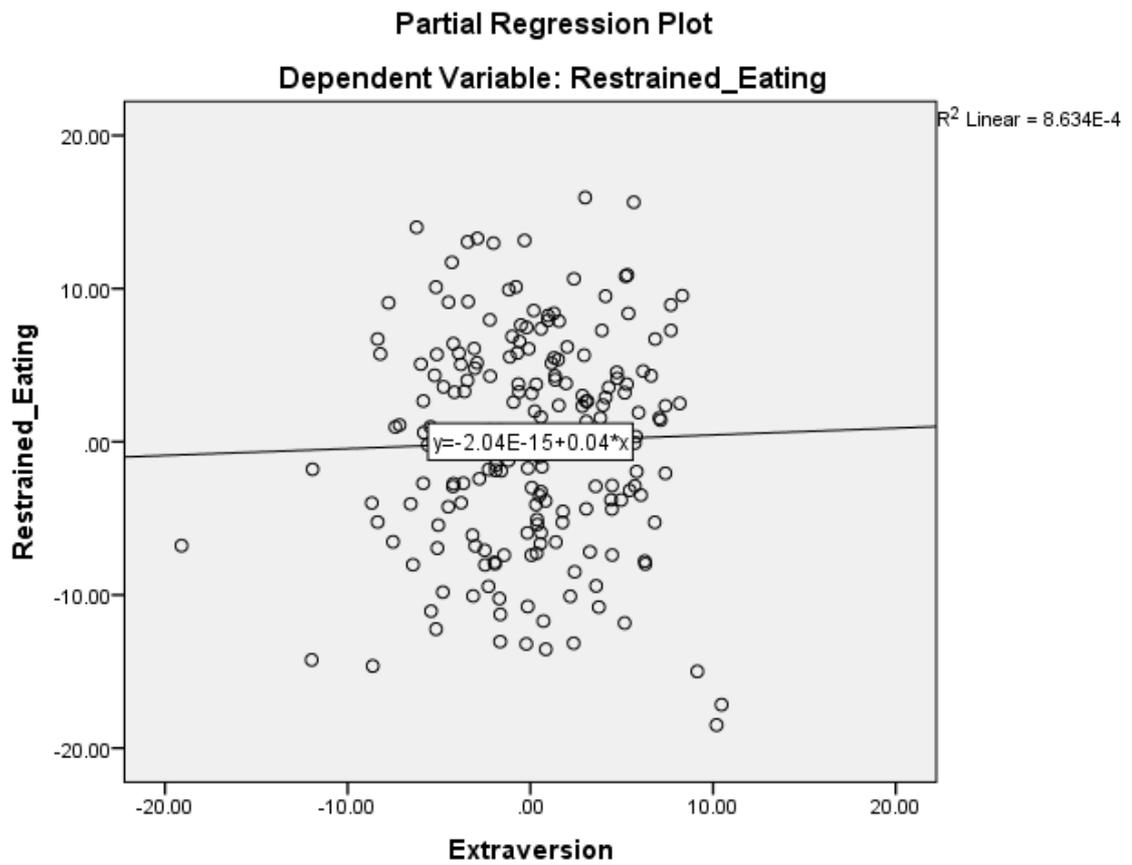


Figure 21. The association between Extraversion vs. Introversion and restrained eating

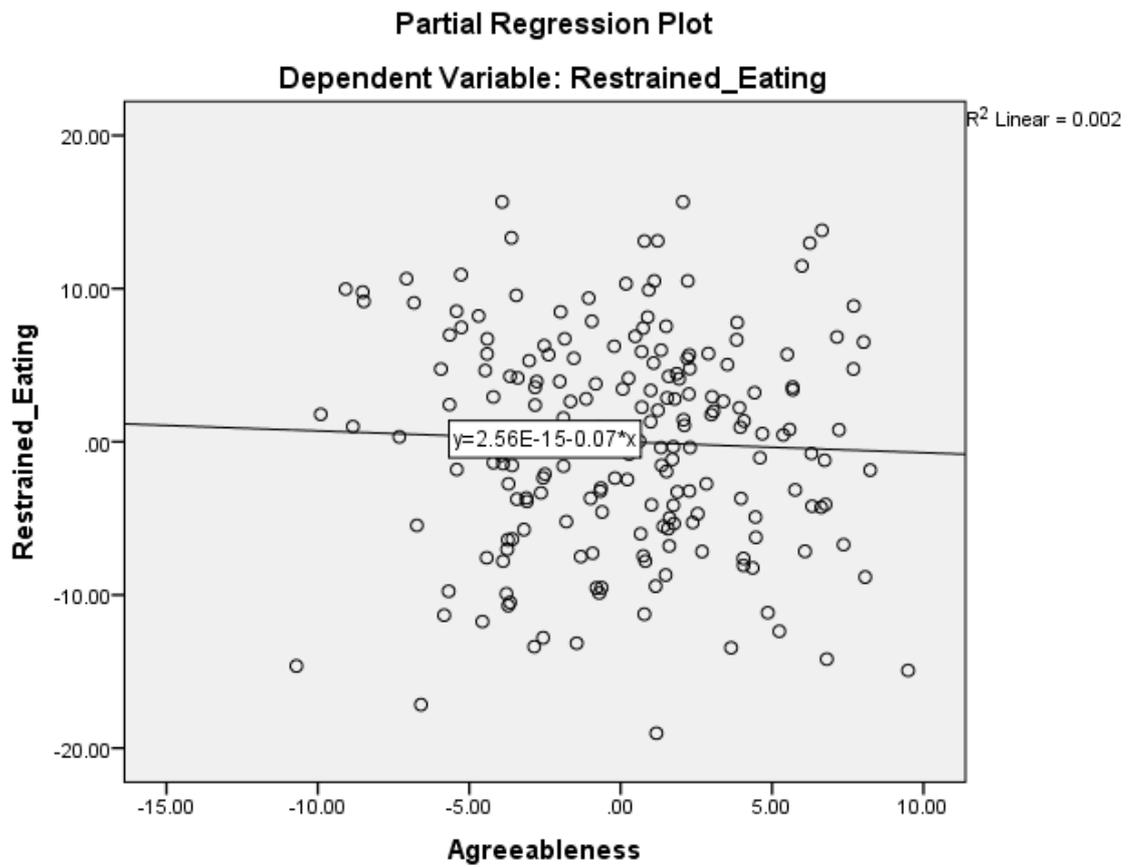


Figure 22. The association between Agreeableness vs. Antagonism and restrained eating

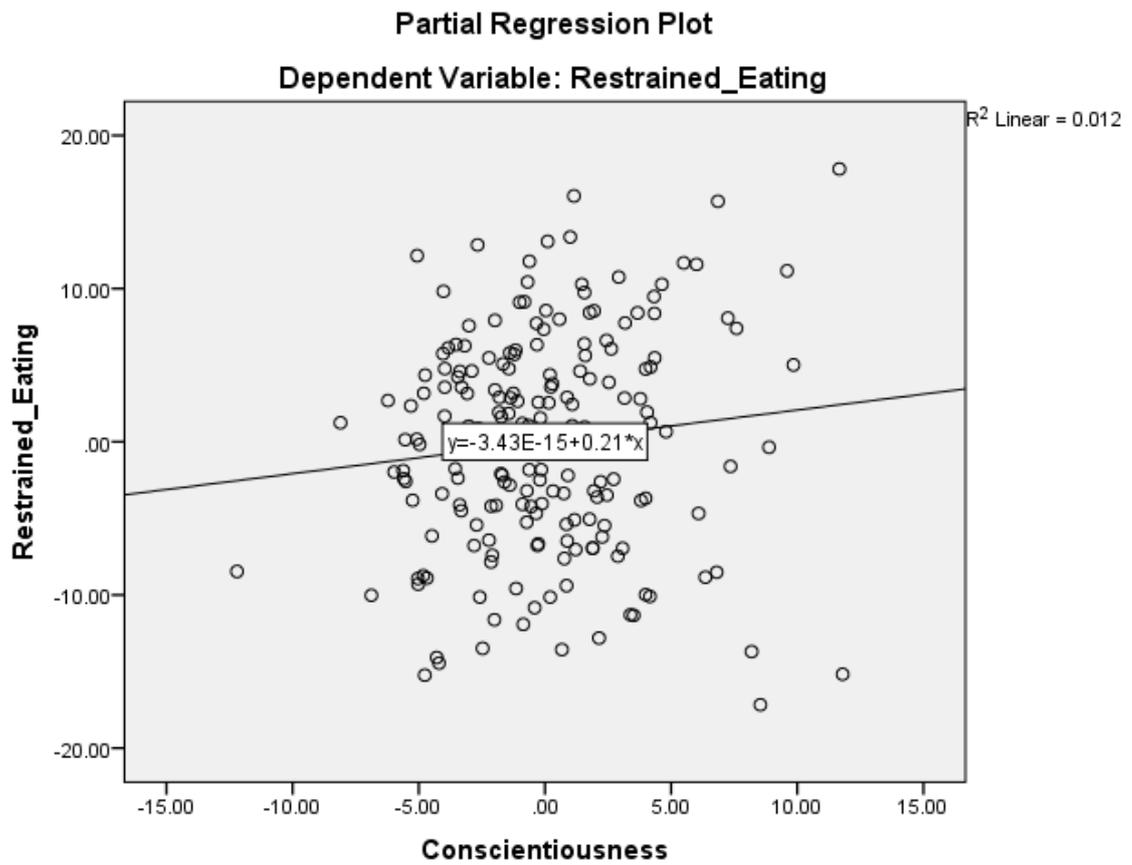


Figure 23. The association between Conscientiousness vs. Lack of Direction and restrained eating

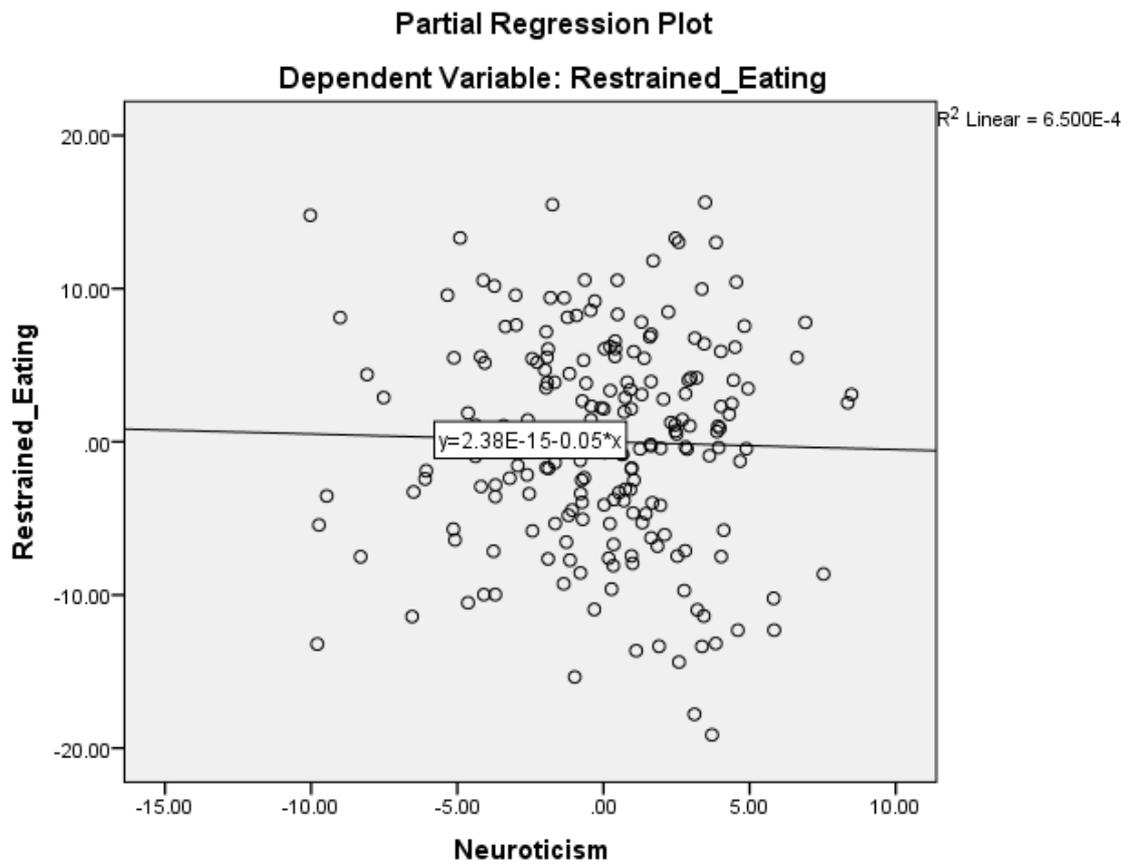


Figure 24. The association between Neuroticism vs. Emotional Stability and restrained eating

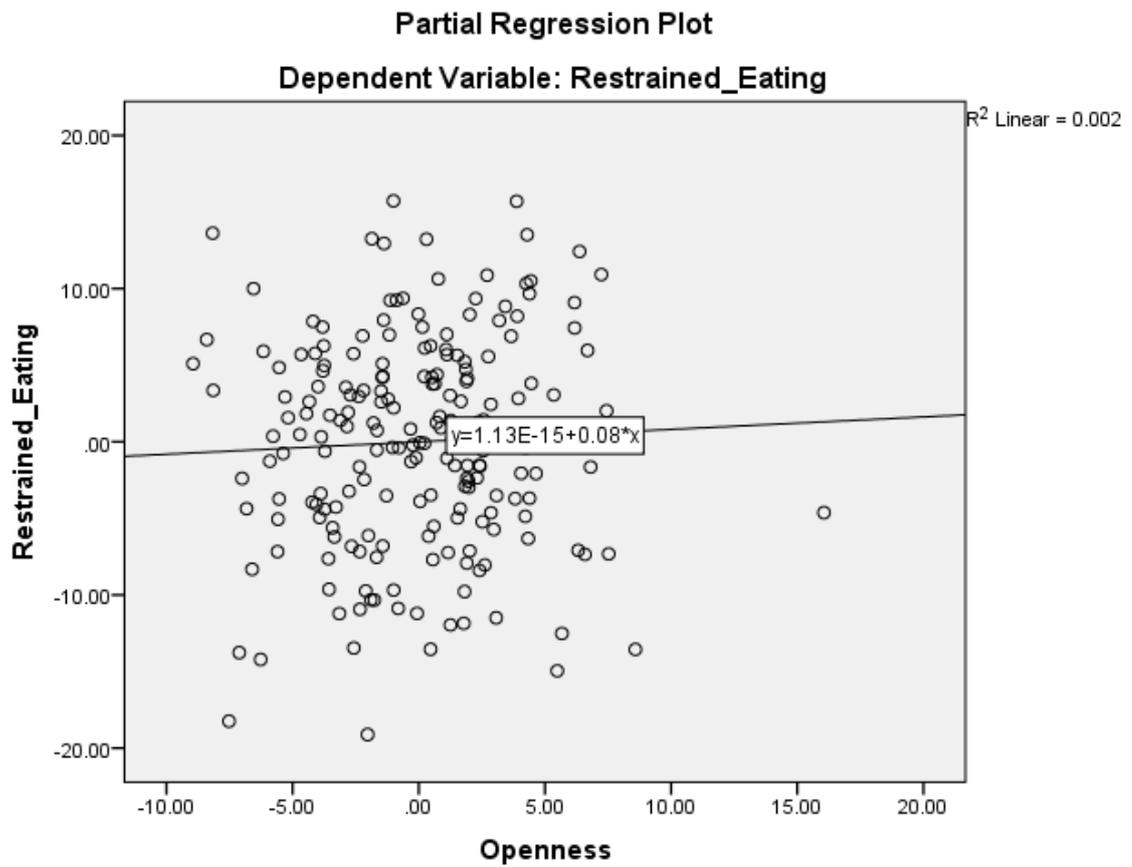


Figure 25. The association between Openness vs. Closedness to Experience and restrained eating

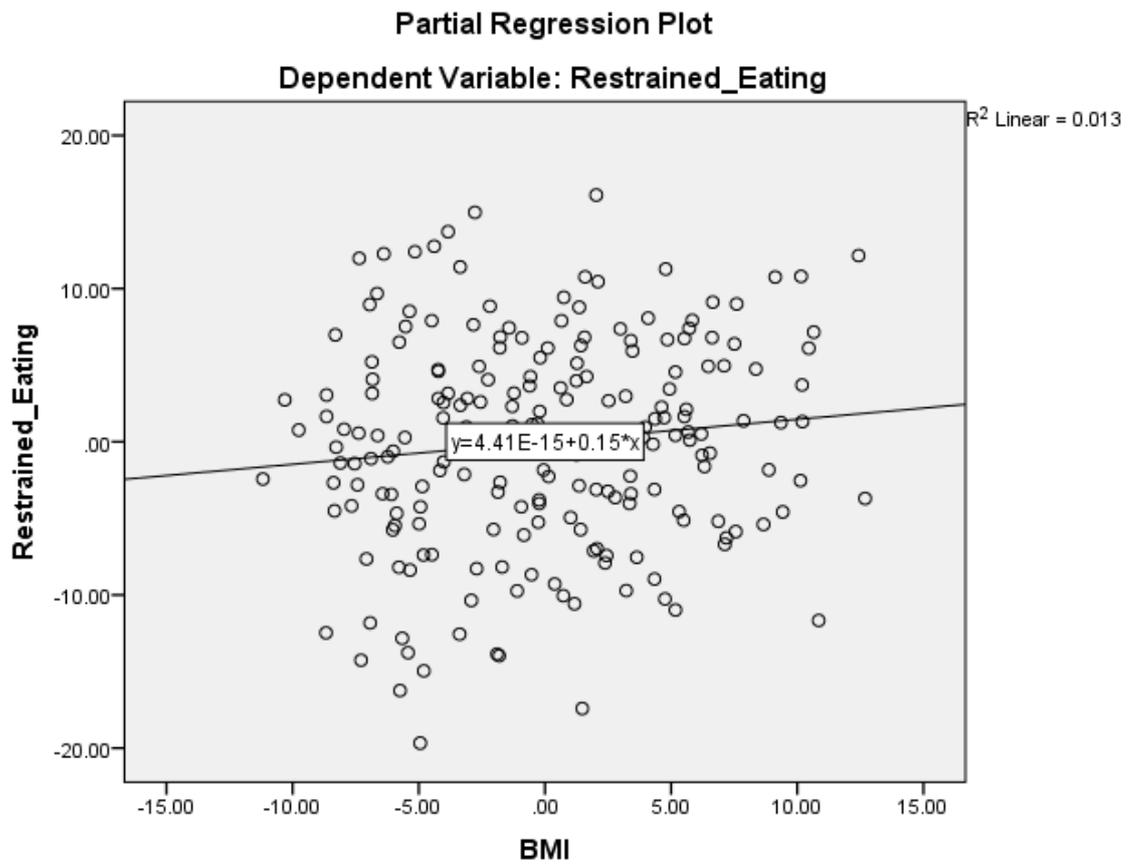


Figure 26. The association between body mass index and restrained eating

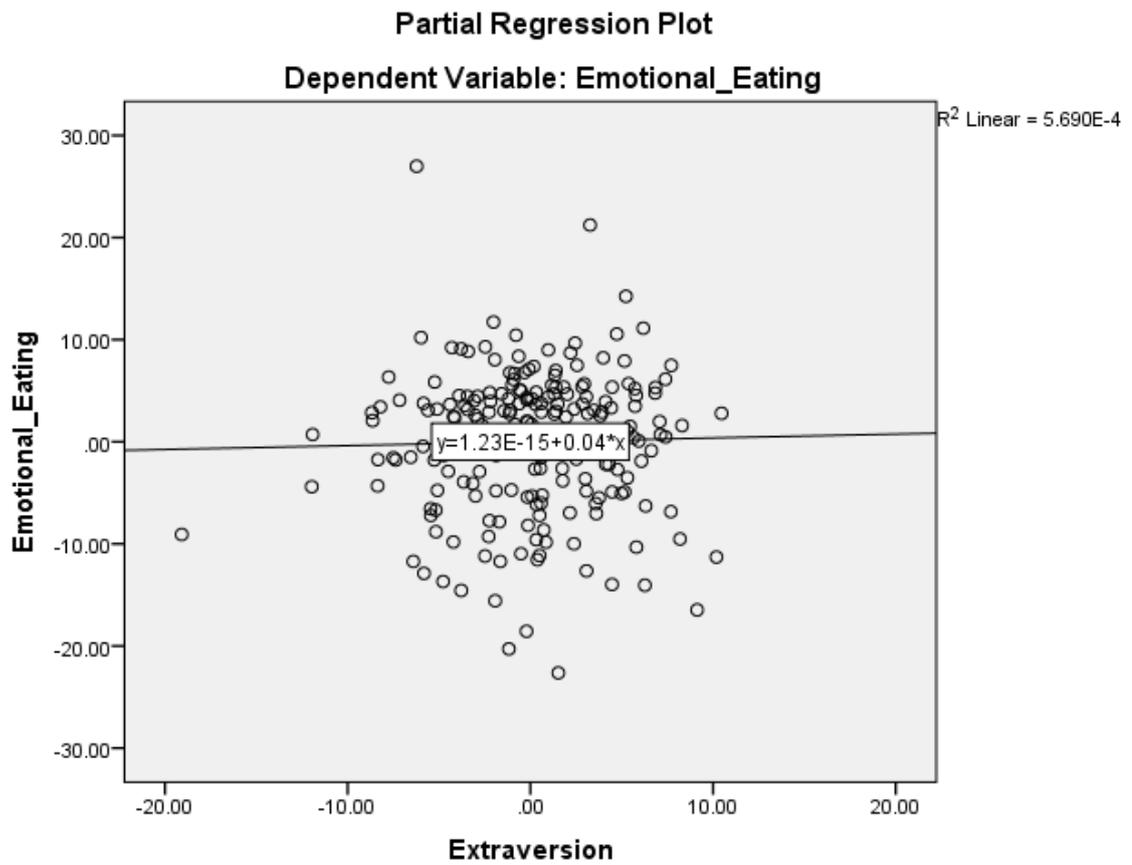


Figure 27. The association between Extraversion vs. Introversion and emotional eating

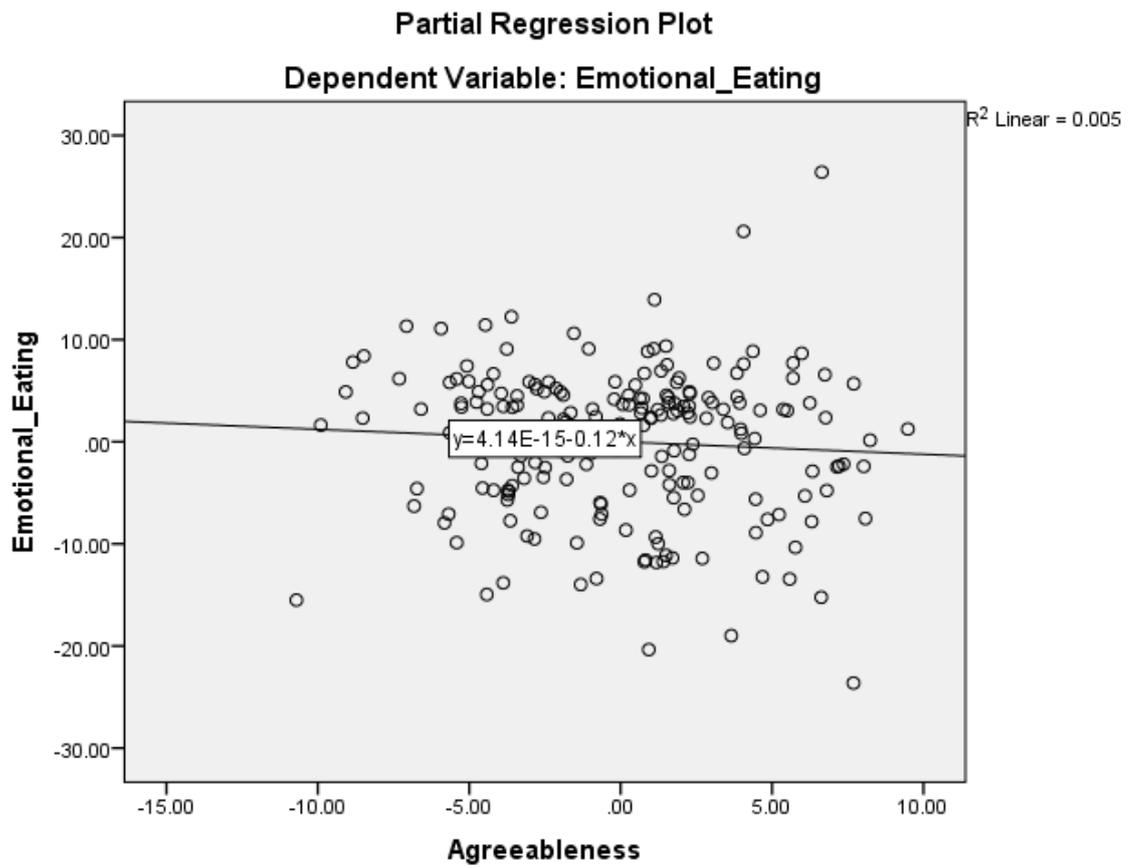


Figure 28. The association between Agreeableness vs. Antagonism and emotional eating

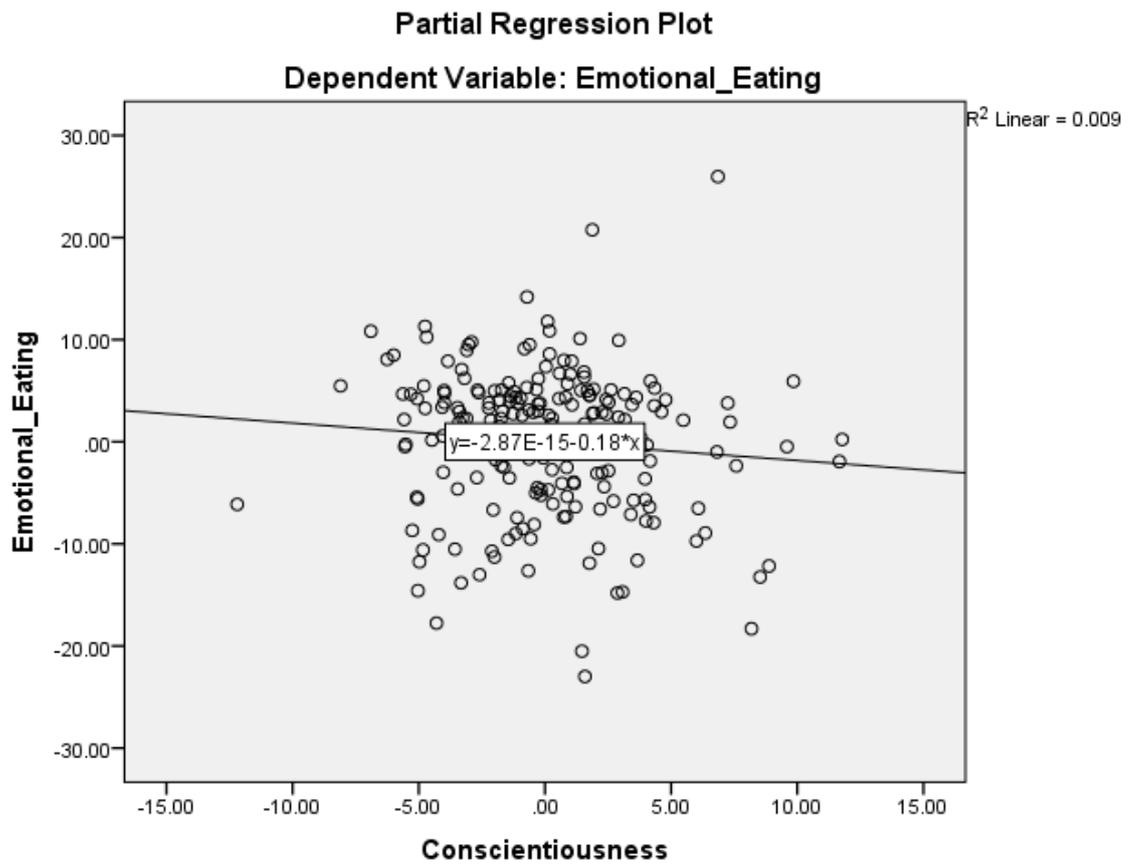


Figure 29. The association between Conscientiousness vs. Lack of Direction and emotional eating

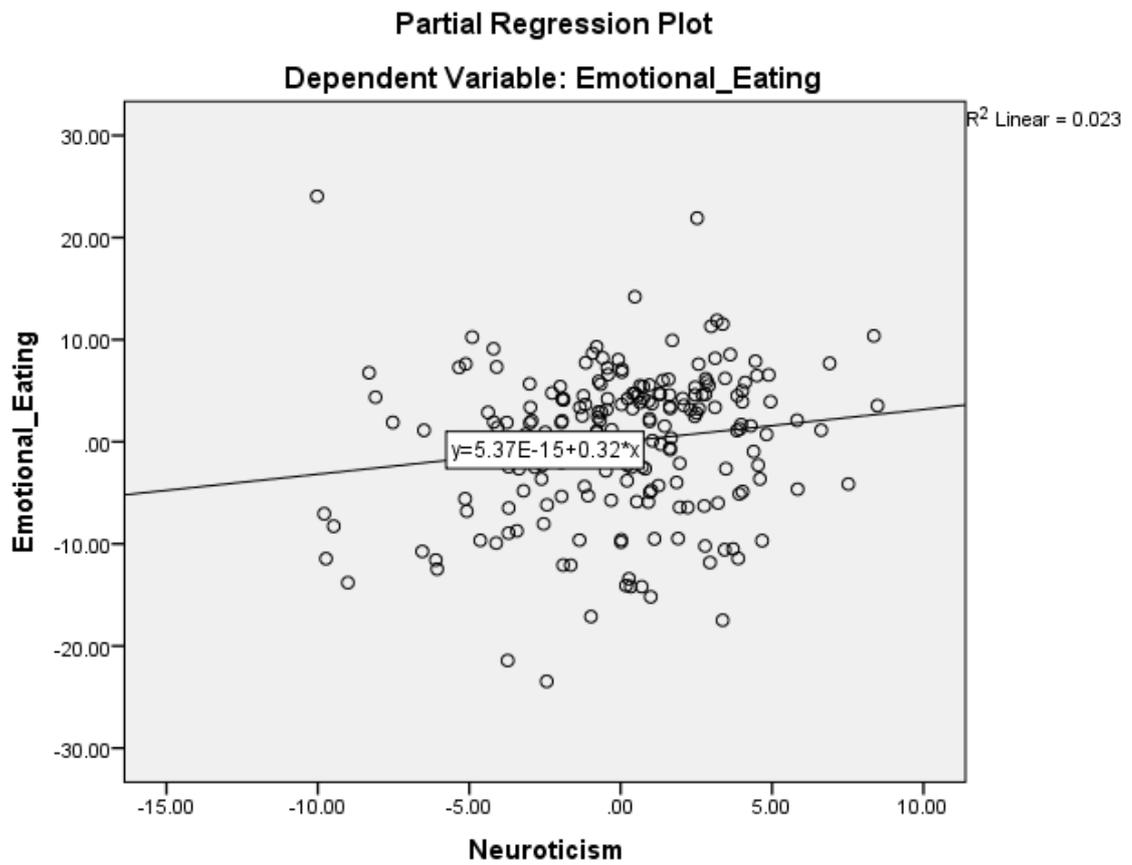


Figure 30. The association between Neuroticism vs. Emotional Stability and emotional eating

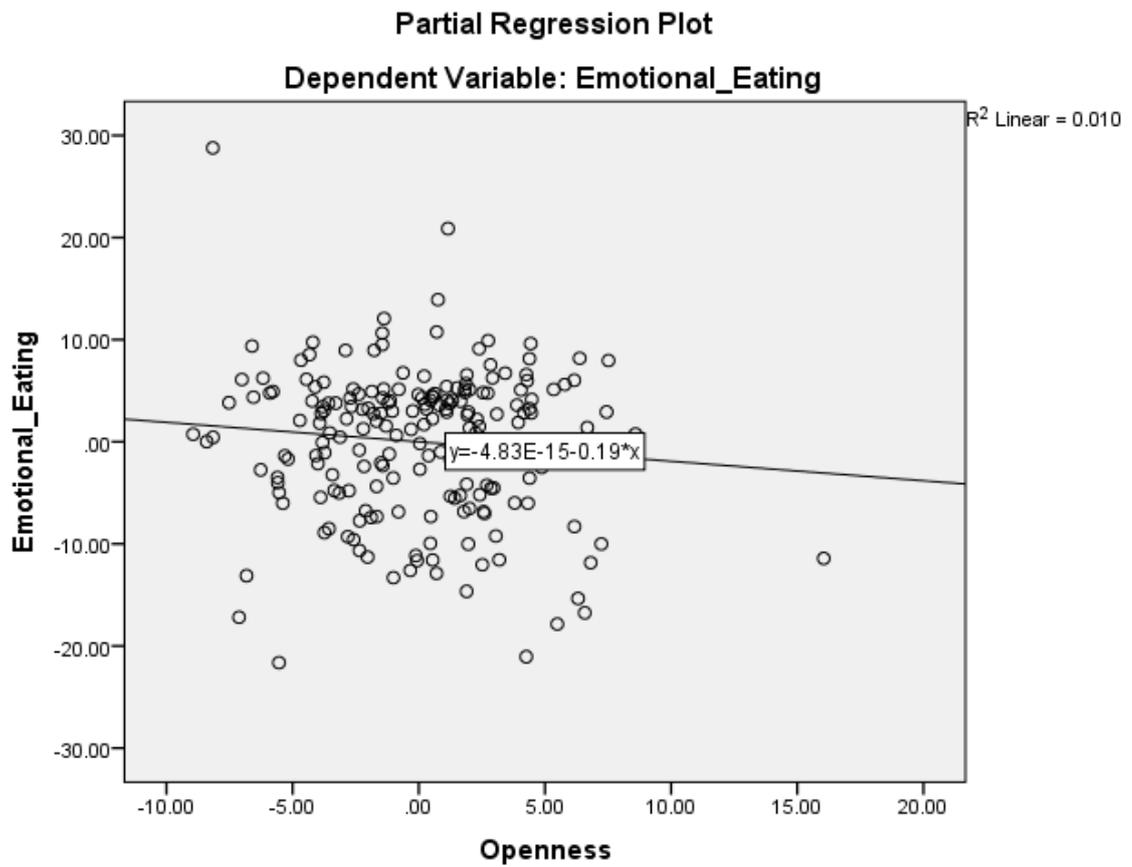


Figure 31. The association between Openness vs. Closedness to Experience and emotional eating

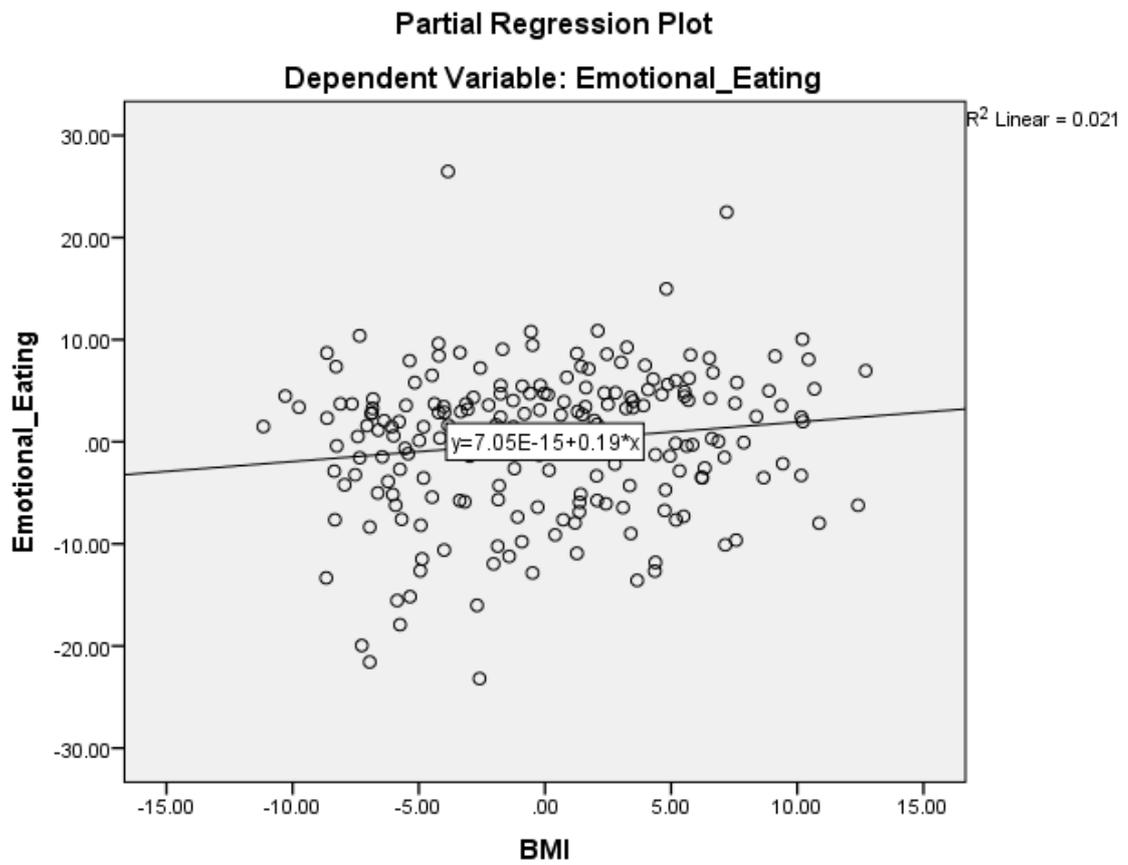


Figure 32. The association between body fat and emotional eating

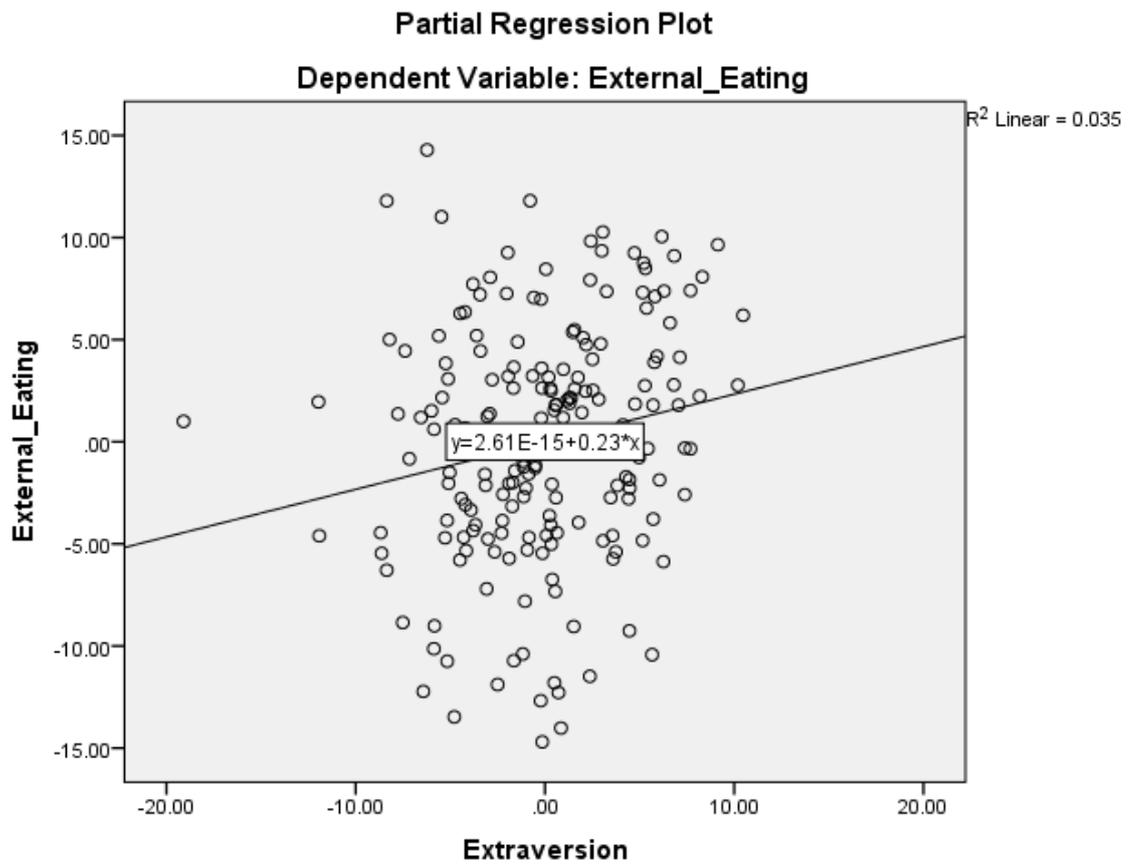


Figure 33. The association between Extraversion vs. Introversion and external eating

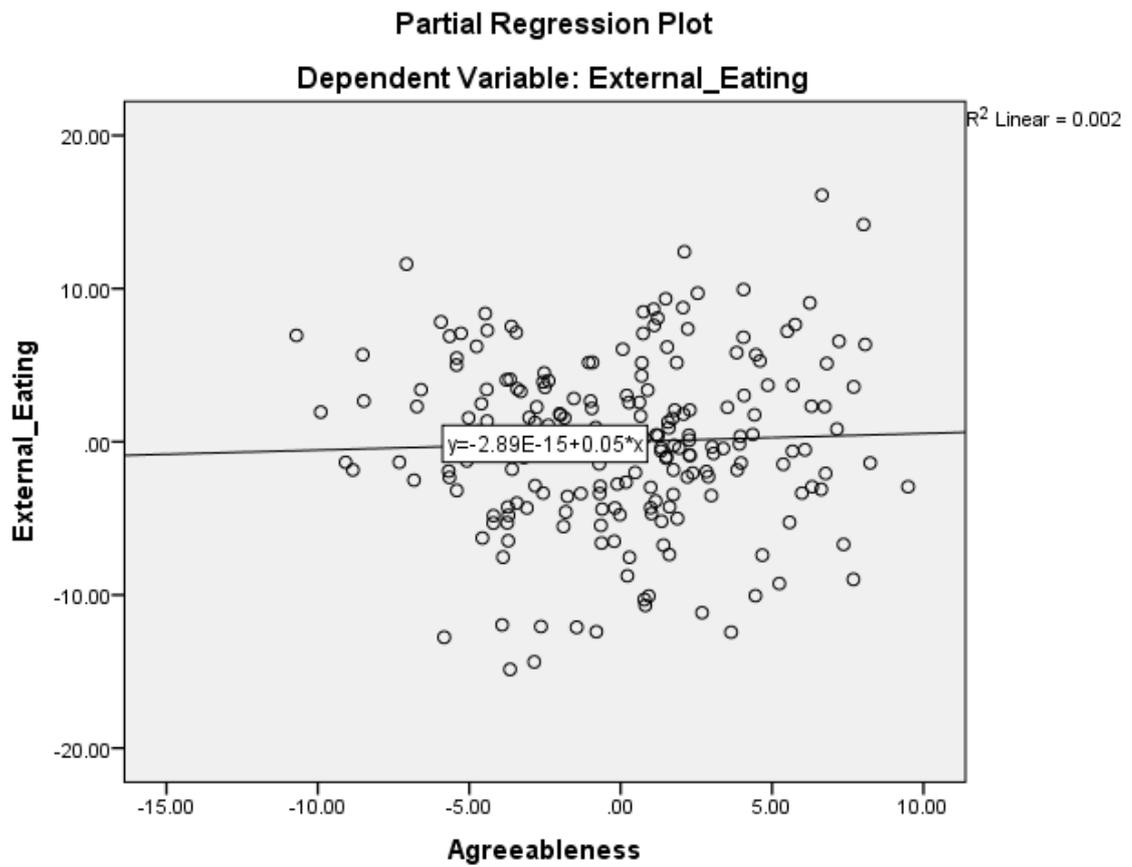


Figure 34. The association between Agreeableness vs. Antagonism and external eating

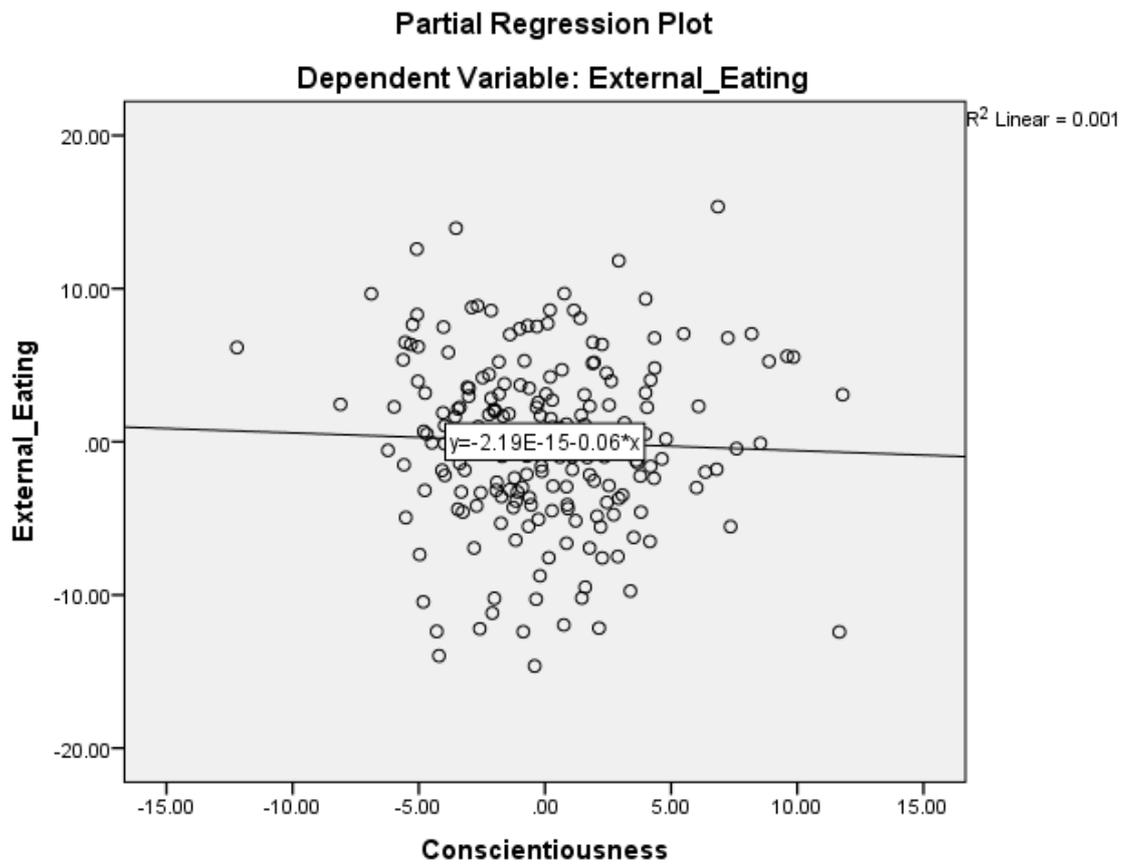


Figure 35. The association between Conscientiousness vs. Lack of Direction and external eating

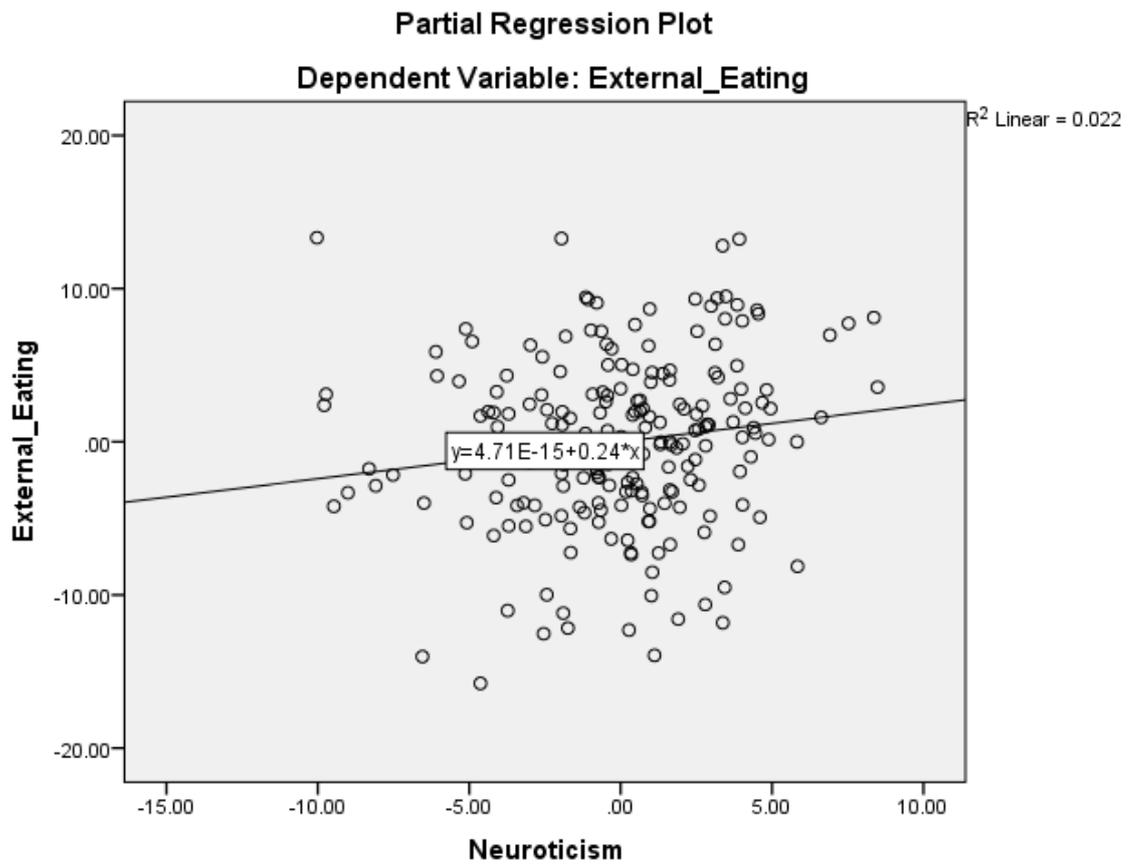


Figure 36. The association between Neuroticism vs. Emotional Stability and external eating

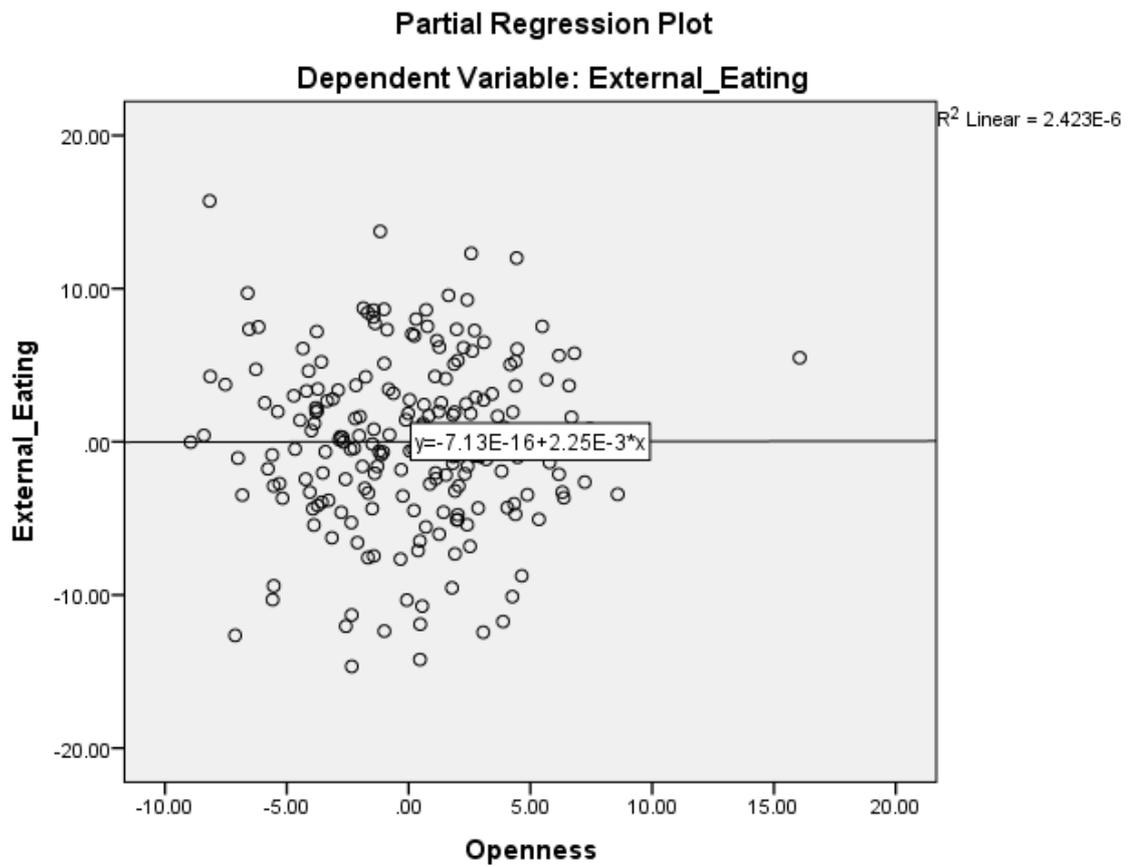


Figure 37. The association between Openness vs. Closedness to Experience and external eating

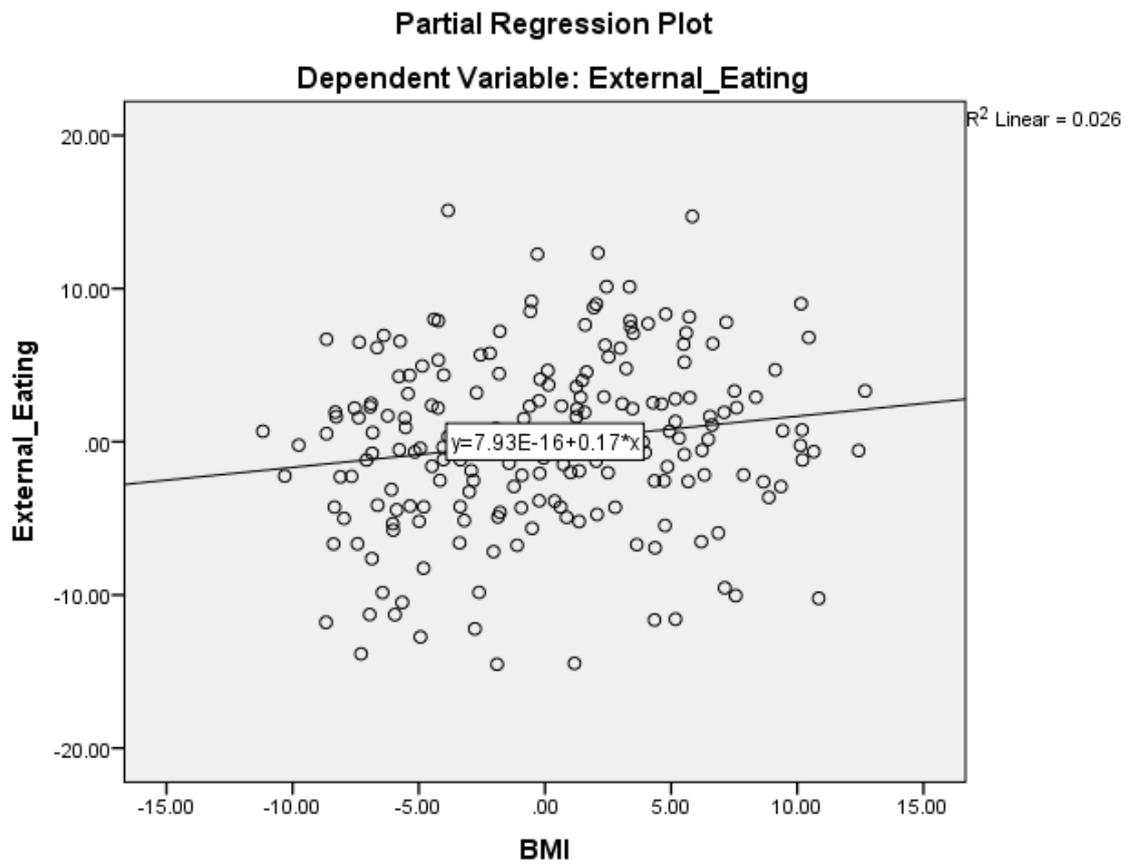


Figure 38. The association between body mass index and external eating

Appendix B

Informed Consent
International Programs/Empire State College Consent Form



Dear Participant,

Thank you for taking part in my Bachelor Thesis. My name is Milena Ferenčíková and I am a student in International Programs at State University of New York's Empire State College. My research project examines the relationship between self-perception and eating. The last section of the questionnaire will ask some information about you. Please be informed that you have the right to withdraw from the project at any time, including withdrawal of any information provided without penalty.

It takes about 10 minutes to complete the questions. The research is anonymous and does not include any information that could identify you. This form signed by you is not submitted with the project. By participating you will help international research on the relationship between possible factors contributing to explanation of eating behavior in university students. If you have any questions, please ask me for clarifications. If you have any questions afterwards, you can contact me via my email: milena_ferencikova003@esc.edu.

I have read and understood the research and want to participate in the study (please circle one)

Yes No

I am 18 years of age or older

Yes No

Signed,

Name _____

Date _____

Appendix C**Questionnaire booklet**

This is a study about self-perception and eating in university students. All information collected is anonymous and will be used for research purposes. There are no right or wrong answers

Please complete the entire survey consisting of three parts. Each part will be explained including examples. Please read the instructions and record your answers on the answer sheet.

Thank you for participating in this research project.

PART I

This part of the study covers how you perceive yourself.

INSTRUCTIONS

Please read carefully each item and answer the following question: To what extent do you agree or disagree with the following statement?

Example

0. I see myself eating pizza

Disagree
strongly

Agree strongly

Disagree
strongly



Agree strongly

To what extent do you agree or disagree with the following statements?

1. I see myself as someone who is talkative
2. I see myself as someone who tends to find fault with others
3. I see myself as someone who does a thorough job
4. I see myself as someone who is depressed, blue
5. I see myself as someone who is original, comes up with new ideas
6. I see myself as someone who is reserved
7. I see myself as someone who is helpful and unselfish with others
8. I see myself as someone who can be somewhat careless
9. I see myself as someone who is relaxed, handles stress well
10. I see myself as someone who is curious about many different things
11. I see myself as someone who is full of energy
12. I see myself as someone who starts quarrels with others
13. I see myself as someone who is a reliable worker
14. I see myself as someone who can be tense
15. I see myself as someone who is ingenious, a deep thinker
16. I see myself as someone who generates a lot of enthusiasm
17. I see myself as someone who has a forgiving nature
18. I see myself as someone who tends to be disorganized
19. I see myself as someone who worries a lot
20. I see myself as someone who has an active imagination
21. I see myself as someone who tends to be quiet
22. I see myself as someone who is generally trusting
23. I see myself as someone who tends to be lazy
24. I see myself as someone who is emotionally stable, not easily upset
25. I see myself as someone who is inventive
26. I see myself as someone who has an assertive personality
27. I see myself as someone who can be cold and aloof
28. I see myself as someone who perseveres until the task is finished
29. I see myself as someone who can be moody
30. I see myself as someone who values artistic, aesthetic experiences
31. I see myself as someone who is sometimes shy, inhibited
32. I see myself as someone who is considerate and kind to almost everyone

Disagree
strongly



Agree strongly

To what extent do you agree or disagree with the following statements?

33. I see myself as someone who does things efficiently
34. I see myself as someone who remains calm in tense situations
35. I see myself as someone who prefers work that is routine
36. I see myself as someone who is outgoing, sociable
37. I see myself as someone who is sometimes rude to others
38. I see myself as someone who makes plans and follows through with them
39. I see myself as someone who gets nervous easily
40. I see myself as someone who likes to reflect, play with ideas
41. I see myself as someone who has few artistic interests
42. I see myself as someone who likes to cooperate with others
43. I see myself as someone who is easily distracted
44. I see myself as someone who is sophisticated in art, music or literature

PART II

This part of the study is about eating.

INSTRUCTIONS

The following questions relate to how you may react around food and what you would do in situations related to food. Please indicate how often you felt or thought a certain way.

Example

0. Do you have the desire to eat pizza when watching TV?

Never

Very often

Never Very often

Please indicate how often you felt or thought a certain way

45. If you have put on weight, do you eat less than you usually do?
46. Do you have the desire to eat when you are irritated?
47. If food tastes good to you, do you eat more than usual?
48. Do you try to eat less at mealtimes than you would like to eat?
49. Do you have a desire to eat when you have nothing to do?
50. If food smells and looks good, do you eat more than usual?
51. How often do you refuse food or drink offered because you are concerned about your weight?
52. Do you have a desire to eat when you are depressed or discouraged?
53. If you see or smell something delicious, do you have a desire to eat it?
54. Do you watch exactly what you eat?
55. Do you have a desire to eat when you are feeling lonely?
56. If you have something delicious to eat, do you eat it straight away?
57. Do you deliberately eat foods that are slimming?
58. Do you have a desire to eat when somebody lets you down?
59. If you walk past the baker do you have the desire to buy something delicious?
60. When you have eaten too much, do you eat less than usual the following days?
61. Do you have a desire to eat when you are cross?
62. If you walk past a snack bar or a café, do you have the desire to buy something delicious?
63. Do you deliberately eat less in order not to become heavier?
64. Do you have a desire to eat when you are approaching something unpleasant to happen?
65. If you see others eating, do you also have the desire to eat?
66. How often do you try not to eat between meals because you are watching your weight?
67. Do you get the desire to eat when you are anxious, worried or tense?
68. Can you resist eating delicious foods?
69. How often in the evening do you try not to eat because you are watching your weight?
70. Do you have a desire to eat when things are going against you or when things have gone wrong?
71. Do you eat more than usual, when you see others eating?
72. Do you take into account your weight with what you eat?
73. Do you have a desire to eat when you are frightened?
74. When preparing a meal are you inclined to eat something?
75. Do you have a desire to eat when you are disappointed?
76. Do you have a desire to eat when you are emotionally upset?
77. Do you have a desire to eat when you are bored or restless?

PART III

This part of the study involves socio-demographic information.

- 78. What is your height? (in cm)
- 79. What is your weight? (in kg)
- 80. What is your gender?
- 81. How old are you?
- 82. Where are you from?

Thank you for participating in this research project.

**The Relationship Between Personality Traits, Worry and
Anxiety in Adults**

Thesis

by Lojain Elsaie

Submitted in Partial Fulfillment
of the Requirements for the Degree of Bachelor of Arts
in
Psychology

State University of New York

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2019

Reader: Ronnie Mather, Ph.D.

Statutory Declaration / Čestné prohlášení

I, Lojain Elsaie, declare that the paper entitled:

The Relationship Between Personality Traits, Worry and Anxiety in Adults

was written by myself independently, using the sources and information listed in the list of references. I am aware that my work will be published in accordance with § 47b of Act No. 111/1998 Coll., On Higher Education Institutions, as amended, and in accordance with the valid publication guidelines for university graduate theses.

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Lojain Elsaie

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Table of Contents

Introduction	7
Literature Review	9
2.1 Anxiety.....	9
2.1.1 Measuring Anxiety, The BAI	11
2.2 Worry.....	12
2.2.1 Measuring Worry, The PSWQ.....	13
2.3 Personality Traits.....	14
2.3.1 Big Five Trait Taxonomy.....	16
2.3.2 Big Five Personality traits.....	18
2.3.3 Measuring Personality Traits, BFI.....	21
3.1 Personality Traits and Anxiety.....	22
3.1.1 Neuroticism.....	23
3.2 Personality Traits and Gender.....	24
3.3 Personality Traits and Worry.....	25
3.4 Current Study.....	26
Methodology	27
4.1 Method.....	27
4.1.1 Participants.....	27
4.1.2 Material	28
4.1.3 Procedure	28
4.1.4 Data Analysis	28
Results	29
5.1.1 Descriptive Statistics.....	29
5.1.2 Testing for Hypothesis.....	37

5.2 Discussion	39
5.3 Conclusion	43
5.3.1 Summary	39
5.3.2 Implications	43
5.3.3 Limitations	44
5.3.4 Suggestions for Future Research	44
References.....	45
Appendix A (QuestionnaireBooklet).....	52
Appendix B (Figures).....	57
Appendix C (Tables).....	62

The Relationship Between Personality Traits, Worry and Anxiety in Adults

Abstract

The aim of this study was to investigate the possible relationship between the Big Five Personality traits and both anxiety and worry in adults. That is, whether there is a correlation between these dimensions of personality and whether variance there might predict anxiety or worry. A significant correlation between the three concepts is expected, with the following main hypothesis that the trait neuroticism would positively correlate with both worry and anxiety. Personality traits were measured by the Big Five Inventory (BFI) with five dimensions Extraversion, Openness to Experience, Agreeableness, Conscientiousness, and Neuroticism. Anxiety was measured by the Beck Anxiety Inventory (BAI) and worry was measured by the Penn State Worry Questionnaire (PSWQ). One hundred and seventeen adults participated in this study, their anxiety scores were measured by the Beck Anxiety Inventory, worry scores were measured by the Penn State Worry Questionnaire and personality traits were measured by the Big Five Inventory. The results showed that neuroticism had the strongest correlation out of all five personality traits with both anxiety and worry.

Keywords: Anxiety, Beck Anxiety Inventory, Big Five Inventory, Big Five Personality Traits, Neuroticism, Penn State Worry Questionnaire, Worry.

Introduction

Anxiety is an expected part of life; people experience anxiety at different points in their lives. One may feel anxious when faced with a problem at work, before taking an exam, or before making an important decision. Oxford Medicine (2007) states that anxiety is more related to being cautious, showing avoidant behavior, and is often associated with muscle tension. Anxiety symptoms are divided into two parts: somatic symptoms and cognitive symptoms. Somatic symptoms of anxiety are physical symptoms such as hyperventilation and a fast heartbeat; whereas, cognitive symptoms are thoughts.

Worry can be understood as the cognitive symptoms associated with anxiety; it is related to many psychological disorders including generalized anxiety disorder and depression. Worry is defined as a chain of thoughts and images which are quite uncontrollable; as well as, worrying is an attempt to engage in mental problem-solving on an issue whose outcome is uncertain, but contains the possibility of one or more negative outcomes (Borkovec, Robinson, Pruzinsky, & DePree, 1983).

Personality is defined as the characteristics that make us who we are, our thoughts, beliefs, feelings and behavior. The Big Five Personality traits consists of five personality traits each of which includes many facets. Facets are subscales to the five main personality traits with each trait having around six facets that describe it. The big five personality traits are: Extraversion (E), Agreeableness (A), Conscientiousness (C), Neuroticism (N), and Openness (O).

This thesis investigates the relationship between personality traits, anxiety and worry in adults. We chose a sample of 117 adults of different age groups and backgrounds and asked them to fill in a questionnaire booklet consisting of the Beck Anxiety

Inventory, the Penn State Worry Questionnaire and the Big Five Inventory. The BAI was developed in order to lower the overlap with depressive symptoms; as a result, it focuses more predominantly on somatic symptoms such as heart rate and hyperventilation. However, the BAI does not assess other important symptoms of anxiety, such as worry, and cognitive aspects of anxiety, and as a result the BAI may provide a limited assessment of anxiety (Julian, 2011). Since the BAI focuses more on somatic symptoms of anxiety, we chose to pair it with the Penn State Worry Questionnaire. The PSWQ focuses on more cognitive aspects of anxiety symptoms such as the generality of worry over time and situations, as well as, the intensity or excessiveness of worry, and lastly, the uncontrollability of worry (Molina, & Borkovec, 1994). Hence, we chose to use both tests to ensure that we measured both somatic and cognitive aspects of anxiety symptoms. Personality traits are measured using the Big Five Inventory because at the time a short version of the test was needed. Their aim was to develop a brief and short inventory that would efficiently assess the big five dimensions when it is not required to differentiate between facets as well (Pervin, & John, 1999).

2 Literature Review

2.1 Anxiety

Experiencing occasional anxiety is a normal part of life. However, people with high anxiety often feel worried and fear intensely and excessively regarding day-to-day situations. Such feelings can often interfere with daily activities, and they are also quite difficult to control. Such symptoms may start during childhood or the adolescent years and continue into adulthood (Anxiety disorders, 2018). Anxiety and fear are closely related, some view anxiety as an emotion that is unique to humans, while fear as common to nonhuman species. Another way in which fear and anxiety are different is that fear is an adaptive response to a realistic threat, while anxiety is a diffuse emotion, which can sometimes be an unreasonable or an excessive reaction to a present or future perceived threat (Defining Anxiety Disorders, 2005). The American Psychological Association defines anxiety as an emotion. An emotion that is defined by feeling tense, having worrisome thoughts as well as, having physical changes. Another definition of anxiety entails that anxiety consists of several mental and physiological phenomena as well as, being in a state of worry over a future unwanted event or fear of a situation (Defining Anxiety Disorders, 2005).

Anxiety symptoms are divided into two parts: somatic symptoms and cognitive symptoms. Anxiety plays the role of being a sign of danger. As a result, a series of related somatic processes take place to prepare the body for an emergency. Such somatic processes are developed earlier in life. Furthermore, they are not less discrete when compared to the cognitive processes of anxiety (Spielberger, 1966). Somatic symptoms make up the part of our evolved fight/flight/freeze response, such as increased blood flow

to bigger muscles, a feeling of numbness in one's limbs as well as goosebumps. Goosebumps are related to making the hair stand on end to make animals look larger and scarier, and thereby discourage predators. Another symptom is sweating which in part makes animals more slippery and cools them off (Boyes, 2012). Furthermore, some somatic symptoms include: trembling, hyperventilating, frequent headaches, and having trouble sleeping (Anxiety disorders, 2018). Other somatic anxiety symptoms include: abdominal pain, chest pain, fatigue, indigestion, restlessness, and dizziness (Gelenburg, 2000).

Cognitive symptoms of anxiety consist of thoughts, people with anxiety often worry that their anxiety will be obvious to others, or that people will judge them as boring, stupid, or unattractive. In reality, this may not be true, but their thinking processes have convinced them otherwise. People often worry about being incapacitated by anxiety or feeling as though they are losing control due to anxiety. They also tend to overestimate the likelihood of negative things happening. They underestimate their ability to cope if something negative actually happens. Anxiety often causes people to lose confidence in themselves (Boyes, 2012). Since people high on anxiety often have frequent intrusive troubling thoughts, they may choose to avoid certain situations out of worry ("Anxiety"). They might also have trouble concentrating or thinking about anything other than the present worry (Anxiety disorders, 2018).

2.1.1 Measuring Anxiety, The BAI

The Beck Anxiety Inventory (BAI) is one of the most commonly used inventories to measure anxiety. It was developed by Beck, Epstein, Brown, and Steer (1988) as a 21 item self-report inventory which measures the severity of anxiety in psychiatric populations. Initially, Beck and colleagues (1988) drew 86 items from three pre-existing scales: The Anxiety Checklist, the Physician's Desk Reference Checklist, and the Situational Anxiety Checklist. They conducted a series of analyses which resulted in the reduction of the items, the result of that was the BAI. Beck and colleagues (1988) ran a series of tests to ensure the validity and reliability of the test. This showed that the BAI had high internal consistency, and test-retest reliability over a week.

As a self-report inventory, respondents select to what extent they have been troubled by each symptom over the past month. The BAI is a brief inventory, which makes it easy to administer, and easily scored, enabling it to measure anxiety. Respondents' responses are rated on a four-point Likert scale which ranges from 0 (not at all) to 3 (severely). Respondents scores are determined by calculating the respondent's sum on all items. Total scores range from 0 to 63, scores are divided into four categories: normal or no anxiety (0-9), mild-to-moderate anxiety (10-18), moderate-to-severe anxiety (19-29); and severe anxiety (30-63) (Julian, 2011). Through their first factor analysis, Beck (1988) discovered that their inventory had two factors: somatic and subjective anxiety and panic. The first factor, somatic included 12 items which describe physiological symptoms, some examples include: "numbness or tingling," "feeling dizzy or lightheaded". The subjective anxiety and panic included the remaining nine items of the BAI, some examples include: "fear of the worst happening" and "unable to relax." (Beck et al., 1988). The BAI was developed in an effort to decrease the overlap with

depressive symptoms; hence, the BAI is inclined towards giving more focus to somatic symptoms (Julian, 2011). Hence, in this study we chose to use the BAI due to its accuracy in measuring somatic symptoms of anxiety, and its high validity and reliability.

2.2 Worry

Worry is a human experience we have all felt at one point or another. When such worrying occurs too often, and becomes harder to control, it can interfere in one's life. Such worry often leads to discomfort and a loss of joy (Borkovec, Ray, & Stöber, 1998). An early definition of worry by Borkovec, Robinson, Pruzinsky, and DePree, (1983) was defined as a series of thoughts and images that are uncontrollable to some extent; as well as, worrying in an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes hence, worry is closely related to fear. Worry is also defined as the continuous depiction of emotional and psychological stressors (Brosschot, Gerin, & Thayer, 2006). Similarly, Hong (2007) discusses that the precise thoughts, as well as the unproductive thoughts that come with worry, are a way of engaging in solving mental problems and seems to be a successful coping mechanism for some during a time of stressful events.

Worry is characterized by the predominance of verbal thought whose function appears to be the cognitive avoidance of threat. Symptoms associated with worry include having verbal thoughts that aim to avoid a threat. When an individual is worried, they often tend to talk to themselves about negative things such as unwanted events that might happen in the future. When worried an individual talks to themselves often about negative things, often about negative events which they are afraid might happen in the future (Borkovec, Ray, & Stöber, 1998). Worry is associated with procrastination as well as, maladaptive relationships that involve patterns of intrusive, overly nurturant behavior.

Procrastination plays the role of delaying punishment for mistakes which could delay worrying, while taking care of others prevents social criticism or rejection as a result, protects the individual (Borkovec, Ray, & Stöber, 1998). The manifestation of worry before or after threatening events decreases the emotional processing of such events which in turn can increase the anxious meaning surrounding the event.

2.2.1 Measuring Worry, The PSWQ

The Penn State Worry Inventory (PSWQ) is the most commonly used measure of anxiety. It was developed by Meyer, Miller, Metzger, and Borkovec in 1990. Originally, the PSWQ was hypothesized to be a unidimensional instrument, as a result, all items were assumed to reflect a general worry factor (Meyer, Miller, Metzger & Borkovec, 1990).

The PSWQ is a self-report questionnaire which consists of sixteen questions that cover different aspects of worry (Crittendon & Hopko, 2006). It was designed to provide a trait assessment of worry, with the sixteen items focused on several important aspects. These include the generality of worry over time and situations, as well as, the intensity or excessiveness of worry, and lastly, the uncontrollability of worry (Molina, & Borkovec, 1994). The items are rated on a five-point Likert scale of 1 ("not at all typical of me") to 5 ("very typical of me"). In all, eleven of the items of PSWQ (item no. 2, 4, 5, 6, 7, 9, 12, 13, 14, 15 and 16) are non-reversed, hence high scores on these items show high levels of worry, while on the other hand, five items are reversed (item no. 1, 3, 8, 10, 11). Hence, high scores on these items show an absence of or denial of worry. Total scores range from 16 to 80 (Meyer et al., 1990).

The PSWQ has been effective in distinguishing between generalized anxiety disorder, control groups, and other anxiety disorders. The Inventory has shown high internal validity as well as test-retest reliability. To ascertain the test-retest reliability of the questionnaire, it was applied to student samples. The test showed a good internal consistency as well as, good test-retest reliability during a period consisting of 8–10 weeks, which, in return, showed moderate to strong correlations with measures of anxiety and depression (Meyer et al., 1990).

2.3 Personality Traits

The American Psychological Association (2017) defines personality as "individual differences in characteristic patterns of thinking, feeling and behaving". There are two aspects to the study of personality firstly, understanding people's individual differences regarding specific personality characteristics. Secondly, understanding the different aspects of a person's personality and how they come together. Allport (1937) believed the ultimate and true dispositions of a mature personality included: the psychology of traits, attitudes, interests, and emotional experience. These dispositions comprise several variables, such as motives, intentions, goals, strategies, and subjective representations (Funder, 2016).

Personality psychologists often focus on the ways in which people differ psychologically, and how these differences could be conceptualized and measured in doing so. A trait can be understood from certain behaviors and based on that understanding other behavior and phenomena can be predicted (Cicchetti, & Grove, 1987). Traits show the degree to which a person desires a goal over another or believes

that the world is changeable and not fixed, or is generally happy, or is optimistic rather than pessimistic, or is sexually attracted to members of the same or the opposite sex. Such variables are quite stable attributes of one's psychological makes up (Funder, 2016).

The trait approach starts with common sense and non-scientific words, and a researcher's work aims to base the scientific measurement of individual differences on known concepts for instance: sociability, reliability, dominance, nervousness, and cheerfulness (Funder, 2016). This approach assumes the behavior is determined by relatively stable traits which are the central units of a person's personality. As a result, one has the disposition to behave in a certain way, regardless of the situation. That is, traits should remain consistent across situations, and over time, but may vary between individuals. It is assumed that individuals' traits differ because of genetic differences (McLeod, 2017).

Other theories of personality include Eysenck's personality theory which was based on biological factors. He argued that individuals inherit a type of nervous system that affects their ability to learn and adapt to the environment. Allport, on the other hand, highlighted the difference between individuals and the internal cognitive and motivational processes that influence behavior such as intelligence, temperament, habits, skills, attitudes, and traits (McLeod, 2017).

2.3.1 Big Five Trait Taxonomy

The five-factor model has gone through many changes and replications from Cattell to Norman, followed by Borgatta and then Goldberg's work. The model was later described as the Big Five model, not as a result of their eminent greatness, but as an emphasis that each factor is very broad. Furthermore, such a structure does not state that personality is divided into five dimensions rather, the five dimensions represent personality broadly, and each dimension summarizes more distinct and specific personality traits (Pervin, & John, 1999). The Big Five personality dimensions do not represent a particular theoretical perspective. Rather, they were obtained as a result of the analysis of the natural-language terms people use to describe themselves and others. Instead of replacing all previous systems, the Big Five taxonomy served as an integrative structure, because it could represent the various and diverse systems of personality description in a common framework (John, & Srivastava, 1999). The big five model represents the five personality traits hierarchically, in which the narrow and even narrower traits represent the lower levels. The model is thought to be universal across cultures (Paunonen, & Ashton, 2001).

Goldberg (1990) constructed an inventory of 1,710 trait adjectives that participants could use to rate their own personality. Initially, there was some sense of confusion. For example, in different studies the first factor appeared as confident self-expression, surgency, assertiveness, social extraversion, and power. Agreeableness was labeled social adaptability, likability, friendly compliance, agreeableness, and love. The Conscientiousness factor has appeared under the names: dependability, task interest, will to achieve, impulse control, and work. Neuroticism versus Emotional Stability has also been called emotionality, ego strength (anxiety), dominant- assured, satisfaction, and

effect. Finally, Openness has also been labeled as inquiring intellect, culture, intelligence, intellect, and intellectual interests. Hence, John and Srivastava (1999) suggested using the mnemonic OCEAN, which induce multiple associations that represents more fully than a single word, the broad range of meaning captured by each factor. The first factor is Extraversion, Energy, Enthusiasm (E), the second factor is Agreeableness, Altruism, Affection (A), the third is Conscientiousness, Control, Constraint (C), the fourth factor is Neuroticism, Negative Affectivity, Nervousness (N) and lastly, the fifth factor is Openness, Originality, Open-mindedness (O).

One of the strengths of the Big Five taxonomy is that it represents a wide range of ideas as well as common aspects between most of the existing systems of personality traits. As a result, it provides an integrative descriptive model for research. Such dimensions may not highlight the diversity of present personality concepts. However, they do represent important connections with past findings. For example, many theorists had included a dimension similar to Extraversion, the labels and definitions may have varied, but the importance of the dimension did not. (John, & Srivastava, 1999).

2.3.2 Big Five Personality Traits

The five factors are not necessarily traits in and of themselves, they are however factors in which many related traits and characteristics fit. Such characteristics and traits within are known as facets, facets are unique aspects to each trait (Ackerman, 2017). A study by Paunonen and Ashton (2001) compared the big five factors with the facets of personality that relate to the factors and found that the broad factors and the narrow facets predicted criterion; however, the narrow facets were better at prediction.

Extroversion is a factor that conveys two ends of a spectrum: extraversion and introversion. Generally speaking, extroverts draw energy from interacting with others, whereas, introverts get tired from interacting with others and replenish their energy from solitude (Ackerman, 2017). People high on extraversion are known to be warm, assertiveness, active, seek excitement, and show positive emotions. For instance, they are more likely to make moral judgments that hold people responsible for the consequences of their actions, even if they were unintentional. Extroverts achieve higher status than introverts, they are also often rated as more popular and more physically attractive than introverts. They also tend to be happier; this is partly because extraverts are more sociable, and their social activity makes them happy. Extroverts are more likely to spend their money on experiences rather than on material things (Funder, 2016). People low on extroversion are more likely to be quiet, introspective, reserved, and thoughtful (Ackerman, 2017).

Neuroticism is viewed as a trait which relates to confidence as well as emotional stability. People high on neuroticism are known to be anxious, hostile, depressed, self-consciousness impulsiveness and vulnerable to stress. They often do not deal with their problems effectively and react more negatively to stressful events. They are very sensitive to social threats, such as signs that other people do not accept or support them. Several questionnaires assess happiness, well-being, and physical health correlate negatively with neuroticism, which is often referred to as negative emotionality. The higher the level of neuroticism, the more likely people are to report being unhappy, anxious, and even physically sick. (Funder, 2016). On the other hand, individuals who score low on neuroticism are more likely to feel confident, sure of themselves, and adventurous (Ackerman, 2017).

Agreeableness has to do with how well people get along with others, it concerns an individual's orientation to others (Ackerman, 2017). People high on agreeableness are known to be trustworthy, straightforward, altruistic, compliant, modest, and tender minded. Agreeable people rate other people more positively than disagreeable people do, they say nice things more often than mean things, they smoke less, though the reason for that is unknown (Funder, 2016). Whereas, people who score low on agreeableness are less likely to be trusted and liked by others. They are often blunt, rude, ill-tempered, antagonistic, and sarcastic. However, not all people who are low on agreeableness are cruel, but often do not leave others with warm feelings (Ackerman, 2017).

Conscientiousness is a trait that can be described as the tendency to control impulses and act in a socially acceptable manner and behave in a way that facilitates goal-

directed behavior (John, & Srivastava, 1999). People high on conscientiousness are known to be competent, orderly, dutiful, strive for achievement, self-disciplined and deliberate. Highly conscientious people are prone to feel guilty when they do not live up to expectations and are likely to suffer if they become unemployed. Conscientiousness has a wide range of implications beyond job performance; they also live longer, and not just because they are driven, they are also less likely to smoke, overeat, or use alcohol to excess. They also avoid violence, risky sex, and drug abuse (Funder, 2016). On the other hand, an individual who is low on conscientiousness is much more likely to procrastinate, to be flighty, impetuous, and impulsive (Ackerman, 2017).

Openness to experience has been described as the depth and complexity of an individual's mental life and experiences (John, & Srivastava, 1999). Openness to experience concerns an individual's willingness to try new things, to be vulnerable, as well as, being innovative and coming up with new ideas. People high on Openness are described as imaginative, intelligent, original, curious, artistic, inventive, and witty, they are also unlikely to be viewed as simple, shallow, or unintelligent. They are more likely to have artistic interests and being politically liberal, and admit to sometimes having an overactive imagination (Funder, 2016). An individual who is low in openness to experience probably prefers routine over variety, sticks to what they know and prefers fewer abstract arts and entertainment (Ackerman, 2017).

2.3.3 Measuring Personality Traits, BFI

John, Donahue and Kentle (1991) developed the Big Five Inventory. Their aim was to develop a brief inventory that would efficiently assess the big five dimensions when it is not required to differentiate between facets as well (Pervin, & John, 1999). The BFI uses short phrases based on the trait adjectives, due to the fact that using the adjectives alone leads to less consistent answers. The Big Five Inventory consists of 44 item which assesses the Big Five personality domains and is freely available for use in research. It has been proven to have shown high reliability, clear factor structure, strong convergence with longer Big Five measures, and substantial self-peer agreement (Soto & John, 2009).

The inventory measures each subscale using eight to ten questions per subscale. For instance, for extraversion some of the questions include: “Is talkative”, “Is full of energy” and “Has an assertive personality”. For agreeableness some questions include: “Is helpful and unselfish with others”, “Has a forgiving nature” and “Is considerate and kind to almost everyone”. For conscientiousness some of the questions include: “Does a thorough job”, “Is a reliable worker” and “Perseveres until the task is finished”. For neuroticism some of the questions include: “Is depressed, blue”, “Can be tense” and “Worries a lot”. Lastly, openness, some of the questions for openness include: “Is original, comes up with new ideas”, “Is curious about many different things” and “Is ingenious, a deep thinker”.

3.1 Personality Traits and Anxiety

Several studies have examined the relationship between anxiety and personality traits. They have found that agreeableness and openness do not influence anxiety. Watson, Gamez, & Simms (2005) found that Openness was unrelated to mood disorders, anxiety disorders, and substance disorder. Kaplan, Levinson, Rodebaugh, Menatti, & Weeks (2015) looked into the relationship between openness and social anxiety and suggested that increased openness may protect against the higher level of social anxiety which results from low trust. A third study conducted by Karsten, Penninx, Hariëtte, Ormela, Nolena, and Hartmana (2012), aimed to determine whether there was a relationship between anxiety disorders and the big five personality traits. Their findings showed that agreeableness and openness are not influenced by anxiety.

Bienvenu, Samuels, Costa, Reti, Eaton, & Nestadt, 2004) showed that individuals high on anxiety were low on the extraversion facet, scoring particularly low on warmth and positive emotions. Another study found that there was a negative correlation between extraversion and anxiety meaning that when extraversion increases anxiety decreases and vice versa (Jylhä, & Isometsä, 2006). On the other hand, another study conducted by Watson, Gamez, & Simms (2005) they found that extraversion had significant yet modest correlations with both mood disorders and anxiety disorders. A meta-analysis of 175 studies on personality disorder traits in the Big Five in adults with anxiety disorders found that adults with anxiety had higher scores on neuroticism, and lower scores on conscientiousness. Their findings showed a strong correlation between mental disorders and personality traits, the strongest correlation was neuroticism (Kotov, Gamez, Schmidt, & Watson, 2010).

3.1.1 Neuroticism

Many studies have been conducted to determine the link between neuroticism and anxiety, as well as many theories explaining such a link. There are five theories that have tried to explain the link between neuroticism and common mental disorders. The first theory is the vulnerability model, it suggests that neuroticism leads to common mental disorder, for instance, high neuroticism causes the development of common mental disorders directly, or it enhances the impact of risk factors such as stressful life events. The second theory is the spectrum model, it suggests that neuroticism and common mental disorders are different manifestations of the same processes, in which high neuroticism scores are equivalent to symptoms of common mental disorders. The third theory is the common cause model, it suggests that neuroticism can predict common mental disorders because both share genetics and environmental factors. The fourth theory is the scar model, which suggests that neuroticism is shaped by common mental disorders, meaning having a major common mental disorder episode has effects on neuroticism. Lastly, the state model suggests that neuroticism is shaped by common mental disorders and that their effects are temporary and disappear after the episode has remitted (Ormel, Jeronimus, Kotov, Riese, Bos, Hankin, Oldehinkel, 2013).

Several studies have found that neuroticism had the strongest correlation with psychopathology having the strongest significant correlation to both mood and anxiety disorders (Watson, Gamez, & Simms, 2005). Griffith, Zinbarg, Craske, Mineka, Rose, Waters, and Sutton (2009) found a link between neuroticism, mood and anxiety disorders. Neuroticism is viewed as a trait that makes an individual more vulnerable when it comes to internalizing disorders. Neuroticism is also known as negative affectivity; it appears to

make one vulnerable to developing anxiety and depression. Neuroticism is a stable, heritable, and highly general trait dimension with a multiplicity of aspects ranging from mood to behavior. Hence, it comes as no surprise that scoring high on neuroticism is related to psychopathology, which includes both anxiety and depression (Clark, Watson, & Mineka, 1994).

3.2 Personality Traits and Gender

A study done by Soto, John, Gosling, & Potter (2011) aimed to determine if there were differences in the Big Five personality traits among different age groups. They tested 10 more specific traits within the Big Five personality traits in a large group of children, adolescents, and adults. They found that conscientiousness was very different among different age groups, conscientiousness decreased between late childhood to adolescence however, it showed an increase from adolescence to adulthood through middle age. Agreeableness was similar to Conscientiousness however, less pronounced. Gender differences between males and females were quite different through late childhood, adolescence, and adulthood. Females were higher in anxiety and Neuroticism during adolescence, and lowered during early adulthood and middle age. Females were more susceptible to anxiety as well as other negative emotion. On the other hand, males were lower from late childhood through middle age. These gender differences decreased starting in early adulthood and middle age. Openness to ideas, as well as overall Openness, decreased in late childhood into early adolescence and decreased further across adolescence for females. Openness to ideas, and Openness, increased in both males and females in adulthood.

3.3 Personality Traits and Worry

A study done in China was conducted to examine the relationship between worry and personality traits, the researchers had 1,135 Chinese college undergraduates who completed the Chinese versions of the Penn State Worry Questionnaire, the Intolerance of Uncertainty Scale, and the Revised Eysenck Personality Questionnaire-Short Scale for Chinese. The results of their study showed that neuroticism and extraversion were significantly correlated with worry (Yang, Wang, Chen, & Ding, 2015). Another study was done in Germany which aimed to determine if there was a correlation between personality trait, and worry. One of their findings was that neurotics tend to worry more. However, they worry more regarding aspects that refer to them personally but not about general, society-related aspects (Rammstedt, 2007). Muris, Roelofs, Rassin, Franken and Mayer (2005) conducted a study in which they examined the relations between neuroticism, rumination, and worry. The results of their study showed that there were significant correlations between neuroticism, rumination, and worry. Furthermore, they found that neuroticism was associated with the cognitive factors of worry and rumination, which in turn were related to anxiety and depression.

3.4 Current Study

The current study aims to determine if there is a relationship between worry and anxiety and the Big Five Personality Traits in adults. Furthermore, this study aimed to answer the research question: Can personality traits determine anxiety levels? Can personality traits determine worry levels? And can women's anxiety levels be determined by their neuroticism levels? To answer these questions, the following seven hypotheses were proposed:

Ha1: High Extraversion not will relate to high anxiety

H01: High Extraversion will relate to high anxiety

Ha2: High Neuroticism will relate to high anxiety

H02: High Neuroticism will not relate to high anxiety

Ha3: Women's Neuroticism level will relate to high anxiety

H03: Women's Neuroticism level will not relate to high anxiety

Ha4: Low Conscientiousness will relate to high anxiety

H04: Low Conscientiousness will not relate to high anxiety

Ha5: Openness and Agreeableness scores will not relate to anxiety or worry

H05: Openness and Agreeableness scores will t relate to anxiety or worry

Ha6: High Extraversion will relate to high worry

H06: High Extraversion will not relate to high worry

Ha7: High Neuroticism will relate to high worry

H07: High Neuroticism will not relate to high worry

4.1 Methods

4.1.1 Participants

This study is a quantitative non-experimental research study that investigated the possible correlation between personality traits, worry and anxiety. In trying to establish the relationship between these three constructs, the independent variables were the Big Five personality traits, the dependent variables were worry and anxiety. These constructs were measured in the form of three questionnaires that the participants were asked to fill out. Participants were also asked to provide the researcher with age, gender and nationality on a separate sheet following the questionnaires. All participants were informed by the researcher of the purpose of the study. An informed consent form was distributed and collected, before the questionnaires were given. This had 117 participants overall and the age ranged from 18 to 42 and above, most participants were females. Participants were selected via convenient sampling, the survey was conducted online and was sent to students via the university social media page as well as personally, using Facebook. From 120 participants initially, 3 participants were excluded due to incomplete answers which would have skewed the data further in an unwanted direction.

4.1.2 Material

The data collected was via three questionnaires. The Penn State Worry Questionnaire (1990); the items on the scale assess the occurrence, intrusiveness, pervasiveness, and other characterizing features of an individual's experience with worry (Mayer, Miller, Metzger, & Borkovec, 1990). The Beck Anxiety Inventory measures

somatic symptoms of anxiety it was developed in order to differentiate between anxiety and depression (Julian, 2011). The Big Five Inventory is a 44-item inventory that measures an individual on the Big Five Factors of personality which is based on a hierarchical model of personality traits that consists of five broad factors (Gosling, Rentfrow, & Swann, 2003). Participants were asked to fill in the booklet consisting of all three questionnaires as well as a demographics section. The aforementioned tests will be included in the appendix.

4.1.3 Procedure

To acquire the information an informed consent form was distributed to the participants which made sure to inform them of the benefits, risks, and the motives of the study and to give them the related information about their rights to withdraw from the study. The instructor monitored this procedure to ensure that no ethical problems arose.

4.1.4 Data Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences program (SPSS) examining descriptive statistics and inferential statistics to see the characteristics of the sample population. The relationship between anxiety and worry and personality traits were examined through a correlation and a multiple regression procedure. In the multiple regression procedure, the dependent variables were worry and anxiety and the separate personality traits as the independent variables.

5.1 Results

5.1.1 Descriptive Statistics

A sample of one hundred and seventeen subjects voluntarily participated in our study ($N=117$). Of these participants 25.64% were males and 74.36% were females (see Figure 1). There were four age ranges, the most frequent age range was 18-25 with a total of 86 participants, followed by 42 and above with a total of 15 participants, followed by 26-33 with a total of 10 participants and the least amount of participants were between the ages of 34-41 with a total of 6 participants (see Table 1). The participants' mean anxiety score was 19.13, their median score was slightly lower ($Mdn= 17.00$). The score range was 48 on the Beck Anxiety Inventory. The standard deviation of the scores was ($SD=11.981$). The participants' mean worry score was 52.52, their median score was slightly lower ($Mdn= 51.00$). The score range was 56 on the Penn State Worry Questionnaire. The standard deviation of the scores was ($SD=12.461$). The participants' mean extraversion score was 22.56, their median score was slightly lower ($Mdn= 22.00$). The score range was 24. The standard deviation of the scores was ($SD=5.342$). The participants' mean agreeableness score was 29.85, their median score was slightly higher ($Mdn= 30.00$). The score range was 24. The standard deviation of the scores was ($SD=4.387$). The participants' mean conscientiousness score was 30.64, their median score was slightly higher ($Mdn= 31.00$). The score range was 29. The standard deviation of the scores was ($SD= 6.044$). The participants' mean neuroticism score was 25.44, their median score was slightly lower ($Mdn=25.00$). The score range was 27. The standard deviation of the scores was ($SD=6.842$). The participants' mean openness score was

33.55, their median score was slightly higher ($Mdn=34.00$). The score range was 25. The standard deviation of the scores was ($SD=4.975$) (see Table 2).

To determine if there was a relationship between extraversion and anxiety a correlation was conducted. The scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$), however, anxiety scores were not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 3). Hence Spearman's rho correlation was used to determine the relationship between extraversion and anxiety. Extraversion was inversely insignificantly correlated to anxiety $r_s(115) = -.125, p = .178$ (see Table 4).

Table 4
Correlation between Extraversion and Total Anxiety

		Extraversion	Total Anxiety
Spearman's rho	Extraversion	Correlation	1.000
		Coefficient	-.125
		Sig. (2-tailed)	.
		N	117
	Total Anxiety	Correlation	-.125
		Coefficient	1.000
		Sig. (2-tailed)	.178
		N	117

To determine if there was a relationship between extraversion and worry a correlation was conducted. Extraversion and worry scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 3). Hence the Pearson correlation was used to determine the relationship between extraversion and worry. Extraversion was inversely statistically significantly correlated to worry $r_s(115) = -.256, p = .005$ (see Table 5).

Table 5
Correlations between Extraversion and Total Worry

		Extraversion	Total Worry
Extraversion	Pearson Correlation	1	-.244**
	Sig. (2-tailed)		.008
	N	117	117
Total Worry	Pearson Correlation		1
	Sig. (2-tailed)	.008	
	N	117	117

** . Correlation is significant at the 0.01 level (2-tailed).

To determine if there was a relationship between neuroticism and anxiety a correlation was conducted. The scores were not normally distributed, as assessed by Shapiro-Wilk's test ($p < .05$) anxiety scores were also not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 3). Hence Spearman's rho correlation was used to determine the relationship between neuroticism and anxiety. Neuroticism was directly significantly correlated to anxiety $rs(115) = .678, p = .000$ (see Table 6).

Table 6
Correlations between Neuroticism and Total Anxiety

		Total Anxiety	Neuroticism
Spearman's rho	Total Anxiety	Correlation Coefficient	1.000
		Sig. (2-tailed)	.678**
		N	.000
Neuroticism		Correlation Coefficient	1.000
		Sig. (2-tailed)	.000
		N	.000

** . Correlation is significant at the 0.01 level (2-tailed).

To determine if there was a relationship between neuroticism and worry a correlation was conducted. Neuroticism scores were not normally distributed, as assessed by Shapiro-Wilk's test ($p < .05$). Worry scores were normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 3). Hence Spearman's rho correlation was used to determine the relationship between neuroticism and worry. Neuroticism was directly significantly correlated to worry $r_s(115) = .767, p = .000$ (see Table 7).

Table 7
Correlations between Neuroticism and Total Worry

		Total Worry	Neuroticism
Spearman's rho	Total Worry	Correlation Coefficient	1.000
		Sig. (2-tailed)	.000
		N	117
	Neuroticism	Correlation Coefficient	.767**
		Sig. (2-tailed)	.000
		N	117

** . Correlation is significant at the 0.01 level (2-tailed).

To determine if there was a relationship between conscientiousness, and anxiety a correlation was conducted. For conscientiousness, scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) however, anxiety scores were also not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 3). Hence Spearman's rho correlation was used to determine the relationship between conscientiousness and anxiety. Conscientiousness was inversely significantly correlated to anxiety $r_s(115) = -.284, p = .002$ (see Table 8).

Table 8
Correlations between Conscientiousness and Total Anxiety

		Conscientiousness	Total Anxiety
Spearman's rho	Conscientiousness	Correlation	1.000
		Coefficient	
	Sig. (2-tailed)	.	.002
	N	117	117
Total Anxiety	Total Anxiety	Correlation	1.000
		Coefficient	
	Sig. (2-tailed)	.002	.
	N	117	117

** . Correlation is significant at the 0.01 level (2-tailed).

To determine if there was a relationship between agreeableness and anxiety a correlation was conducted. Agreeableness, scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) however, anxiety scores were also not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 3). Hence Spearman's rho correlation was used to determine the relationship between agreeableness and anxiety. Agreeableness was directly insignificantly correlated to anxiety $r_s(115) = .023, p = .806$ (see Table 9).

Table 9

Correlations between Agreeableness and Total Anxiety

		Total Anxiety	Agreeableness
Spearman's rho	Total Anxiety	1.000	.023
	Correlation Coefficient		
	Sig. (2-tailed)	.	.806
	N	117	117
Agreeableness	Agreeableness	.023	1.000
	Correlation Coefficient		
	Sig. (2-tailed)	.806	.
	N	117	117

To determine if there was a relationship between agreeableness and worry a correlation was conducted. Agreeableness scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) worry was also normally distributed as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 3). Hence Pearson correlation was used to determine the relationship between agreeableness and worry. Agreeableness was directly insignificantly correlated to anxiety $r_s(115) = .083$, $p = .373$ (see Table 10).

Table 10

Correlations between Agreeableness and Total Worry

		Total Worry	Agreeableness
Total Worry	Pearson Correlation	1	.083
	Sig. (2-tailed)		.373
	N	117	117
Agreeableness	Pearson Correlation	.083	1
	Sig. (2-tailed)	.373	
	N	117	117

To determine if there was a relationship between openness and anxiety a correlation was conducted. Openness, scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) however, anxiety scores were also not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 3). Hence Spearman's rho correlation was used to determine the relationship between openness and anxiety. Openness was directly insignificantly correlated to anxiety $r_s(115) = .044$, $p = .635$ (see Table 11).

Table 11
Correlations between Openness and Total Anxiety

			Openness	Total Anxiety
Spearman's rho	Openness	Correlation Coefficient	1.000	.044
		Sig. (2-tailed)	.	.635
		N	117	117
		<hr/>		
	Total Anxiety	Correlation Coefficient	.044	1.000
		Sig. (2-tailed)	.635	.
		N	117	117
		<hr/>		

To determine if there was a relationship between openness and worry a correlation was conducted. Openness and worry scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$) (see Table 3). Hence the Pearson correlation was used to determine the relationship between openness and worry. Openness was inversely statistically significantly correlated to anxiety $r_s(115) = -.004$, $p = .963$ (see Table 12).

Table 12

Correlations between Openness and Total Worry

		Total Worry	Openness
Total Worry	Pearson Correlation	1	-.004
	Sig. (2-tailed)		.963
	N	117	117
Openness	Pearson Correlation	-.004	1
	Sig. (2-tailed)	.963	
	N	117	117

To determine if female's neuroticism levels determined their anxiety levels a correlation was conducted. There were 87 women in this study (see Table 13). Neuroticism scores were not normally distributed, as assessed by Shapiro-Wilk's test ($p < .05$). Anxiety scores were also not normally distributed as assessed by Shapiro-Wilk's test ($p < .05$) (see Table 14). Hence Spearman's rho correlation was used to determine the relationship between neuroticism and anxiety. Neuroticism was directly significantly correlated to anxiety $r_s(115) = .692, p = .000$ (see Table 15).

Table 15

Correlations for Anxiety

		Neuroticism	Total Anxiety
Spearman's rho	Neuroticism	Correlation	1.000
		Coefficient	.692**
		Sig. (2-tailed)	.000
		N	87
	Total Anxiety	Correlation	1.000
		Coefficient	.000
		Sig. (2-tailed)	.000
		N	87

** . Correlation is significant at the 0.01 level (2-tailed).

5.1.2 Test of Hypotheses

The purpose of this study was to examine the possible relationship between anxiety and worry and personality traits as the research question. Multiple regression was run to predict the relationship between anxiety and worry and the five personality traits: extraversion, agreeableness, openness to experience, conscientiousness, and neuroticism.

To determine if any of the Big Five personality traits predicted anxiety a multiple regression was conducted. The assumption of independence of error was not violated according to the Durbin-Watson statistic (1.863) (see Table 16). The tolerance value was greater than 0.1, hence there was no multicollinearity. Neuroticism was statistically significant ($p = .000$) while extraversion, agreeableness, conscientiousness, and openness were insignificant ($p > .005$) (see Table 17). The prediction for all variables was statistically significant $F(5, 111) = 22.953$, $p = .000$ (see Table 18) these variables accounted for 50% (see Table 16). There was a linear relationship between the predictor variables and the residuals (see Figure 2). The residuals were approximately normally distributed (see Figure 3).

Table 18
ANOVA for Anxiety

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8464.298	5	1692.860	22.953	.000 ^a
	Residual	8186.778	111	73.755		
	Total	16651.077	116			

a. Predictors: (Constant), Openness, Extraversion, Conscientiousness, Agreeableness, Neuroticism

b. Dependent Variable: Total Anxiety

To determine if any of the Big Five personality traits predicted worry a multiple regression was conducted. The assumption of independence of error was not violated according to the Durbin-Watson statistic (1.997) (see Table 19). The tolerance value was greater than 0.1, hence there was no multicollinearity. Neuroticism and agreeableness were statistically significant ($p=.000$) while extraversion, agreeableness, conscientiousness, and openness were insignificant ($p>.005$) (see Table 20). The prediction for all variables was statistically significant $F(5, 111) = 31.528, p=.000$ (see Table 21 these variables accounted for 58% (see Table 19). There was a linear relationship between the predictor variables and the residuals (see Figure 4). The residuals were approximately normally distributed (see Figure 5).

Table 21
ANOVA for Worry

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10570.271	5	2114.054	31.528	.000 ^a
	Residual	7442.925	111	67.053		
	Total	18013.197	116			

a. Predictors: (Constant), Openness, Extraversion, Conscientiousness, Agreeableness, Neuroticism

b. Dependent Variable: Total Worry

5.2 Discussion

This study examined the relationship between anxiety, worry and personality traits. The results of this study suggest that there is a statistically significant correlation between anxiety, worry, and The Big Five personality traits. In this study, a total of 117 responses were included in the analysis, in which 25.64% were males and 74.36% were females. The age ranged between 18 to 42 years and above with the 18 to 25 age group having the greatest number of participants.

The main finding in this study was a significant correlation between personality traits and anxiety, which was analyzed through correlations and a multiple regression analysis. The first hypothesis which states that higher extraversion will not relate to high anxiety scores was confirmed. The correlation showed that high extraversion scores did not relate to high anxiety scores since the results were insignificant. The literature confirms that, individuals high on anxiety were low on extraversion facet scoring particularly low on warmth and positive emotions (Bienvenu, Samuels, Costa, Reti, Eaton, & Nestadt, 2004).

The second hypothesis which states that high neuroticism will relate to high anxiety was confirmed. A correlation between neuroticism scores and anxiety scores showed a strong correlation between neuroticism and anxiety. This was confirmed by the literature as well, the higher the level of neuroticism, the more likely people are to report being unhappy, anxious, and even physically sick. (Funder, 2016).

The study had 87 female participants. Their neuroticism scores were correlated to their anxiety scores to determine if the third hypothesis was proven. A correlation was conducted between neuroticism scores and anxiety scores showed a strong correlation between neuroticism and anxiety meaning that the third hypothesis was confirmed. This was also confirmed by the literature, a study found that females were higher in anxiety and Neuroticism during adolescence and lowered during early adulthood and middle age. Females were more susceptible to anxiety as well as other negative emotion (Soto, John, Gosling, & Potter, 2011).

The fourth hypothesis which states that low conscientiousness will relate to high anxiety was confirmed. A correlation between conscientiousness and anxiety showed an inverse correlation between conscientiousness and anxiety which means when one variable increases the other decreases. Hence, if conscientiousness scores are low, anxiety scores will be high and vice versa. This was also confirmed by the literature, an individual who is low on conscientiousness is much more likely to procrastinate, to be flighty, impetuous, and impulsive (Ackerman, 2017). If an individual procrastinates, they are more likely to feel anxious due to all the work that they would have to in a shorter period of time. Furthermore, someone who is impulsive is more likely to take decisions that could lead to anxiety.

The fifth hypothesis which states that Openness and Agreeableness scores will not relate to anxiety or worry was confirmed. The correlation showed there was no correlation between either personality trait and anxiety or worry. That was also proven by the literature, Watson, Gamez, & Simms (2005) found that Openness was unrelated to mood disorders, anxiety disorders, and substance disorder. Karsten, Penninx, Hariëtte,

Ormela, Nolena, & Hartmana (2012) also found that both agreeableness and openness are not influenced by anxiety.

The sixth hypothesis which stated that high extraversion will relate to high worry was not confirmed. The correlation showed that there was an inversely significant correlation meaning when one variable increases the other decreases. These findings were not as hypothesized nor were they confirmed by the literature. However, these results could be due to the fact that the more sociable and outgoing one is the less likely they will report worry. This could also be due to the fact that people high on extraversion are known to be warm, assertiveness, active, seek excitement and show positive emotions (Funder, 2016).

The last hypothesis which stated that neuroticism levels will relate to high worry was confirmed. This was supported by the correlation which showed that there was a strong statistically significant correlation between neuroticism and worry. Yang, Wang, Chen, and Ding (2015) conducted a study where they found that there was a correlation between neuroticism and worry.

Further research was conducted to determine if any of the Big Five personality traits could predict anxiety. Hence a multiple regression was conducted between the personality traits and anxiety showed that neuroticism was a strong predictor of anxiety as opposed to the other personality traits (extraversion, agreeableness, conscientiousness, and openness). This study supports previous findings. Watson, Gamez, and Simms (2005) found that out of all personality traits neuroticism had the strongest correlation as well as,

the broadest correlations with psychopathology. It also had the strongest significant correlation to both mood disorders and anxiety disorders.

Furthermore, a multiple regression was conducted to determine if any of the Big Five personality traits could predict worry. The results of the multiple regression showed that neuroticism and agreeableness were both strong predictors of worry. Neuroticism had the strongest correlation to worry out of all the traits, however, the finding that agreeableness could predict worry was not expected based on both the correlation between agreeableness and worry as well as the previous literature. However, agreeableness was a weak predictor of worry since it had a low B value ($B = .465$) as well as, a low Beta value ($\beta = .164$). Meaning it is not as strong of a predictor as neuroticism which has a high B value ($B = 1.408$) as well as, the Beta value ($\beta = .773$) (see Table 20).

5.3 Conclusion

5.3.1 Summary

There are significant differences between adults who scored higher on certain personality traits and their anxiety and worry levels. The results revealed that people who scored higher neuroticism also scored higher on both anxiety and worry. It is therefore assumed that neuroticism significantly impacts, and can predict, anxiety and worry. Furthermore, when comparing women's neuroticism scores with their anxiety levels the results were significant which leads us to conclude that women are higher on both anxiety and neuroticism. The results also showed that adults who scored lower on conscientiousness scored higher on anxiety hence, it is assumed that the lower one's conscientiousness levels are the more anxious they are. Some of our other findings were that people who scored high on extraversion did not score high on worry and/or anxiety. However, no significant difference was discovered between the traits agreeableness and openness when compared to worry or anxiety. Thus, it is concluded that out of all five traits neuroticism had the strongest relationship with both worry and anxiety.

5.3.2 Implications

Some of the implications of this study as of these findings are: firstly, it could be helpful for people suffering from anxiety symptoms to better understand their symptoms by relating them to their personality traits. It is important for an individual to understand which personality traits they are high or low on, because in knowing they could better understand themselves, and what triggers their anxiety symptoms. Secondly, psychologists could look into understanding and treating patient's anxiety symptoms based on their BFI scores. Based on the results obtained in the current study as well as, as well as the previous studies that were reviewed in the literature, there is a correlation

between both high anxiety and worry and neuroticism. Despite the fact that further experimental and longitudinal research will be required, this study adds to the pool of evidence supporting the claim that personality traits can predict a person's worry and anxiety levels.

5.3.3 Limitations

There are several limitations in this study, participants were recruited from only one university via convenience sampling. Data from more people from other universities, and other groups, would extend the generalizability of our results. Furthermore, the study relied on non-clinical subjects due to the fact that individuals who have general anxiety symptoms often do not meet the requirement for clinical diagnosis and often do not seek treatment.

5.3.4 Suggestions for Future Research

The current study looked into anxiety symptoms both somatic and cognitive. It aimed to determine if personality traits could predict anxiety and worry. Future research might focus on clinical samples for further discussion of the pathology of anxiety and worry. Furthermore, future research could look deeper into the link between neuroticism, anxiety and worry as well as, cause and effect. In addition, future research could look into is the relationship between agreeableness and worry. That is, why agreeableness was a weak predictor of worry even though there was no correlation between worry and agreeableness.

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Appendix A

Questionnaire Booklet

Informed Consent

1. Summary: This research study will examine worry, anxiety and personality traits. If you agree to participate, you will be asked to answer survey questions that ask about worrying, anxiety and personality traits.
 2. Your right to withdraw/discontinue: You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.
 3. Benefits: Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted, and you may learn something about this area of research (i.e., factors that are related to worry and anxiety).
 4. Additional information: You will be given additional information about the study after your participation is complete.
 5. Time commitment: If you agree to participate in the study, it may take up to 20 minutes to complete the survey.
 6. Guarantee of Confidentiality: All data from this study will be kept from inappropriate disclosure and will be accessible only to the researchers. The researchers are not interested in anyone's individual responses, only the average responses of everyone in the study.
- Risks: The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns.
7. Researcher Contact Information: This research study is being conducted by Lojain Elsaie for my bachelor's thesis. The course instructor is Dr Ronnie Mather in the Psychology department at Empire State College. If you have questions or concerns about your participation in this study, you may contact the researcher at xelsaiel@student.unyp.cz.
 8. Results of the Study: You may obtain information about the outcome of the study at the end of the Spring 2019 semester by contacting the researcher listed above.
 9. Verification of Adult Age: By clicking "I Agree" below, you attest that you are 18 years old or older.

10. Verification of Informed Consent: By clicking “I Agree” below, you are indicating that you have freely consented to participate in this research study.

Part I

Beck Anxiety Inventory (BAI)

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

0 (“Not at all”) 1 (“Mildly, but it didn't bother me much”) 2 (“Moderately – it wasn't pleasant at times”) 3 (“Severely – it bothered me a lot”)

1. Numbness or tingling
2. Feeling hot
3. Wobbliness in legs
4. Unable to relax
5. Fear of worst happening
6. Dizzy or lightheaded
7. Heart pounding / racing
8. Unsteady
9. Terrified or afraid
10. Nervous
11. Feeling of choking
12. Hands trembling
13. Shaky / unsteady
14. Fear of losing control
15. Difficulty in breathing
16. Fear of dying

17. Scared
18. Indigestion
19. Faint / lightheaded
20. Face flushed
21. Hot / cold sweats

Part II

The Penn State Worry Questionnaire (PSWQ)

Instructions: Rate each of the following statements on a scale of 1 (“not at all typical of me”) to 5 (“very typical of me”). Please do not leave any items blank.

1. If I do not have enough time to do everything, I do not worry about it.
2. My worries overwhelm me.
3. I do not tend to worry about things.
4. Many situations make me worry.
5. I know I should not worry about things, but I just cannot help it.
6. When I am under pressure, I worry a lot
7. I am always worrying about something.
8. I find it easy to dismiss worrisome thoughts.
9. As soon as I finish one task, I start to worry about everything else I have to do.
10. I never worry about anything.
11. When there is nothing more I can do about a concern, I do not worry about it any more.
12. I have been a worrier all my life.
13. I notice that I have been worrying about things.
14. Once I start worrying, I cannot stop.
15. I worry all the time.

16. I worry about projects until they are all done.

Part III

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly (1) Disagree a little (2) Neither agree nor disagree (3) Agree a little (4)
Agree Strongly (5)

1. Is talkative
2. Tends to find fault with others
3. Does a thorough job
4. Is depressed, blue
5. Is original, comes up with new ideas
6. Is reserved
7. Is helpful and unselfish with others
8. Is relaxed, handles stress well
9. Is curious about many different things
10. Is full of energy
11. Starts quarrels with others
12. Is a reliable worker
13. Can be tense
14. Is ingenious, a deep thinker
15. Generates a lot of enthusiasm
16. Has a forgiving nature
17. Tends to be disorganized
18. Worries a lot
19. Has an active imagination
20. Tends to be quiet
21. Is generally trusting
22. Tends to be lazy
23. Is emotionally stable, not easily upset
24. Is inventive
25. Has an assertive personality
26. Can be cold and aloof
27. Perseveres until the task is finished
28. Can be moody
29. Values artistic, aesthetic experiences
30. Is sometimes shy, inhibited
31. Is considerate and kind to almost everyone

32. Does things efficiently
33. Remains calm in tense situations
34. Prefers work that is routine
35. Is outgoing, sociable
36. Is sometimes rude to others
37. Makes plans and follows through with them
38. Gets nervous easily
39. Likes to reflect, play with ideas
40. Has few artistic interests
41. Likes to cooperate with others
42. Is easily distracted
43. Is sophisticated in art, music, or literature

Part IV

Gender

Male

Female

Age

18-25

26-33

34-41

42+

Appendix B

Figures used

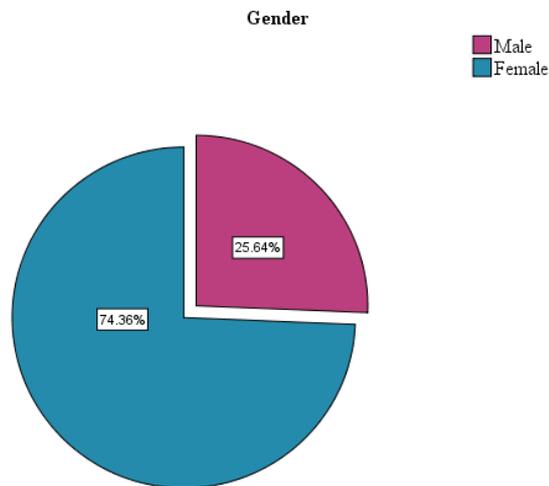


Figure 1. Gender Percentage

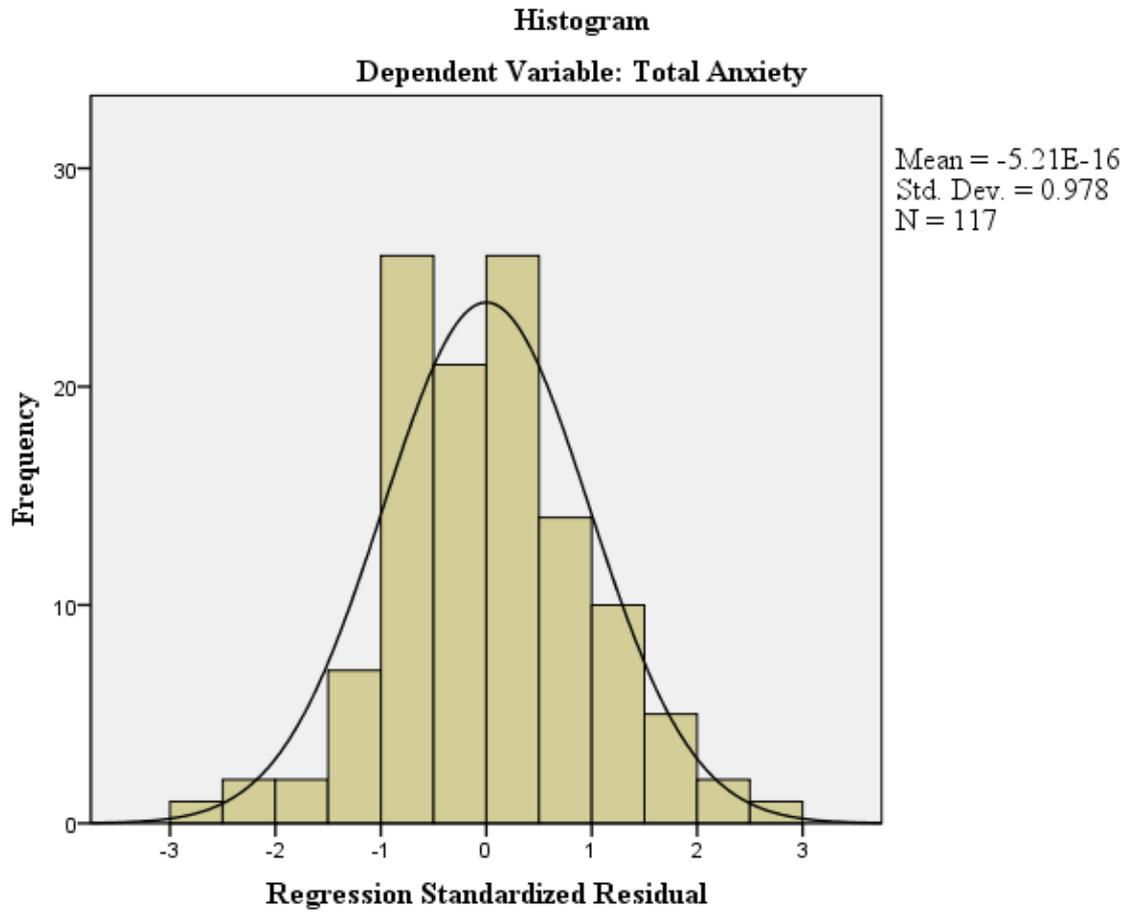


Figure 2. Histogram for Anxiety

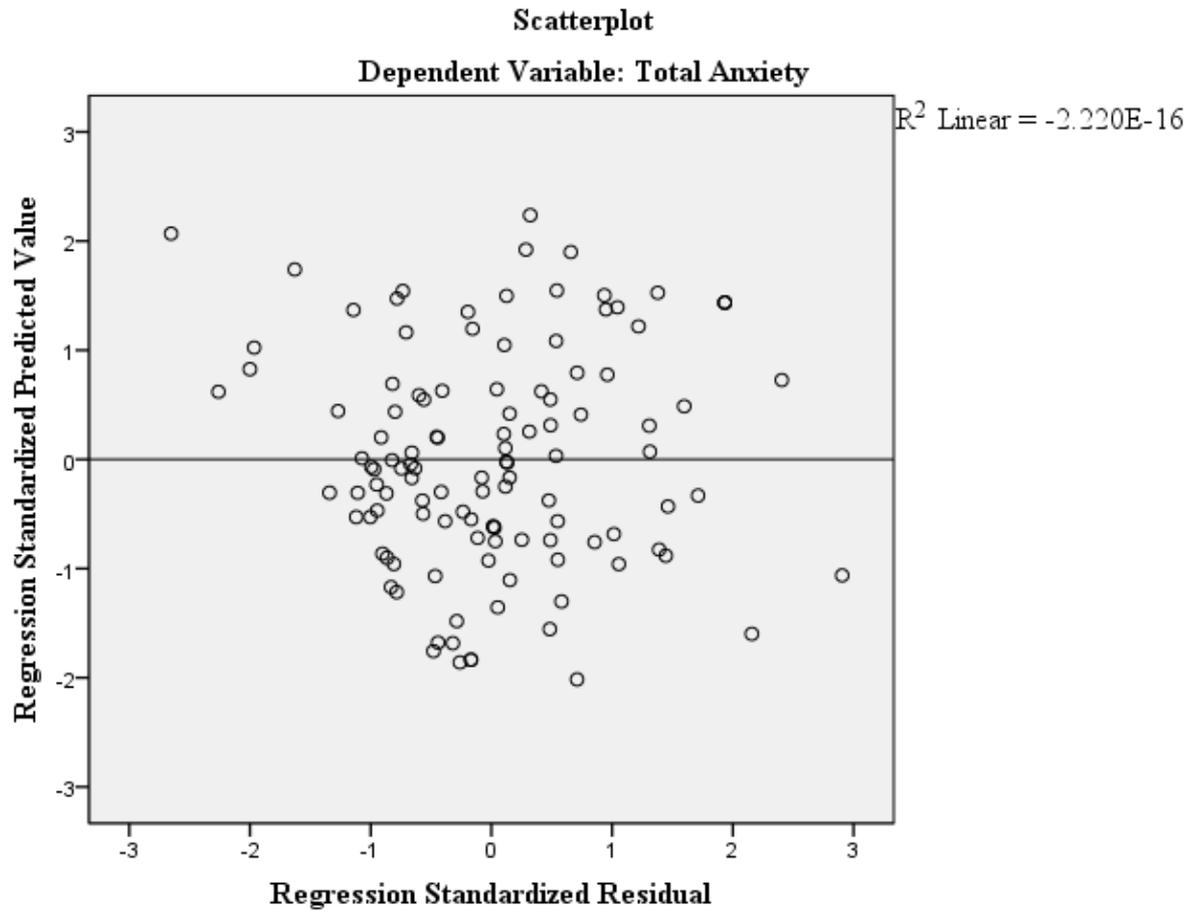


Figure 3. Scatterplot for Anxiety

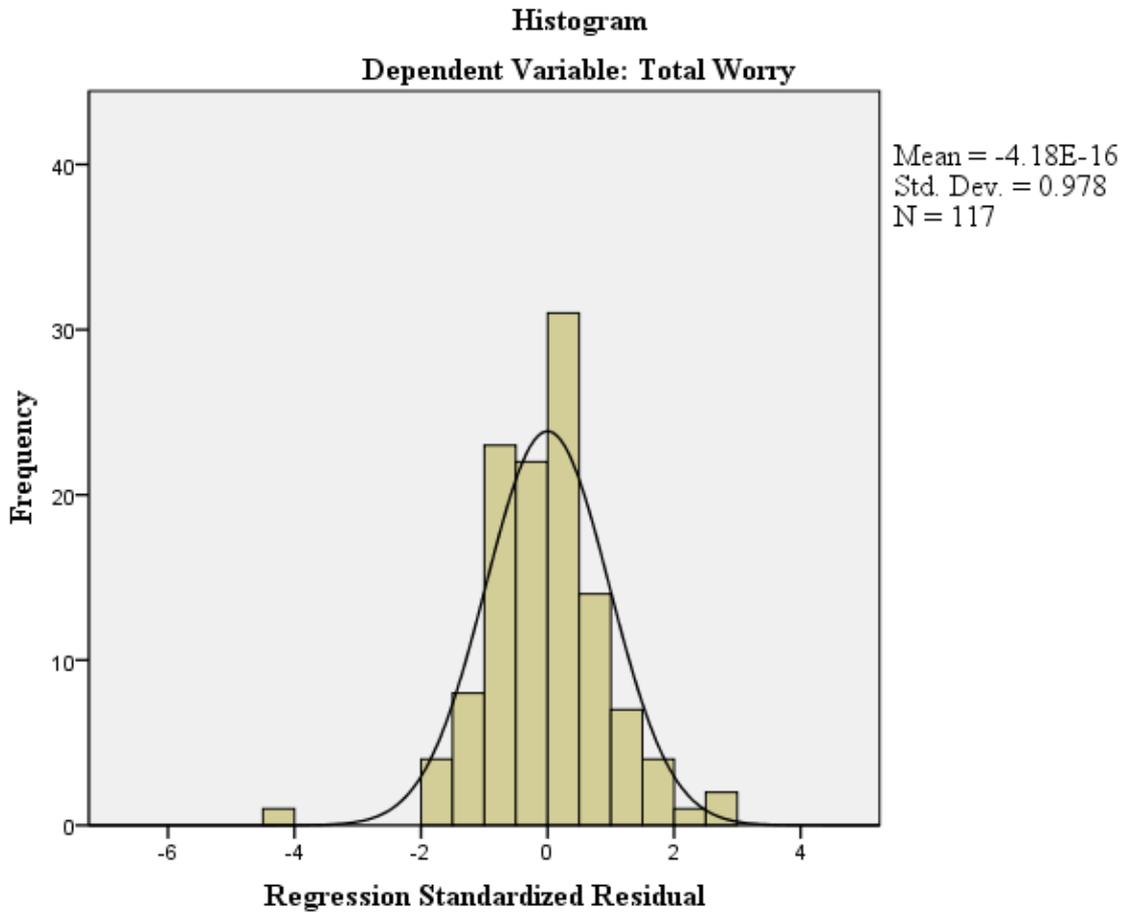


Figure 4. Histogram for Worry

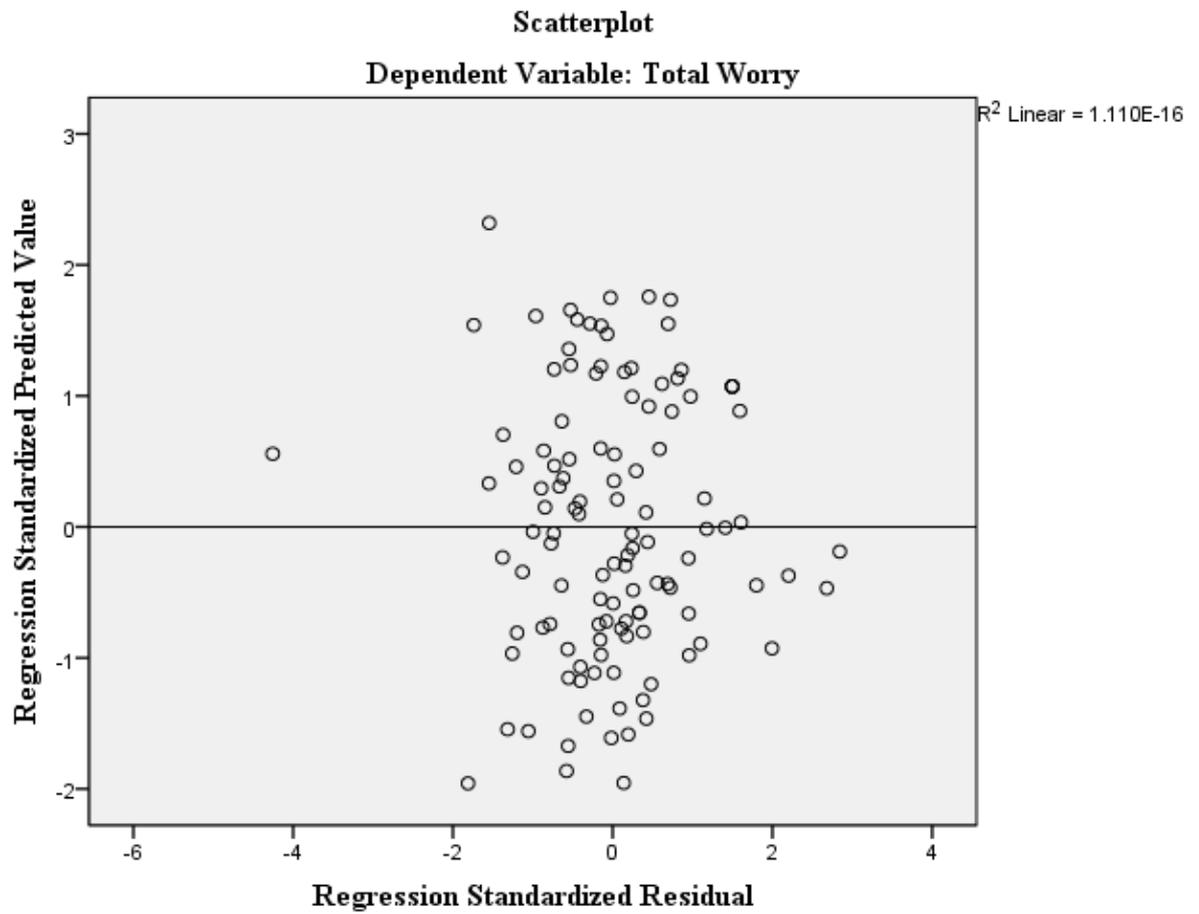


Figure 5. Scatterplot for Worry

Appendix C

Tables used

Table 1
Age Frequency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	86	73.5	73.5	73.5
	26-33	10	8.5	8.5	82.1
	34-41	6	5.1	5.1	87.2
	42+	15	12.8	12.8	100.0
	Total	117	100.0	100.0	

Table 2
Statistics

		Total Anxiety	Total Worry	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
N	Valid	117	117	117	117	117	117	117
	Missing	0	0	0	0	0	0	0
Mean		19.13	52.52	22.56	29.85	30.64	25.44	33.55
Median		17.00	51.00	22.00	30.00	31.00	25.00	34.00
Std. Deviation		11.981	12.461	5.342	4.387	6.044	6.842	4.975
Range		48	56	24	24	29	27	25

Table 3
Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Extraversion	.095	117	.011	.982	117	.127
Agreeableness	.083	117	.047	.985	117	.225
Conscientiousness	.088	117	.027	.990	117	.520
Neuroticism	.079	117	.069	.974	117	.021
Openness	.085	117	.037	.983	117	.155
Total Anxiety	.110	117	.001	.954	117	.001
Total Worry	.067	117	.200*	.984	117	.173

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 4
Correlation between Extraversion and Total Anxiety

		Extraversion	Total Anxiety
Spearman's rho	Extraversion	Correlation	1.000
		Coefficient	-.125
		Sig. (2-tailed)	.
		N	117
	Total Anxiety	Correlation	-.125
		Coefficient	1.000
		Sig. (2-tailed)	.178
		N	117

Table 5
Correlations between Extraversion and Total Worry

		Extraversion	Total Worry
Extraversion	Pearson Correlation	1	-.244**
	Sig. (2-tailed)		.008
	N	117	117
Total Worry	Pearson Correlation		1
	Sig. (2-tailed)	.008	
	N	117	117

** . Correlation is significant at the 0.01 level (2-tailed).

Table 6
Correlations between Neuroticism and Total Anxiety

		Total Anxiety	Neuroticism
Spearman's rho	Total Anxiety	Correlation Coefficient	1.000
		Sig. (2-tailed)	.678**
		N	.000
Neuroticism		Correlation Coefficient	1.000
		Sig. (2-tailed)	.000
		N	.117

** . Correlation is significant at the 0.01 level (2-tailed).

Table 7
Correlations between Neuroticism and Total Worry

		Total Worry	Neuroticism
Spearman's rho	Total Worry	1.000	.767**
	Correlation Coefficient		
	Sig. (2-tailed)	.	.000
	N	117	117
	Neuroticism		1.000
	Correlation Coefficient		
	Sig. (2-tailed)	.000	.
	N	117	117

** . Correlation is significant at the 0.01 level (2-tailed).

Table 8
Correlations between Conscientiousness and Total Anxiety

		Conscientiousness	Total Anxiety
Spearman's rho	Conscientiousness	1.000	-.284**
	Correlation Coefficient		
	Sig. (2-tailed)	.	.002
	N	117	117
	Total Anxiety		1.000
	Correlation Coefficient		
	Sig. (2-tailed)	.002	.
	N	117	117

** . Correlation is significant at the 0.01 level (2-tailed).

Table 9

Correlations between Agreeableness and Total Anxiety

		Total Anxiety	Agreeableness
Spearman's rho	Total Anxiety	1.000	.023
	Correlation Coefficient		
	Sig. (2-tailed)	.	.806
	N	117	117
Agreeableness	Correlation Coefficient	.023	1.000
	Sig. (2-tailed)	.806	.
	N	117	117

Table 10

Correlations between Agreeableness and Total Worry

		Total Worry	Agreeableness
Total Worry	Pearson Correlation	1	.083
	Sig. (2-tailed)		.373
	N	117	117
Agreeableness	Pearson Correlation	.083	1
	Sig. (2-tailed)	.373	
	N	117	117

Table 11
Correlations between Openness and Total Anxiety

			Openness	Total Anxiety
Spearman's rho	Openness	Correlation Coefficient	1.000	.044
		Sig. (2-tailed)	.	.635
		N	117	117
	Total Anxiety	Correlation Coefficient	.044	1.000
		Sig. (2-tailed)	.635	.
		N	117	117

Table 12
Correlations between Openness and Total Worry

		Total Worry	Openness
Total Worry	Pearson Correlation	1	-.004
	Sig. (2-tailed)		.963
	N	117	117
Openness	Pearson Correlation	-.004	1
	Sig. (2-tailed)	.963	
	N	117	117

Table 13
Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	87	100.0	100.0	100.0

Table 14
Tests of Normality for Females

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Anxiety	.072	87	.200*	.970	87	.039
Neuroticism	.101	87	.027	.967	87	.026

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 15
Correlations for Anxiety

			Neuroticism	Total Anxiety
Spearman's rho	Neuroticism	Correlation	1.000	.692**
		Coefficient		
		Sig. (2-tailed)	.	.000
		N	87	87
	Total Anxiety	Correlation		1.000
		Coefficient		
		Sig. (2-tailed)	.000	.
		N	87	87

** . Correlation is significant at the 0.01 level (2-tailed).

Table 16
Model Summary for Anxiety

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.713 ^a	.508	.486	8.588	1.863

a. Predictors: (Constant), Openness, Extraversion, Conscientiousness, Agreeableness, Neuroticism

b. Dependent Variable: Total Anxiety

Table 17
Coefficients for Anxiety

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-22.810	10.817		-2.109	.037		
	Extraversion	.205	.164	.092	1.252	.213	.829	1.206
	Agreeableness	.210	.191	.077	1.099	.274	.906	1.104
	Conscientiousness	-.260	.146	-.131	-1.775	.079	.812	1.232
	Neuroticism	1.192	.133	.681	8.959	.000	.767	1.303
	Openness	.259	.165	.108	1.573	.119	.947	1.056

a. Dependent Variable: Total Anxiety

Table 18
ANOVA for Anxiety

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8464.298	5	1692.860	22.953	.000 ^a
	Residual	8186.778	111	73.755		
	Total	16651.077	116			

a. Predictors: (Constant), Openness, Extraversion, Conscientiousness, Agreeableness, Neuroticism

b. Dependent Variable: Total Anxiety

Table 19

Model Summary for Worry

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1		.766 ^a	.587	.568	8.189

a. Predictors: (Constant), Openness, Extraversion, Conscientiousness, Agreeableness, Neuroticism

b. Dependent Variable: Total Worry

Table 20

Coefficients for worry

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-4.830	10.314		-.468	.640		
	Extraversion	-.075	.156	-.032	-.477	.634	.829	1.206
	Agreeableness	.465	.182	.164	2.555	.012	.906	1.104
	Conscientiousness	.093	.140	.045	.665	.507	.812	1.232
	Neuroticism	1.408	.127	.773	11.102	.000	.767	1.303
	Openness	.193	.157	.077	1.230	.221	.947	1.056

a. Dependent Variable: Total Worry

Table 21

ANOVA for Worry

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10570.271	5	2114.054	31.528	.000 ^a
	Residual	7442.925	111	67.053		
	Total	18013.197	116			

a. Predictors: (Constant), Openness, Extraversion, Conscientiousness, Agreeableness, Neuroticism

b. Dependent Variable: Total Worry

The elimination of homework and improvement in the class environment leads to increased University students' interest in subject and learning outcome

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Abstract

This paper investigates University students' attitude towards the current educational program and potential changes to it. First, the literature review analyzes the current interests and situation of learning programs in general. Second, it evaluates the advantages and disadvantages of homework for middle and high school grades. And additionally, this work explores the modern technologies used to raise student's educational outcome. Particularly, the experimental research was done in order to see if undergraduates are more interested in studying and completing the work at the class than completing it at home. By eliminating homework completely if it results in the successful subject's acknowledgment. The research was conducted by the description of the "typical" and "ideal" classrooms based on the preferences of students through the literature review. And then the research-created questionnaires were passed to collect the data for their attitudes, additionally considering their time spent doing homework per week. To evaluate this, the Likert scale was used. The analysis of data was done through the independent sample t-test which showed that there was a statistically significant difference between the two proposed classes, and the hypothesis that the "ideal" class would be more preferable in contrast to the "typical" one was confirmed.

Keywords: University, school, education, homework, class, online, social network

The elimination of homework and improvement in the class environment leads to the increased students' interest in subject and learning outcome

Education is one of the relatively stable programs on the governmental level, which let people acquire knowledge through the learning experience. That is provided for different ages, economic and social statuses, purposes and health abilities. Typically, education starts from primary school and continues to the college or University level. Within this time, students receive lectures, participate in activities, and have homework almost every day for several years. The main concern of the modern world is the last-mentioned point – homework.

Besides spending time at school and having six to eight classes that last for forty-five minutes to an hour, depending on the country's declaration, students receive a significant amount of work for home. It consists of reading assignments, relevant tasks for school children, projects and essays for the University students. If for primary and middle-school grades homework might be beneficial for the memory development, collaborative skills, group work, and social environment, creation abilities, even though some people might argue to the contrary, for the high school and college students it is essential to apply the acquired knowledge in practice (Bandy, 2018). That is what recently became one of the major concerns which start to apply a variety of educational programs such as gadgets and online techniques, an example, to make the process of learning active and interesting. However, besides that, the amount is still the same and some of the University students have issues regarding health problems and social life which are impacted by the amount of homework (Scipioni, 2018). Additionally to that, some of the Universities lack the opportunity to provide students with the internship or other work that may encourage students to appropriately use their knowledge. Therefore, students are left with continual lectures for several hours, a significant amount of homework, thus the deficiency in social life. And

describing closer the problem that was raised in this paper is indifference and apathy of students being encouraged into class participation and successful learning during the lesson.

Accordingly, this research suggests that elimination of homework and increased class interaction will interest University students more in learning the subject and becoming successful within their field of study. It is suggested based on the students' interest in the class activity, such as shared ideas, arguments, support from the person who has the same point of view, and knowledge from the experienced person - professor. This might lead the students to become professionals because they will receive communication skills, be acknowledged about the limitations of their beliefs and learn to respect other's point of view. Moreover, shared ideas and properly organized class lectures might contribute to the improvement in one's learning process and the increase in subject interest. Therefore, with the qualitatively spent hours of class activity allows the homework process to disappear from the educational program because, with the engagement in class, students will learn most of the course and memories the material.

As the issue with homework and classroom environment is relatively new, there is not much of the empirical evidence within the literature review to strongly suggest the benefit of not taking work to home. However, it analyses the educational performance from the variety of perspectives taking into the consideration online technologies, studying gadgets and assessments, socio-economical influence, and environment of completing the task. More recent studies that are out on the Internet were also taken into the account and are suggested to be revised and implied for the future studies.

Literature review

One of the first to raise the question of whether the qualitative research was done regarding the homework necessity was the American lecturer on education Alfie Kohn (2006) in his book "The

Homework Myth: Why Our Kids Get Too Much of a Bad Thing”. What he revealed is that the orientation of the children to the high competitiveness within the completeness of homework, right answers during the class session or other challenges resulted in the students’ inability to spend profound time with their family, physical activity, and other interests. Revising the reviews to this book, it seems that the author brought up the hidden topics that were assumed as traditions for decades. It emphasized the ideas of homework to be a way of children being engaged in anything and the excessive amount seemed to result in more learning, which was the opposite conclusion to the real case. Moreover, it highlighted the outcome of such misuse of home time in the decreasing interest for learning itself, which was one of the main points of this paper – to increase class activity in order to improve the learning ability and memory intake. Thus, led to the negative connotation of that process for both students and parents who should help their children. The last significant implication was the potential absence of independent thinking – that is, an ability to define one’s worldview, and comprehend the information as true and necessary. However, after more than ten years such topic as effective education has not been revised since.

The other problem that was analyzed in the study of Berchback (2010) is the teachers’ required skills. He mentioned homework session and revealed the negative sides of it such as the expectation of students to ascertain that it was prepared because it would be checked – so the initial idea of homework was already misunderstood, it was no more the acknowledgment, it was the ability of completeness the work, and no more as the development of memory (Berschback, 2010). Recently it starts to result in inattention during the class – students no more profit and know how to apply the learned information and acquired skills.

Continuing on students’ preferences in education, two different studies by Cristescu and Iordache (2017), and by Mendicino, Razzaq, & Heffernan (2009) introduced the beneficial application

of social network to the learning system. The first research showed that the use of Facebook improved student's communication, access to information, even though revealed negative results in school performance. However, still, students stayed engaged in the subject (Cristescu & Iordache, 2017). Whereas, the second research showed the contrary, that the use of the Online Social Network (OSN) helped students learn more about the subject while completing the classwork or homework. (Mendicino, Razzaq, & Heffernan, 2009).

According to Al-Rahmi and Othman's pilot study and research on the topic of the influence online networks bring on academic performance (Rahmi & Othman, n.d.) it was determined that the phenomenon of the improved utility of the social networks and websites, in specific, has become improved over quite some time now. Further, their study demonstrated that due to the elevated level of social networking abilities and its range, students are becoming particularly engaged in a collaborative experience through the utility of social online networking, both in the in-class and out-class environment, and they explore the opportunities given to them through engaging in the social atmosphere. Hence, this evidence demonstrated that with such a positive team learning through the integration of online networks will be beneficial both for their academic and social results.

Clickers are one of the technological solutions for students' class and home engagement in the subject which was researched in the study by Woolley (2015). The clickers are the new gadget for students that look like a remote with the buttons for answers to the variety of questions including critical, experimental, and application ones. They engaged students in the participation, discussion, and attendance to the class, which resulted in the increased interest of the school subject (Woolley, 2015). The other benefit of using clickers which is proposed by the Vanderbilt Center for Teaching was the encouragement of most student's participation, even shy and insecure, as well as analysis of class understanding.

There are different pros and cons for assigning homework in the World Web. The major advantages are time-management, scheduling skills, and being in charge of their work. The major disadvantage is the experience of stress, health problems (ex. insomnia), and burnout for the class time the next day (The Pros And Cons Of Homework: What The Experts Say, 2013). The negative part supports the study done by Galloway, Conner, & Pope (2014) which showed that the learning process while completing the homework was not the main goal anymore; it was a sacrifice of self for high achievement, including physical and psychological well-being, and anxiety experience. Moreover, it reduced the time spent with the family members and leisure moments, such as sport and social interests (Galloway, Conner, & Pope, 2013).

To conclude, research is still limited to the findings in implementing a new educational program where homework will be eliminated, and more class participation and interaction with professor be implied. These researches showed the advantages, disadvantages, and possible improvements in taking work home; however, it did show the needs and preferences of students. Therefore, the following research tries to investigate the student's reaction to the new educational form and how they prefer this proposal.

Research questions

The research proposes a new educational program – “ideal” class description - for the University students in contrast to the “typical” class. It suggests the elimination of homework, and therefore increase of class activity and environment improvement for the better subject acquisition and future implement of the received knowledge to the work sphere of their interest. Therefore, the research question is: Will the university undergraduate students value the education with more class engagement and no homework more than the regular class with lectures, exams, and homework?

Moreover, the additional question subsequently arises from the latter, stating the suggestion of whether the university students would prefer the class to be more engaged in it if social networking usage is applied as a part of it.

Hypothesis

By the elimination of homework, therefore increasing amount of free time in a day for students after the classes, and by improving and increasing quality of class session will raise the interest of the University students in a course. The expected difference in evaluating the content of the course is that the “ideal” class will be rated as the most preferable in comparison to the “typical” one. Additionally, the hypothesis of the appliance of online resources will be evaluated and tested to propose them to be another useful tool to generally improve quality of the “ideal class” session within educational framework. Therefore, the prediction that homework is an unnecessary feature for the undergraduate students should be confirmed, as the “ideal” class with no homework and more class engagement, will be valued.

Method

Participants

A simple random sampling was used to assign thirty students in each group for the first experiment, therefore, the total of participants is sixty. They are the students from the University of New York in Prague, different cultural background, including the Czech Republic and Russia; the mean age is 21 ($M=21$), and gender difference is almost equal. While, for the second experiment fifty students from the same university were administered after amount of time has passed.

Procedure

The research started at the beginning of the class session. First, the entire study was reviewed by the professor to assess possible ethical risks, the informed consent was passed to be signed and then was collected before the further content distribution (see Appendix A for the informed consent). Before the procedure, the instruction was mentioned: first, to read the description, then to take the questionnaire of 15 items and demographic questions. Further, the description of the “typical” class was presented in the written form to one group of students, after which the questionnaire on the course evaluation followed. Meanwhile, the “ideal”, new educational form, was presented with the same following evaluation paper to the other group. These papers were collected at the end of the completeness in person, and the debriefing form was passed (see Appendix B for the debriefing form). The whole procedure took approximately 5-7 minutes to complete the task – reading and filling the questionnaires.

For the second supplementary experiment, the same procedure was applied in theoretical consideration area, with a distinction to a procedure itself, where participant were administered to read the description of the “ideal” class, then to take the research-created questionnaire of 10 items, and lastly to fill the “Social Media and Academic Performance of Students Questionnaire” (SMAAPOS). After answering the presented surveys, these were collected or submitted in case of online participation. The whole procedure took an estimated time of 10 minutes maximum – to read the description of the class and to answer the two questionnaires.

Instrumentation

The research, first, used the instruction of the procedure for the participants – what and when they would receive. Then, the research-created description of the “typical” or “hypothetical” class description, one to one group of students, provided the individuals to read. The “typical” class is defined as a regular class with the lectures, exams, and homework. Whereas, “ideal” class is defined as improved one – the use of students’ preferences in the study, no exams, no homework. Both consist of

the bullet points of the class summary, including the full description of the classes (i.e. activities, exams, professor's job, etc). Further, the research-created fixed-format questionnaire on the evaluation of the proposed class description was passed. It consists of overall 15 questions, using Likert Scale and 5 items (i.e. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), for example "I would achieve the learning outcomes in this type of class?" or "Overall, how would you rate your experience in such class if attended". Thereupon, the two additional 10-items questionnaires were distributed, first being the self-created one, followed by the test measuring the opposite construct, namely "Social Media and Academic Performance of Students Questionnaire" (SMAAPOS).

Research Design

The research was a quantitative one and proposed the experiment with the two "ideal" and "typical" descriptions of the class sessions. One group of students received a "typical" class and after a questionnaire to evaluate their preference for that type of education. And the second group had an "ideal" class description and then the same questions as the first group did. The research was interested in the second group of people – the "ideal" class description – how they evaluated the proposed educational form. Because it consists of improved course processes which are suggested to be implied later in future. The "ideal" class came in contrast to the "typical" one to show the difference in students' educational preferences and needs. Therefore, the independent variable was the class description with the two levels: either "typical" or "ideal", and the dependent variable was the students' preference for a certain type of the class. On top of that, the second experiment, being quantitative as well, proposed the "ideal class" description to each participant, followed by two tests accordingly. The self-created fixed-format questionnaire on the judgment of the presented "ideal" class information and its focus on social networking usage was assessed. It includes 10 questions, supported with the Likert Scale rating (i.e. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), for instance, "I would choose a class

which is mostly based on the interactive social media". Media and Academic Performance of Students Questionnaire" (SMAAPOS) was presented for the purposes to establish the opposite evaluation, which also consisted of maximum 10 items and Likert Scale evaluation. For instance, "I make use of WhatsApp to disseminate knowledge to my classmate." (SMAAPOS). Accordingly, the independent variable (IV) was the type of the class ("ideals" with the application of social networking), and the dependent variable (DV) is the undergraduates' attitude towards the social media within the described class.

Data analysis

The independent sample t-test was used in the research to process the two groups of scores from the Likert scale from two different groups of people. As the following, the mean scores were compared to see which class was preferable. Next, the bar chart showed how many hours students spent on completing the homework as the additional information and support to the literature review. Likert scale was also applied for the second experiment in order to calculate the mean score, further, to compare and analyze it, to see the attitude towards the class with the social networking usage.

Results

Descriptive Statistics

According to the statistical analysis, the "Ideal" class scored more in preference for the class ($M=61.83$, $SD=6.592$) as opposed to the "typical" class ($M=50.90$, $SD=8.636$) (see table 1). Through the demographic questionnaire, the data of hours spent to do the homework per week was collected. The graph showed that 59% of students participated in the study spend about two to four hours doing the subjects' tasks at home. And only 5% of tested individuals spend less than two hours (see Figure 1).

Test of Hypothesis

The independent sample t-test was performed to determine whether there was a significant difference in students' preferences for a class between the "ideal" class group and the "typical" one. There was the homogeneity of variances, as assessed with the Levene's test of equality of variances ($p > .05$) (see Table 1). A statistically significant mean difference of 10.933, $t(58) = 5.512$, $p < .05$ (see Table 1). Thus, the stated hypothesis that students would prefer "ideal" class to "typical" one was supported.

The person Correlation (normality assumed) was performed between the self-created test ("Student's Attitude about Social Network within the Educational Environment"), and the opposite test, Media and Academic Performance of Students Questionnaire" (SMAAPOS), which revealed that there was positive, but insignificant correlation, $r(48) = .058$, $p = .691$ (see Table 3). Therefore, the stated hypothesis that students would prefer online social networking within the educational field was not confirmed.

Discussion

Summary of findings

The results of this study showed that the "ideal" class was preferred by the students more, than the "typical" one, thus, the stated hypothesis of this paper was confirmed. Moreover, the analysis of the hours spent per week by students preparing homework for the lesson revealed that the class type did not matter in this case. Because on average, individuals, both from "ideal" and "typical" groups, spent two to four hours, which seemed relatively manageable for adults. As for the second experiment, after the comparison with our test, it was revealed that the preference for utilization of online resources for in-class setting did not appear to be strong. However, generally speaking, the literature review provided an

insight into the deeper understanding of how to effectively imply and operate the online social networking for educational purposes.

Interpretation of findings

The proposed findings of this research suggest that the educational system for undergraduate students should be revised and partly improved. This means, according to the proposed description of the “ideal” class type, students seek for more in-class activity engagements and outside University aid for the internship and possible implication of the received knowledge from the lesson. However, it is hard to state the differences between the performed experiment and literature review, because this is a relatively new study. But the conclusion can be made, that the notion of homework changed from the educational improvement to the traditional habit. This is supported by the finding that the “ideal” class did not include homework, and it received more preference than the “typical” one. Meanwhile, results of online social networking application to the class environment did not signify the strong preference for their utilization.

Limitations

One of the most observed limitations of this study is that it is a recently performed one, not enough documents were presented to analyze in depth the necessity of homework for the University students. The literature review was limited to the elementary and middle school pupils.

The second limitation of this research is the number of participants. To evidently support the idea of the “ideal” class implication into the real educational program, more participants from different Universities should be considered. It is essential for the study because the University in which the current research was done was a private American/European based, which might be different from the State University and schools in other countries.

And the third limitation of the current research is the personality type of the participants. This might bias the study because some people value traditional studying over the modern, improved form. As well as, some students prefer to study being intrinsically motivated. Even though, the results were statistically significant yet.

Lastly, due to not enough clarified meaning of “online social networking” and examples, students might negatively and preferably answer to the research-created and other surveys.

Implications and Future Research

The interpretation of the received data supports the stated hypothesis, that the changes within the class processes seem as an advantage for the educational preferences for the undergraduate university students. Therefore, it includes elimination of homework and tests, first of all. And further implication of improved class discussions (use of group games, laboratories), class environment based on students’ preferences, and instead of tests is the final project development. Additionally, help with the internship over the summer.

The possible suggestion for this research topic can be to implement such “ideal” program for one full University year, so students can get more familiar and present new suggestions to what they lack in education. This can be done through two groups: one is the experimental group of students who receive the “ideal” class program, including summer internship, and control group – “typical” class which is a regular lesson session as it was described in this research.

The possible suggestions for this could be a better and well-researched, supportive and opposite questionnaire, as well as the implementation of such tools into the variety course for at least one full-time semester. This would be done in order to receive how professors effectively apply the online

platforms and what students would prefer to be changed and what would they lack for the learning processes.

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Appendix A

INFORMED CONSENT FORM

Summary: This research study will examine your personal attitude on the educational program at the University. If you agree to participate, you will be asked to read the description form, and then you will be asked to answer survey questions that ask about your attitude towards the proposed educational program at the current state.

Your right to withdraw/discontinue: You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.

Benefits: Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted, and you may learn something about this area of research (i.e. possible contribution to the improvement of the learning environment).

Additional information: You will be given additional information about the study after your participation is complete.

Time commitment: If you agree to participate in the study, it may take up to 5 min maximum to read and complete the survey.

Guarantee of Confidentiality: All data from this study will be kept from inappropriate disclosure and will be accessible only to the researchers. The researchers are not interested in anyone's individual responses, only the average responses of everyone in the study.

Risks: The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns.

Researcher Contact Information: This research study is being conducted by Anastasia Nagaytseva for a Research Methods course. The course instructor is Dr. Bethany Butzer, Lecturer in the Psychology department at the University of New York in Prague. If you have questions or concerns about your participation in this study, you may contact the researcher at xnagaytsevaa@student.unyp.cz.

Results of the Study: You may obtain information about the outcome of the study at the end of the Fall 2018 semester by contacting the researcher listed above.

Personal Copy of Consent Form: You will be provided with a blank, unsigned copy of this consent form at the beginning of the study.

Verification of Adult Age: By signing below, you attest that you are 18 years old or older.

Verification of Informed Consent: By signing below, you are indicating that you have freely consented to participate in this research study.

PARTICIPANT'S FULL NAME (printed): _____

PARTICIPANT'S SIGNATURE: _____ DATE: _____

DEMOGRAPHICS QUESTIONNAIRE

How many hours per week on average do you spend to prepare homework for a class?

0-1 2-4 5-6 7-8

Your Gender:

Male

Female

I want to describe: _____

Your Age: _____

Please select the race/ethnicity category that best describes you:

Black / African American

Native American / American Indian / Alaskan Native

White or Caucasian

Asian / Indian

Latino / Hispanic

Native Hawaiian / Other Pacific Islander

Two or more races

Other:

Appendix B

DEBRIEFING FORM

Title of Research: The elimination of homework and improvement in the class environment leads to the increased University students' interest in subject and learning outcome

Thank you for participating in this research. You have made an important contribution to a developing body of knowledge in psychology. Now that your participation is complete, we can tell you more about the study you have just participated in.

The current study was designed to investigate students' attitudes towards the changes in the educational program, particularly elimination of homework and an increase of class engagement. The last point suggests more within class communication, professors' improved lectures with the knowledge of how to apply the learned material to life, and course activities in general; moreover, use of interactive board and students' preferences in the classroom setting. Such theory holds that the homework process lost the initial meaning of it – memory improvement and practice. In the modern world, it is taken as the traditional style of education and the completion of the test. One of the first book, “The Homework Myth: Why Our Kids Get Too Much of a Bad Thing” by Kohn, which mentioned such issue was written in 2006 and since that time did not change much. In addition, some of the studies later mentioned the following problems with the homework completion: parental participation, socio-economic status, and environmental setting (Felix, 2008; Hong, Milgram, & Rowell, 2004). Besides the stated concern, the solution to it was mentioned: the use of online networks such as Facebook for communication and online help, and Online Social Network (OSN) which provides students with the explanation (Cristescu, 2017; Mendicino, Razzaq, & Heffernan, 2009). Moreover, the use of modern gadgets such as clickers (the remote) was suggested by the Vanderbilt Center for Teaching as a way to engage students into the participation. Therefore, analyzing the studies and the students' preferences in the educational program, the current research was conducted to see if the students would enjoy participating in the class-activity more while lacking the homework, and if such attempt would improve their application of knowledge to life and future work.

In order to test these ideas, the two different groups which consisted of thirty students received two different class descriptions – “ideal” class and “typical” class, afterward, the questionnaires of the proposed course evaluation were the same to all the participants. The “ideal” class description was written according to the recent students' interests in how they would improve the educational program for themselves, including environment setting changes, communication style, necessary ways of knowledge comprehension, and how they would apply their learned subject (internship and final projects). Whereas, the “typical” class description was the University based class that is standard in different educational centers in different countries. It summarized the most noticeable procedures and instruments that are proposed during the lectures' sessions. The questionnaires evaluated the student's attitude towards the read class description, after which the data was analyzed. This was done through the comparison of answers between the two groups, to conclude, whether the “ideal” class was more preferable than the “typical” class – which was the research expected. Moreover, this study proposes the future implementation of the suggested elimination of homework and improvement in class activity and out of school exercise (ex. the internship).

If you have any further questions, please feel free to contact Anastasia Nagaytseva (xnagaytsevaa@student.unyp.cz).

For more information on this topic, some references are provided below.

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INSTRUCTION

First, the informed consent will be passed and collected after it is signed.

Second, the class description will be passed. The task is to read it on one's own and think about the attitude and preference to the defined class.

Third, the evaluation course questionnaire will be passed and collected when it is completed.

“TYPICAL” CLASS DESCRIPTION

- 3 hours duration
- Breaks for 5-10 min
- Max 29 students
- Professor reads the lecture, using presentations and smartboard, sometimes gives class work (ex. Class discussion in groups), shows videos, passes readings
- There are sometimes quizzes (10 multiple choice questions and 3 open questions), midterm exams (first half of the course material), final exams (second half of the course material)
- Requirements: write a final paper (15 pages) and a 5 min presentation of it
- Homework: takes 2-3 hours to complete (readings of 30-40 pages, prepare for discussion)

Additionally:

- The internship is up to students (they need to find themselves the internship; preferably have at least three by the end of Bachelor's degree)

“IDEAL” CLASS DESCRIPTION

- 3 hours duration
- Breaks for 5-10 min
- Max 29 students
- Professor reads the lecture, using life examples, parallel analysis to how the proposed information is applicable and useful in different situations, use of the smartboard
- The class environment is designed as the students think more appropriate to study and easy to memorize the material (ex. Décor of magazines and journals, pictures relevant to class – ex. Photographs of war and victory with the written date on it, or any other historical moments)
- During the class activities, students work through the games (ex. If it is a biology class, the students are assigned to small groups 4-5 people, have a topic to present. To do so, they use the blackboard/smartboard to draw, easy mode of computer graphics, or other materials to produce a certain process. Then, each student in the group has to shortly present certain action of the material to the other groups). And the use of laboratories and relevant materials
- Professor asks the students if they know or have performed previously anything that was discussed during the lecture and class activity
- There are quizzes each class (10 multiple choice questions and 3 open questions)
- No midterms
- No final exam. Instead of it will be the final project of the group (4 people max) proposed with the presentation (15 min) and the research paper written collectively (pages depend on the details), that should be worked from the beginning of the course. The project is freely chosen by the participants that are relevant to the class material. For any experiment or supplements – professor should provide the ideas and contacts
- No homework

Additionally:

- The University helps students to find the internship either by the available one in the world (person and online) and organizes the field trip with the professor and volunteer stuffs (multilingual, from reliable organizations; Ex. UNESCO). The program will last for one month during the summer (probably July), the students can choose either stay for two weeks or one month. The volunteer program depends on the course (ex. If it is a business field, then students can create a whole company with the relevant project)

QUESTIONNAIRE “STUDENT’S PREFERENCE FOR A CLASS”

1. Overall, how would you rate your experience in such class if attended
Excellent Very Good Good Fair Poor
2. This seems like a worthwhile type of class
Strongly Agree Agree Neutral Disagree Strongly Disagree
3. I would be interested in this type of class
Strongly Agree Agree Neutral Disagree Strongly Disagree
4. I would recommend this type of class to a fellow student
Strongly Agree Agree Neutral Disagree Strongly Disagree
5. I would achieve the learning outcomes in this type of class
Strongly Agree Agree Neutral Disagree Strongly Disagree
6. I would contribute constructively during in-class activities in this type of class
Strongly Agree Agree Neutral Disagree Strongly Disagree
7. This class seems effectively organized
Strongly Agree Agree Neutral Disagree Strongly Disagree
8. This class would help increase the general/overall learning of a subject
Strongly Agree Agree Neutral Disagree Strongly Disagree
9. This class would develop the students’ ability to interact with a diverse group of people
Strongly Agree Agree Neutral Disagree Strongly Disagree
10. This class would provide guidance on how to become a complete professional
Strongly Agree Agree Neutral Disagree Strongly Disagree
11. This class seems helpful to apply a received knowledge to life
Strongly Agree Agree Neutral Disagree Strongly Disagree

12. This class will stimulate my interest in a subject

Strongly Agree Agree Neutral Disagree Strongly Disagree

13. The smartboard seems useful in this class

Strongly Agree Agree Neutral Disagree Strongly Disagree

14. Tests directly identify your academic performance in this class

Strongly Agree Agree Neutral Disagree Strongly Disagree

15. I would enjoy the studying process in this class

Strongly Agree Agree Neutral Disagree Strongly Disagree

Students' Attitude about Social Network within the Educational Environment

1. Overall, I consider social media as a useful tool for in-class and homework activity
Strongly Agree Agree Neutral Disagree Strongly Disagree
2. I would choose a class which is mostly based on the interactive social media
Strongly Agree Agree Neutral Disagree Strongly Disagree
3. I would be more open in sharing my own ideas in a class with the social media interaction
Strongly Agree Agree Neutral Disagree Strongly Disagree
4. Usage of social network would contribute to the rise of one's academic performance
Strongly Agree Agree Neutral Disagree Strongly Disagree
5. I would be more interested in the class session if the social network were part of the class
Strongly Agree Agree Neutral Disagree Strongly Disagree
6. I consider online assignments as a better tool than the pencil-and-paper ones
Strongly Agree Agree Neutral Disagree Strongly Disagree
7. I would like to participate in most online discussions during the class
Strongly Agree Agree Neutral Disagree Strongly Disagree
8. Knowledge received from the class with social media interaction would be helpful to apply in life
Strongly Agree Agree Neutral Disagree Strongly Disagree
9. I would contribute more to the online homework assignment than to the regular assignment (pencil-and-paper)
Strongly Agree Agree Neutral Disagree Strongly Disagree
10. I would receive more knowledge from the class with social media usage than from a regular class
Strongly Agree Agree Neutral Disagree Strongly Disagree

Social Media and Academic Performance of Students Questionnaire” (SMAAPOS)

S/N	ITEMS	SA	A	D	SD
	STUDENTS ADDICTIVENESS TO SOCIAL NETWORK AND ACADEMIC PERFORMANCE				
1	Addiction to online social networks is a problematic issue that affects my academic life.				
2	Online social networks distract me from my studies.				
3	Hours spent online can never be compared to the number of hours I spend reading.				
4	There is no improvement in my grades since I became engaged into these social networking sites.				
	EXPOSURE OF STUDENTS TO SOCIAL MEDIA NETWORK AND THEIR ACADEMIC PERFORMANCE				
5	I usually have unlimited access to Facebook and this has affected my academic performance negatively.				
6	I engage in academic discussions on twitter and this has improved my academic performance.				
7	I make use of whatsapp to disseminate knowledge to my class mate.				
8	I Solely rely on information gotten from Wikipedia to do my assignments without consulting other sources.				
	USE OF SOCIAL MEDIA AND STUDENTS' ACADEMIC PERFORMANCE				
9	The usage of Wikipedia for research has helped improve my grades.				
10	Engaging in academic forums on yahoo reduces my rate of understanding.				
11	I use materials gotten from blogging sites to complement what I have been taught in class.				
12	I will not perform well in my academics even if I stop using social media.				

Table 1
Group Statistics

Class		N	Mean	Std.	Std. Error
Type				Deviation	Mean
Total	Ideal	30	61.83	6.592	1.204
	_ Typica l	30	50.90	8.636	1.577

Table 2. *Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Differen ce	Std. Error Differen ce	95% Confidence Interval of the Difference	
									Lower	Upper
Tot	Equal	1.432	.236	5.51	58	.000	10.933	1.984	6.963	14.904
al	variances			2						
	assumed									
	Equal			5.51	54.23	.000	10.933	1.984	6.957	14.910
	variances			2	0					
	not									
	assumed									

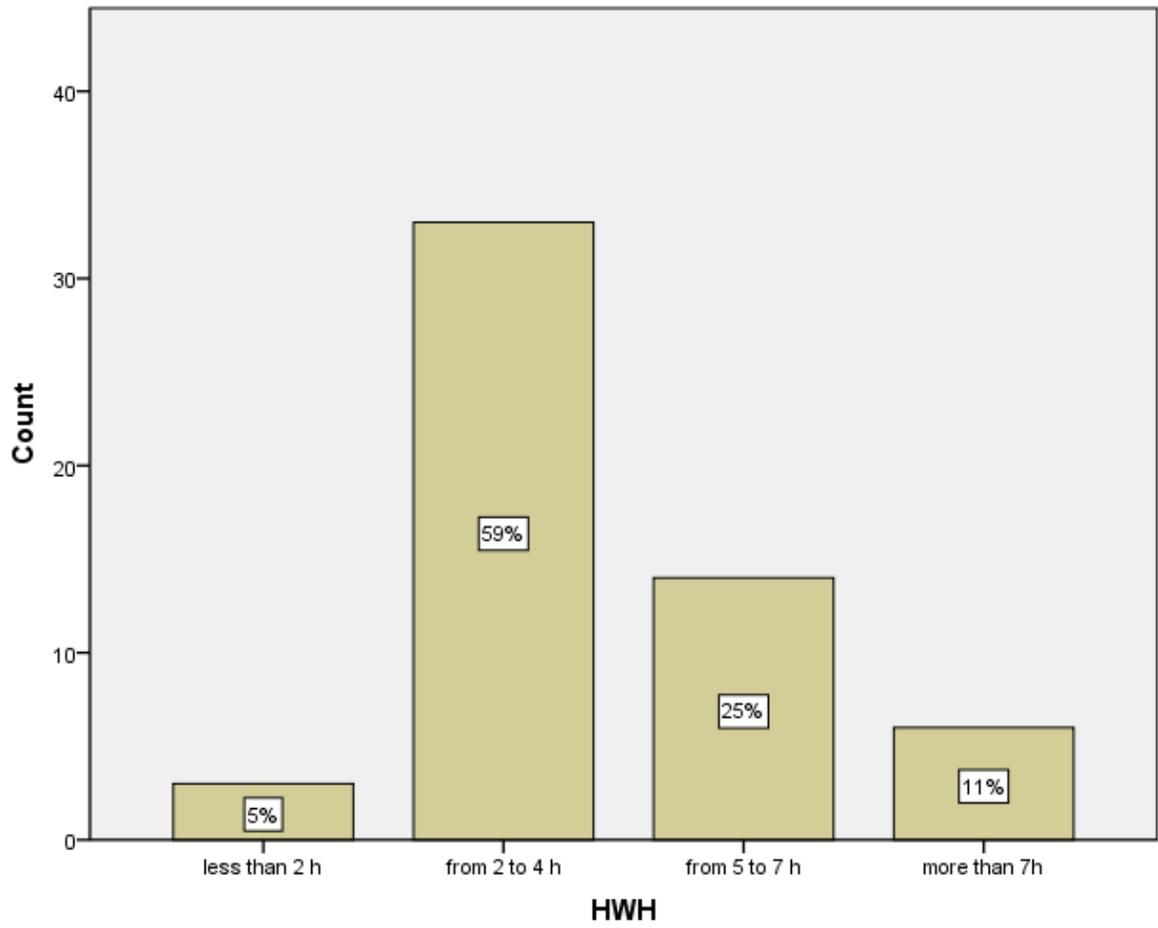


Figure 1. Percentage of hours spent on homework per week

Table 3. *Correlations*

Correlations

		Students' Attitude about Social Network within the Educational Environment	Social Media and Academic Performance of Students Questionnaire" (SMAAPOS)
Students' Attitude about Social Network within the Educational Environment	Pearson Correlation	1	.058
	Sig. (2-tailed)		.691
	N	50	50
Social Media and Academic Performance of Students Questionnaire" (SMAAPOS)	Pearson Correlation	.058	1
	Sig. (2-tailed)	.691	
	N	50	50

Validating a Questionnaire to Measure Attitudes towards Death

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Abstract

The following research was presented to establish the validity and reliability of a newly developed test, called Modern Attitudes towards Death Scale. The construct of the study was the concept of how do people perceive death and all of its aspects. As an emotional experience of death can be presented from the various points of view, the new questionnaire was divided into two subscales, "Own Death" and "Death of Others". Participants received four-part online survey, where each part showed independent test for the future analysis (Informed Consent, Collett – Lester Fear of Death Scale 3.0, Modern Attitudes towards Death Scale, General Happiness Scale).

Nevertheless, after the answers of the participants were acquired and analyzed, they were compared to a well-established test Collett – Lester Fear of Death Scale 3.0 to distinguish validity. Results showed that there was statistically insignificant positive correlation between these two tests of the same construct and statistically significant positive correlation among second subscale about death of other people.

Keywords: Anxiety, attitude, Collett-Lester, death, fear

Attitude towards death

Understanding of death and whether there is a life after it is the subject that people discuss many centuries. However, there are many different attitudes towards the end of life. Many different cultures, professions, religions, ages, etc. perceive the idea of death differently. From the cultural perspectives, the universality and the uniqueness of the perception and dealing with this anxiety can be historically explained. Pentaris (2011) emphasize that many cultures (e.g. Native Hawaiians) believe in the spiritual connection with people that passed away. This denial of the death of others can be due to close connection between religion or spirituality and culture. However, cultural perception of death can change (Dadfar & Lester, 2017). Researchers say that in more developed western societies, even in the period of ten years attitudes towards death and dying can change into more acceptable tendencies (Di Mola & Crisci, 2001). Another obstacle is the occupation of the person. If the personnel experience death of others on the daily basis, such as nurses or doctors, they will more likely accept death and its aspects. Moreover, due to their profession they are not so influenced by their culture in comparison to other occupations (Akpan - Idiok, 2009).

In the field of psychology, scientists were trying to assess death attitudes since the 1969. One of the most popular and significant theories, Terror Management Theories, states that all of people's actions are motivated by the death anxiety and we either acknowledge it or deny it (Pyszczynski, Greenberg, & Solomon, 1999). Pyszczynski and his colleagues (1999) created a series of the experiments, which measure actions of people in different conditions: whether they are aware of their own death or not. However, not only experiments were constructed to measure death anxiety. One of the first original questionnaires that was created to assess fear of death was Collett – Lester Fear of Death Scale in 1969 (Collett & Lester, 1969). Later it was reviewed and

retested twice for better adaptation due to changes in modern society and to improve accuracy. Adding and deleting items for better statistical validity and reliability (Lester & Abdel - Khalek, 2003; Lester, 1990). For the purposes of the study, this research will use Collett – Lester Fear of Death Scale 3.0 as this version had higher accuracy. Nevertheless, various modern questionnaires were developed to assess death anxiety and perception, such as Death Anxiety Scale, Multidimensional Death Anxiety Questionnaire, Chinese death Anxiety Inventory, etc., which constructed differently and adopted for various languages and have varied subscales (Cai, Tang, Wu, & Li, 2017).

Theoretical Considerations

Perception and attitudes toward death is a very fascinating topic, however, the exploration of it is not common in modern behavioral sciences. Thus, the importance for the investigation is highly preferred. Attitude is the behavior an individual performs in accordance to his or her beliefs. Various attitudes can be formed in relation to personal life experience, occupation, culture, religion, etc. Attitudes towards death as a construct supposed to show how individual perceives death in many different aspects. Death can be easily accepted by the individual or even denied for beliefs of afterlife. Nevertheless, many questionnaires, such as Collett – Lester Fear of Death Scale (1969), and experiments attempt to measure this construct and explain the possibility of the actions caused by that anxiety (Pyszczynski, Greenberg, & Solomon, 1999; Cai, Tang, Wu, & Li, 2017).

Operational definition of the construct

In this research, we define attitudes towards death. As the perception can have various aspects, this research will be mainly focused on perception of the own death and death of others.

Death can be considered as the end of life or another step of the development of the soul. Fear or death anxiety is common question to be answered. Depending on the perception of death, people form attitudes and perform the certain way. Attitudes towards death show the anxiety level and people can manage thoughts about it. Whether the death as a construct is acceptable for them or they use defense mechanisms to avoid acknowledgement about the end of his or her death.

Other authors' definition of the construct

According to Dadfar and Lester (2017), death anxiety is a fear of physical and mental deterioration, separation anxiety, experience of ultimate loneliness and stress about extreme conditions, when people have no control over situation. They emphasize that death anxiety can be explained by negative emotional reactions which can lead to various psychological distortions due to intrusive thoughts of the loss of someone's existence.

Other investigators emphasized that death is unavoidable, thus this fear is the greatest motivation for the human actions. Unpredictability of death and awareness of that creates the horror among society and causes anxiety. Researches consider that in the relation to Terror Management Theory (Pyszczynski, Greenberg, & Solomon, 1999), it is important to measure death anxiety to eventually detect mental disorders (Cai, Tang, Wu, & Li, 2017).

Akpan – Idiok (2009) defines attitudes as the predisposition for the behavior of an individual in a certain manner. Researcher's goal was to define the attitudes toward death among the population of the specific occupation – nurses. Moreover, attitudes towards death is a very sensitive topic, even for the people experience death of others on a daily basis (Akpan - Idiok, 2009).

Death and dying are universal and at the same time unique for many cultures, in many aspects of the event. No one can experience grieving caused by death or own dying in the same manner. Pentaris (2011) emphasize the that the interaction between cultures and religion constructs our attitudes towards death and how we behave in a certain manner.

Importance of the construct

As was mentioned preciously, plenty of different attempts were constructed to measure fear of death. Experiments that were constructed by Pyszczynski, Greenberg and Solomon (1999) showed that people behave differently in case when they are aware, even unconsciously, about their death and conclude that death can be the major drive for our actions. In case of questionnaires, attitudes towards death can be measured not only for the investigative purposes, but also to assess and/or predict cognitive, emotional and physical reactions due to accident loss, grief or loneliness (Cai, Tang, Wu, & Li, 2017). Nevertheless, assess possible mental and psychological disorders, such as depression and likelihood for suicide, which can impair functioning of an individual and society around him or her.

Other scales measuring the construct

Besides the experiments to prove Terror Management Theory, other questionnaires were constructed to assess attitudes towards death (Pyszczynski, Greenberg, & Solomon, 1999). Development of various scales shows the evolution of perception of this construct. Death Anxiety Scale, which was constructed relatively at the same time with the original Collett – Lester Fear of Death Scale. Death Anxiety Scale is unidimensional, consists 15 items with True or False answers. Later revised version of this scale, Death Anxiety Scale Extended, has True or

False 51 items with nine factors, such as Dreams of Death, Death Proximity, Death Thoughts, etc. (Cai, Tang, Wu, & Li, 2017).

Collett – Lester Fear of Death Scale 3.0

Original Collett – Lester Fear of Death Scale was established in 1969 and the latest improvements were done in 2003 (Collett & Lester, 1969; Lester & Abdel - Khalek, 2003). Collett – Lester Fear of Death Scale 3.0 was chosen for this study because it is a modern version with higher Cronbach's Alpha rate and better accuracy. As well, it has four subscales, the same as the original questionnaire had and these subscales are correctly assess perception of death from the different points of view.

Subscales

Collett – Lester Fear of Death Scale 3.0 includes four subscales: Your Own Death, Your Own Dying, The Death of Others, and The Dying of Other. These subscales can broadly assess the perception and acceptance of death in the environment of the individual and how person can overcome and deal with it. Each subscale contains seven items and they are clearly divided in the questionnaire that are given to the participants.

Method

Participants

People were randomly assigned as the researchers asked them in person directly and also provided a link fill in a survey online. Those were either acquaintances through social medias, friends or friends of other friends. The total number of participants was 72 (100%).

Procedure

Main data collection was retrieved as online format with the use of Google Forms and share through the social media. Google Forms is a tool to easily make questionnaires and survey that could be done on any electronic device (phone, tablet, computer) that is easily accessible as the link can be distributed and shared with others. The research survey was divided into nine sections.

Participants were informed about the study consent form (see Appendix A), which was written in the first page (section) in the Google Forms. Participants were fully informed about the structure of the study and expectations about the outcome including the test-retest validity. Nevertheless, the study was reviewed by the course instructor to assess potential risks. Each participant could have a chance to refuse to share their answers or ask a student (researcher) to provide more details. By clicking “I Agree”, participants confirmed that they agree with instructions and are ready to continue the questionnaire (see Appendix A).

Participants had a choice to leave a comment on the last (ninth) section regarding the questionnaire of any kind. Participant answered 44 questions regarding their attitudes towards death and happiness. The first part was well-established test, Collett-Lester Fear of Death Scale 3.0 to determine the attitudes towards death of your own and others, which contained 28 questions (see Appendix B). The second part of the questionnaire was to determine overall general happiness (General Happiness Scale) of the participants that contained four questions (see Appendix C). Nevertheless, the last part of the questionnaire was to determine modern attitudes towards death of your own and others that contained 12 questions, where items 1.2, 1.5 and 2.4 were reversed scored (see Appendix D).

Material

As mentioned before, the first part of the survey was to determine attitudes towards death. For that, Lester Fear of Death Scale Version 3.0 was used with the focus on your own death, and the death of others. In this part, we have used a liker scale where the answers were ranging from 1 to 5 with text containing “Not Anxious” and “Very Anxious” respectively (Lester & Abdel - Khalek, 2003) (see Appendix B).

For the second part General Happiness Scale was used. This section determined the happiness of the participant, whether their score on the attitudes toward death scale would be similar or have a different score towards general happiness (see Appendix C).

The third part was researcher’s own scale that had questions regarding their own death and death of others which was originally thought of and under the professor’s supervision was checked and confirmed to be worth of putting into the questionnaire. Those are the modern attitudes towards death that had also a liker scale scores ranging from 1 to 5 with text “Strongly Disagree” and “Strongly Agree” respectively. (see Appendix D).

Validity Analyses

Face validity

Face validity means to which degree a certain questionnaire or a test appears to be effective in terms of what it is supposed to measure (Walsh & Betz, 2001). We thought the questionnaire is well structured and well made with carefully proposed questions that could assess participant’s view towards death in general that were consulted between students and professors. We have had people commenting on our questionnaire at the end of it, saying that it seems well managed and well structured. Even receiving comments that our questionnaire was relevant and relatable was

our initial purpose of making it. Although some of the participants suggested for the questionnaire to have more questions, the overall feedback was positive.

Criterion-related Validity

Criterion related validity usually shows an association between independent or external measure of the same or opposite construct (Walsh & Betz, 2001). The scores are correlated between three different questionnaires sections and is supposed to see if the researcher's new section is as effective as the Collett-Lester Fear of Death Scale Version 3.0 and General Happiness Scale. Scores correlating indicates that the questionnaire was indeed effective. Criterion-related validity divides into two types: convergent and discriminant (Cohen & Swerdlik, 2010). As was mentioned previously, results of these questionnaires should be retrieved at one time from the same participants.

Convergent validity

Convergent validity shows a correlation of the results between newly constructed test and well-established test measuring same construct. Nevertheless, if both tests have subscales, convergent validation procedure should be done for all subscales of the similar context ("My Death" and "Own Death and Dying"). Preferably, the correlation between similar tests should be significantly positive, as they measure the same construct. Thus, we can consider that new questionnaire is convergent valid. For this research, we use Collett-Lester Fear of Death Scale Version 3.0 with to subscales for convergent validation.

Discriminant validity

Discriminant validity is a correlation between newly created test and well-established test, which measures the opposite concept. If the correlation is highly negative, then we can

consider that newly created test properly measures planned construct. For this research, the counter-construct of attitude towards death was considered to be happiness. Thus, General Happiness Scale was chosen for discriminant validity.

Content Validity

Content validity refers to how well the particular sampling of behaviors used to measure a characteristic reflects performance in the entire domain of behaviors that constitutes those characteristics (Walsh & Betz, 2001). To assess the content validity of the questionnaire, we used terms that were specifically related to the topic that were under the supervision of expert's opinion and literature review. Three panelists were selected from University of New York in Prague and independently completed the content validity from a scale where 0 meant not necessary or not essential and 1 meant the item is essential for the questionnaire. The items with Content Validity Ratio index below zero were removed.

Construct Validity

Construct validity is a judgment about the appropriateness of inferences drawn from test scores regarding individual standings on a variable called a *construct*. (Cohen, Swerdlik, 2010) Furthermore, factor analysis was conducted for the evidence of construct validity.

Factor Analysis

Factor analysis is used by researchers to reduce part of variables in a measure, by taking into account the correlation in between (Aiken, 2003). We have used this tool to find out a correlation of the items of attitudes towards death. Factor analysis includes factor rotation, meaning that original factor matrix can be rotated to increase various levels of loadings in the columns of factor matrix. There are two mainly used rotations: orthogonal (uncorrelated) and

oblique (correlated) (Aiken, 2003). The Kaiser-Meyer-Olkin (KMO) is an index used to measure the linearity of the relationship between variables to identify whether principal factor analysis can be run with existing data (Kaiser, 1974). Value can variates from 0 to 1. Kaiser (1974) describes several levels of the index of factorial simplicity: marvelous (.9 to 1), meritorious (.8 to .89), middling (.7 to .79), mediocre (.6 to .69), miserable (.5 to .59). However, if the index is below .5, it is considered to be unacceptable. Nevertheless, factor analysis includes Bartlett's test of Sphericity which shows the correlation matrix, test hypothesis and identify whether the factor analysis is statistically significant or not. Furthermore, only factor loadings above 0.3 are to be included.

Reliability Analyses

Internal Consistency

Cronbach's alpha (α) values were described in various epithets, as excellent (.93 to .94), strong (.91 to .93), reliable (.84 to .90), robust (.81), fairly high (.76 to .95), high (.73 to .95), good (.71 to .91), reasonable (.67 to .87), adequate (.64 to .85), moderate (.61 to .65), satisfactory (.58 to .97), acceptable (.45 to .98), not satisfactory (.4 to .55) and low (.11). However, most common acceptable Cronbach's alpha value is $\alpha > .5$. (Taber, 2018). Nevertheless, item discrimination (discrimination index) indicates the degree to what participants' responses of the measuring concept are related to their scores on the measure as a whole, the higher correlation the more the item results are consistent with the test as a whole, the index is represented as a fraction and varies between -1 to 1 (Walsh & Betz, 2001). Ideally, index should be positive and at least .2. Although, negative items should be revised to determine whether the item was incorrect or miskeyed. Interpretation: satisfactory discrimination (.4 to 1), some revisions might

be required to the item (.3 to .4), the item needs revision (.2 to .3), the item need to be removed or completely revised (-1 to .2).

Split-Half Reliability

Cronbach's alpha is a mean of all possible split-half correlations, corrected by the Spearman-Brown formula. Some of the alternate forms of reliability is split-half reliability. Instead of constructing additional test, researchers can divide proposed test into two halves and examine relationships between them. The concept of the split-half is similar to the alternate form because we are interested in sources of error variance associated with content sampling (Walsh & Betz, 2001). If scores from the both parts show similar results, then we can conclude that questionnaire properly measures the proposed construct (Aiken, 2003). The main consideration is how to divide the test into two equal part, some options can be used: divide by odd and even-numbered items, randomly assign or to divide by the midpoint (the least convenient) (Walsh & Betz, 2001)

Test-retest Reliability

Test-retest reliability can also be known as "stability", is an extent to which test scores are stable or alike over the time, after multiple retest measures (Walsh & Betz, 2001). Its purpose is to see if the scores correlate or differ from the initial's participants responses/scores and thus asses the reliability if the test was handed to people again, in simple terms, if the consistency is positive (Cohen & Swerdlik, 2010). After a period of five to seven weeks, Modern Attitude towards Death Scale will be distributed to the same participants to assess test-retest reliability.

Results

Validity Analyses

Face Validity

Participant had the option to leave any comments at the end of the questionnaire. Most of our participants gave a positive feedback on our questionnaire with comments such as „The questions were relevant and relatable”; „nice “and „it’s very interesting questionnaire, I hope that could help you”. There were also comments pointing out that some of the questions in the questionnaire were not understandable; however the majority of the participants decided not to comment at the questionnaire all. We could conclude that our questionnaire seemed well managed and relevant based on the feedback of our participants (see Appendix E).

Criterion-Related Validity

Criterion-Related Validity was created to correlate Modern Attitude Towards Death Scale with two well-established test, Collett – Lester Fear of Death Scale 3.0 and its two subscales and General Happiness scale. Results were interpreted and described below.

Convergent Validity

Total.

Study showed that there was a statistically insignificant positive correlation between the Collett – Lester Fear of Death Scale 3.0 and newly created Modern Attitudes Towards Death Scale, $r(70) = .190, p = .110$ (see Table 1).

Subscale 1. “My Death”

Study showed that there was a statistically significant negative correlation between the Collett – Lester Fear of Death Scale 3.0 (Own Death and Dying subscale) and newly created Modern Attitudes Towards Death Scale (My Death Subscale), $r(70) = -.283, p = .016$. (see Table 2).

Subscale 2. “Death of Others”

Study showed that there was a statistically significant positive correlation between Collett – Lester Fear of Death Scale 3.0, subscale of Death and Dying of Others, and Modern Attitudes Towards Death Scale, subscale of Death of Others, $r(70) = .629, p = .000$ (see Table 3).

Discriminant validity

Correlation for the discriminant validity showed that there was statistically insignificant negative correlation between the results of General Happiness Scale and newly created Modern Attitudes Towards Death Scale, $r(70) = -.021, p = .810$ (see Table 4).

Content Validity

In the original draft of our questionnaire there were 16 items. For the check of validity and discussion whether those items were suitable for the questionnaire, we have had three panelists that were invited from University of New York in Prague that would mark our items from zero to one as not useful and useful respectively.

From the original 16 items, four of the items were not included of the questionnaire after the consultation of the panelists and a professional. All 12 items that were used in the questionnaire were therefore reworded as panelists left comments and observations for each item. For example, additional item “When someone dies I feel pleasure, because it makes

positive contribution for society.” Was excluded from the final questionnaire due to low validity ratio (CVR= 0/3=-1).

After the multiple analyses, several items were deleted and reworded. From the first subscale (My Death), items 1.2 and 1.6 were deleted to improve Cronbach’s alpha to acceptable level ($\alpha > .5$, $\alpha = .652$), which left the first subscale with five items. Nevertheless, item 1.2 had low content validity ratio in comparison to other items in the subscale (CVR= 2/3=0.33). In the second subscale (Death of Others) item 2.4 was considered to be deleted due to low content validity ratio in comparison to other items in the subscale (CVR= 2/3=0.33) and Cronbach’s alpha improvement after deleting the item ($\alpha = .652$) (see Table 14).

Item discrimination index was above the acceptable level for the items 2.3 (.241) and 2.5 (.213). Nevertheless, the rest of the items had item discrimination index less than .2, meaning they should be completely revised or deleted (see Table 10). The lowest score was shown by the item 1.2 (-.263) and 2.4 (-.196), meaning that they should be preferably deleted from the finalized questionnaire.

Construct Validity

Factor (component) analysis was run to identify factor and reduce the number of variables and the correlation between them. After multiple exploratory try-outs, varimax rotation was used. Interpretation of the results can be found below in “Factor Analysis” part.

Factor Analysis

A component analysis was run on a 12-item questionnaire that measured attitudes towards death in two various aspects: own death and death of others on 72 people of convenient sampling. The items of sampling adequacy was not violated according to Kaiser-Meyer-Olkin (KMO) measure (.620) and data were good for reduction according to Bartlett's Test of Sphericity

$\chi^2(66) = 194.878, p = .000$ (see Table 5). Inspection of the screeplot revealed four factors (see Figure 1). However, only two factors were chosen due to two subscales of the questionnaire that had eigenvalues greater than one and which explained 23.65% and 17.43% of the total variance respectively. Items 2.2, 2.1, 1.6, 2.4 were loaded on the first factor while Items 1.2, 1.3 were loaded on the second factor. Additionally, items 2.5, 1.1 and 1.5 loaded on both first and second factor. Although, items 1.7, 2.3, 1.4 did not load to any factor (see Table 7). Both factors were strongly ($r > .6$) correlated ($r = .844$) (see Table 8).

Internal Consistency

Total.

An Internal consistency was run through the original questionnaire to see if the questionnaire is reliable, with Cronbach alpha ($\alpha = .157$) for the 12 items. However the overall Cronbach alpha would increase ($\alpha = .283$) if item 1.2 from the first subscale would have been deleted (see Table 9 and 10).

Subscale 1. "My Death"

Nevertheless, Internal Consistency analysis was run for two subscales of the original questionnaire, to see whether both parts are equally reliable. For the seven questions of the first subscale, "My Death", Cronbach's alpha was unacceptably low, $\alpha = .007$. However, Cronbach's alpha would increase if item 1.6 would have been deleted ($\alpha = .345$) (see Table 11 and 12). For the exploratory purposes, researchers decided to run an additional Cronbach's alpha analysis without item 1.6 ($\alpha = .345$). Results showed that alpha would increase to sufficient level ($\alpha > .5$) if item 1.2 would have been deleted ($\alpha = .543$) (see Table 13 and 14).

Subscale 2. “Death of Others”

Moreover, for the five questions of the second subscale, “Death of Others”, Cronbach’s alpha was unacceptably low as well, $\alpha = .327$. However, Cronbach’s alpha would increase to the adequate level ($\alpha > .5$) if item four would have been deleted ($\alpha = .652$) (see Table 15 and 16).

Split-Half Reliability

A split half reliability was conducted to assess the correlation between forms and Spearman-Brown Coefficient. The Spearman-Brown coefficient for equal length was $r(70) = .395$ (see Table 17).

Test – retest

For the retest reliability 42 participants out of 72 have responded to the new questionnaire. Nevertheless, results may differ from the finalized version of the Modern Attitudes Towards Death Scale, due to reduction of several items from the both subscales.

Total.

The test – retest reliability was run to distinguish whether the results are stable over the specific period of time. Study showed there was positive insignificant correlation between total score at the first measure and the retest score, $r(40) = .239$, $p = .061$ (see Table 18)

Subscale 1. “My Death”

Study showed that there was a statistically insignificant positive correlation between My Death subscale in the period several weeks, $r(40) = .219$, $p = .163$ (see Table 19)

Subscale 2. "Death of Others"

Study showed that there was a statistically significant positive correlation in the retest of the second subscale "Death of Others", $r(40) = .327, p = .034$ (see Table 20).

The Final Questionnaire***1. My death***

- 1.1. I consider suicide as the easiest way to eliminate my life problems.
- 1.2. "Live fast, die young" is a very valid statement.
- 1.3. I am mortal as anyone else, for me it is just easier to accept it rather than fight it.
- 1.4. Life is beautiful; I am not ready to lose it.
- 1.5. I accept death and every aspect of it.

2. Death of others

- 2.1. It would be difficult to cope with the death of my family member / friend / significant other / pet.
- 2.2. I am afraid that everyone around me will die and I will be alone.
- 2.3. I try to avoid media information about death and dying (e.g., shooting, wars, etc.)
- 2.4. The death of others disturbs me, because I should deal with it emotionally.

During the evaluation of the questionnaire most of the items were reworded (after CVR). Three items, two from the first subscale and one from the second subscale, were excluded from the finalized version of the questionnaire due to improvement of individual Cronbach's alpha of each individual subscale. Overall, the questionnaire was reformed to be adapted to the university

students and adults, sharing more or less similar background. Nevertheless, numbers of the reversed scored item were slightly changed, due to excluding some items: 1.2 and 1.4.

Discussion

Based on the result, content validity ($CVR > 0$) was relatively high because out of the pool of 16 questions, panelists approved 12 questions, as well as face validity, meaning that questions clearly stated the construct, how do people accept death. Unexpectedly, internal consistencies of two scales highly differentiated. Well-established test (Lester & Abdel - Khalek, 2003), Collett-Lester Fear of Death Scale Version 3.0, had two subscales about own death (Death of Self and Dying of Self), which related to the new questionnaire's first subscale (Own Death). Two subscales of the Collett-Lester Fear of Death Scale Version 3.0 had relatively high internal consistency, in comparison to newly created questionnaire; however, after deleting two items, Cronbach's alpha achieved acceptable level ($\alpha > .5$) (Lester & Abdel - Khalek, 2003). Similar results of internal consistency were seen in comparison of the two subscales of Collett-Lester Fear of Death Scale Version 3.0 and Modern Attitude Towards Death Scale. Fortunately for the research, there was a positive correlation (convergent validity) between Collett-Lester Fear of Death Scale Version 3.0 and Modern Attitude Towards Death Scale and negative linear relationships with opposite construct test (General Happiness Scale), which indicates overall good criterion-related validity of the test. Test – retest reliability showed that the second subscale “Death of Others” was positively significantly correlated over the time. Thus, we can assume that the second subscale is more valid and reliable in comparison to the first one and the scale as a whole; however total score showed p level close to significance and probably later improvement or more participants can make the questionnaire significant.

Overall study showed that newly established test, Modern Attitude Towards Death Scale, had not excellent but average results, meaning that the scale needs to be improved in the future. Possibly, some issues could be the complexity of the construct that were measured and cultural differences of the participants (Pentaris, 2011). Although, if some questions could make people feel anxiety about their own death or death of others Nevertheless, test could be adapted to a larger audience, however, this study had only 72 participants (Cai, Tang, Wu, & Li, 2017; Pyszczynski, Greenberg, & Solomon, 1999). Future research can develop more related questions to the construct and make it more culturally or occupationally narrowed (Pentaris, 2011; Akpan - Idiok, 2009), thus some of the indicators of the validity and reliability can be improved. Although, the attitude towards death is a very sensitive topic, which should be revised in many aspects, which can help future psychologists develop new theories and observe the dynamics of the well-established assumptions (Terror Management Theory) (Cai, Tang, Wu, & Li, 2017; Pyszczynski, Greenberg, & Solomon, 1999).

Conclusion

To conclude, after a multiple analysis of the new questionnaire, Modern Attitude Towards Death Scale, was considered to be reliable and valid. The overall construct of death is a very complicated and sensitive. Due to these issues, such as various cultures, professions and age of the participants, results were not as high as expected. However, the questionnaire may need more questions or even more subscales, as the well-established test, Collett-Lester Fear of Death Scale Version 3.0, which had four subscales and twice more questions than proposed scale (Lester & Abdel - Khalek, 2003). Possibly, the more various questions would be included, the more accurate and better results the test could have.

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Appendix A

INFORMED CONSENT FORM

Summary: This research study will examine factors that are related to your attitudes toward the death of self and perception of the death of the others. If you agree to participate, you will be asked to answer self-made survey questions that ask about your opinion on death anxiety or its acceptance.

1. Your right to withdraw/discontinue: You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.
2. Benefits: Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted and you may learn something about this area of research (i.e., fear of death).
3. Additional information: You will be given additional information about the study after your participation is complete.
4. Time commitment: If you agree to participate in the study, it may take up to 20 minutes to complete the survey.
5. Confidentiality Agreement: For this questionnaire you will be asked to create a code and write your email address for future retesting, which will take place in a period of 5 - 7 weeks. Instead of your name you will create a code, requirements will be listed below, so the researchers would make sure that you have been retested in future. Your e-mail address will not be used in any other purposes besides validation of the questionnaire.
6. Risks: The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns.

7. **Researcher Contact Information:** This research study is being conducted by Natalija Molodcova and Ilija Gajič for a Psychological Methods course. The course instructor is Prof. Vartan Agopian, Lecturer in the Psychology department at the University of New York in Prague. If you have questions or concerns about your participation in this study, you may contact the researchers at xmolodcovan@student.unyp.cz or xgajici@student.unyp.cz.

8. **Results of the Study:** You may obtain information about the outcome of the study at the end of the Spring 2019 semester by contacting the researcher listed above.

9. **Personal Copy of Consent Form:** You will be provided with the structure, requirements, and steps for completion of the survey on each page, as well as the form to fill in your answer.

To save your confidentiality we would ask you to create a code which will be used instead of your name, to make sure you were retested in a period of 5 - 7 weeks. Please write your date of birth (e.g. 9th, April, 1985) and first two letters of the city where you were born. (e.g. 09.04.85 + LONDON = 090485LO)

Your e-mail (your e-mail will not be used anywhere):

10. **Verification of Adult Age:** By clicking below, you confirm you are at least 18 years old or older.

11. **Verification of Informed Consent:** By clicking below, you are indicating that you have freely consented to participate in this research study.

Appendix B

The Collett - Lester Fear of Death Scale Version 3.0

How disturbed or made anxious are you by the following aspects of death and dying? Read each item and answer it quickly. Don't spend too much time thinking about your response. We want your first impression of how you think right now. Mark 1 (Not Anxious) – 5 (Very Anxious) that you feel is most best represents your feelings about the statement.

1. Your Own Death

- 1.1. The total isolation of death.
- 1.2. The shortness of life.
- 1.3. Missing out on so much after you die.
- 1.4. Dying young.
- 1.5. How it will feel to be dead.
- 1.6. Never thinking or experiencing anything again.
- 1.7. The disintegration of your body after you die.

2. Your Own Dying

- 2.1. The physical degeneration involved.
- 2.2. The pain involved in dying.
- 2.3. The intellectual degeneration of old age.
- 2.4. That your abilities will be limited as you lay dying.
- 2.5. The uncertainty as to how bravely you will face the process of dying.
- 2.6. Your lack of control over the process of dying.

2.7. The possibility of dying in a hospital away from friends and family.

3. The Death of Others

3.1. Losing someone close to you.

3.2. Having to see the person's dead body.

3.3. Never being able to communicate with the person again.

3.4. Regret over not being nicer to the person when he or she was alive.

3.5. Growing old alone without the person.

3.6. Feeling guilty that you are relieved that the person is dead.

3.7. Feeling lonely without the person.

4. The Dying of Others

4.1. Having to be with someone who is dying.

4.2. Having the person want to talk about death with you.

4.3. Watching the person suffering from pain.

4.4. Seeing the physical degeneration of the person's body.

4.5. Not knowing what to do about your grief at losing the person when you are with him or her.

4.6. Watching the deterioration of the person's mental abilities.

4.7. Being reminded that you are going to go through the experience also one day.

Appendix C

General Happiness Scale

For each of the following statements and/or questions, please circle 1 – 7 that you feel is most appropriate in describing you.

1. In general, I consider myself:

1 2 3 4 5 6 7

Not a happy person

A very happy person

2. Compared to most of my peers, I consider myself:

1 2 3 4 5 6 7

Less happy

More happy

3. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?

1 2 3 4 5 6 7

Not at all

A great deal

4. Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?

1 2 3 4 5 6 7

A great deal

Not at all

Appendix D

How do you perceive death? Your own death and death of others? Please read and think about the statements carefully. Mark from 1 (Strongly Disagree) to 5 (Strongly Agree), what you consider as the most appropriate in evaluation of your attitudes towards death.

1. My death

- 1.1. I consider suicide as the easiest way to eliminate my life problems.
- 1.2. I did not fulfill my purpose in life before I die.
- 1.3. "Live fast, die young" is a very valid statement.
- 1.4. I am mortal as anyone else, for me it is just easier to accept it rather than fight it.
- 1.5. Life is beautiful, I am not ready to lose it.
- 1.6. I believe in life after death in various forms: heaven & hell, reincarnation, etc.
- 1.7. I accept death and every aspect of it.

2. Death of others

- 2.1. It would be difficult to cope with the death of my family member / friend / significant other / pet.
- 2.2. I am afraid that everyone around me will die and I will be alone.
- 2.3. I try to avoid media information about death and dying (e.g., shooting, wars, etc.)
- 2.4. I consider that if person is in a long-term coma, family should keep him / her alive as long as possible.
- 2.5. The death of others disturbs me, because I should deal with it emotionally.

Appendix E

Comment 1	The questions were relevant and relatable.
Comment 2	Some of the questions or rather statements, especially about my own death, were not as clear. Also, it's interesting that they are considerate modern and I wonder why, because the notions of heaven and hell or reincarnation have been around for a while.
Comment 3	Nice!
Comment 4	It's a very interesting questionnaire, I hope that could help you.
Comment 5	I would hope we are more accepting now than we were and not just because of our history. So I hope we are less anxious now :)
Comment 6	People are afraid of death not wanting to talk and to hear about like they will live forever. Being shy to speak about death like it is a kind of weakness to deal with it.
Comment 7	Happiness is vague.
Comment 8	Death means the loss of your inner potential, the loss of all your possibilities, death means not seeing, not experiencing, not evolving, and not learning. Death is the end of a journey that should never end. I want to see, experience, learn and evolve endlessly. What is on the other side? I do not care, there's so much to do in this side, I want to do it all.
Comment 9	Death is usually perceived as something bad, but for me as a person working in healthcare it is something i perceive as a normal thing (not a good thing, but normal). It is sad when someone dies let alone when someone dies suffering. However, in my opinion it is important to talk about death and not try to avoid it. If we avoid this subject with young kids and people, they will most likely get scared of it, could get depressed because of it, and act impulsively in some situations because of fear of death. The fear is natural but it should not be something that binds us in actions. We should try to avoid death at all cost, we should do preventive health examinations every year, have healthy lifestyle, try to avoid hazardous actions etc. However, in the end we cannot forget to live without anxiety of death, to live happily not worrying about it too much, because it's something natural. We must balance these two things- living happily not fearing too much but still trying to avoid it / postpone it with the medical care we have and our actions. Because our goal (probaly? idk... makes sense doesent it xd) should be to live long and happy life.

Appendix F

Table 1

Correlations

		Modern Att. SUM	Collett - Lester Scale SUM
Modern Att. SUM	Pearson	1	.190
	Correlation		
	Sig. (2-tailed)		.110
	N	72	72
Collett - Lester Scale SUM	Pearson	.190	1
	Correlation		
	Sig. (2-tailed)	.110	
	N	72	72

Table 2

Correlations

		My Death SUM	CL - Own Death SUM
My Death SUM	Pearson	1	-.283*
	Correlation		
	Sig. (2-tailed)		.016
	N	72	72
CL - Own Death SUM	Pearson	-.283*	1
	Correlation		
	Sig. (2-tailed)	.016	
	N	72	72

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3

Correlations

		Death Of Others SUM	CL - Death of Others SUM
Death Of Others SUM	Pearson Correlation	1	.629**
	Sig. (2-tailed)		.000
	N	72	72
CL - Death of Others SUM	Pearson Correlation	.629**	1
	Sig. (2-tailed)	.000	
	N	72	72

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4

Correlations

		General Happiness Scale SUM	Modern Att. SUM
General Happiness Scale SUM	Pearson Correlation	1	-.021
	Sig. (2-tailed)		.860
	N	72	72
Modern Att. SUM	Pearson Correlation	-.021	1
	Sig. (2-tailed)	.860	
	N	72	72

Table 5

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.620
Bartlett's Test of Sphericity	Approx. Chi-Square	194.878
	df	66
	Sig.	.000

Table 6

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of	Cumulative	Total	% of	Cumulative	Total	% of	Cumulative
		Variance	%		Variance	%		Variance	%
1	2.838	23.652	23.652	2.838	23.652	23.652	2.624	21.865	21.865
2	2.092	17.433	41.084	2.092	17.433	41.084	2.306	19.219	41.084
3	1.414	11.786	52.870						
4	1.058	8.813	61.683						
5	.959	7.992	69.675						
6	.864	7.197	76.872						
7	.739	6.157	83.029						
8	.582	4.846	87.875						
9	.452	3.769	91.644						
10	.377	3.140	94.784						
11	.330	2.752	97.536						
12	.296	2.464	100.000						

Extraction Method: Principal Component Analysis.

Table 7

Component Matrix^a

	Component	
	1	2
2.2 I am afraid that everyone around me will die and I will be alone.	.693	
2.1 It would be difficult to cope with the death of my family member / friend / significant other / pet.	.666	
1.6 I believe in life after death in various forms: heaven & hell, reincarnation, etc.	.646	
1.5 Life is beautiful, I am not ready to lose it.	-.580	.413
2.4 I consider that if person is in a long-term coma, family should keep him / her alive as long as possible.	-.506	
1.7 I accept death and every aspect of it.		
2.3 I try to avoid media information about death and dying (e.g., shooting, wars, etc.)		
1.4 I am mortal as anyone else, for me it is just easier to accept it rather than fight it.		
1.2 I did not fulfill my purpose in life before I die.		-.724
2.5 The death of others disturbs me, because I should deal with it emotionally.	.581	.634
1.1 I consider suicide as the easiest way to eliminate my life problems.	-.411	.630
1.3 "Live fast, die young" is a very valid statement.		.510

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

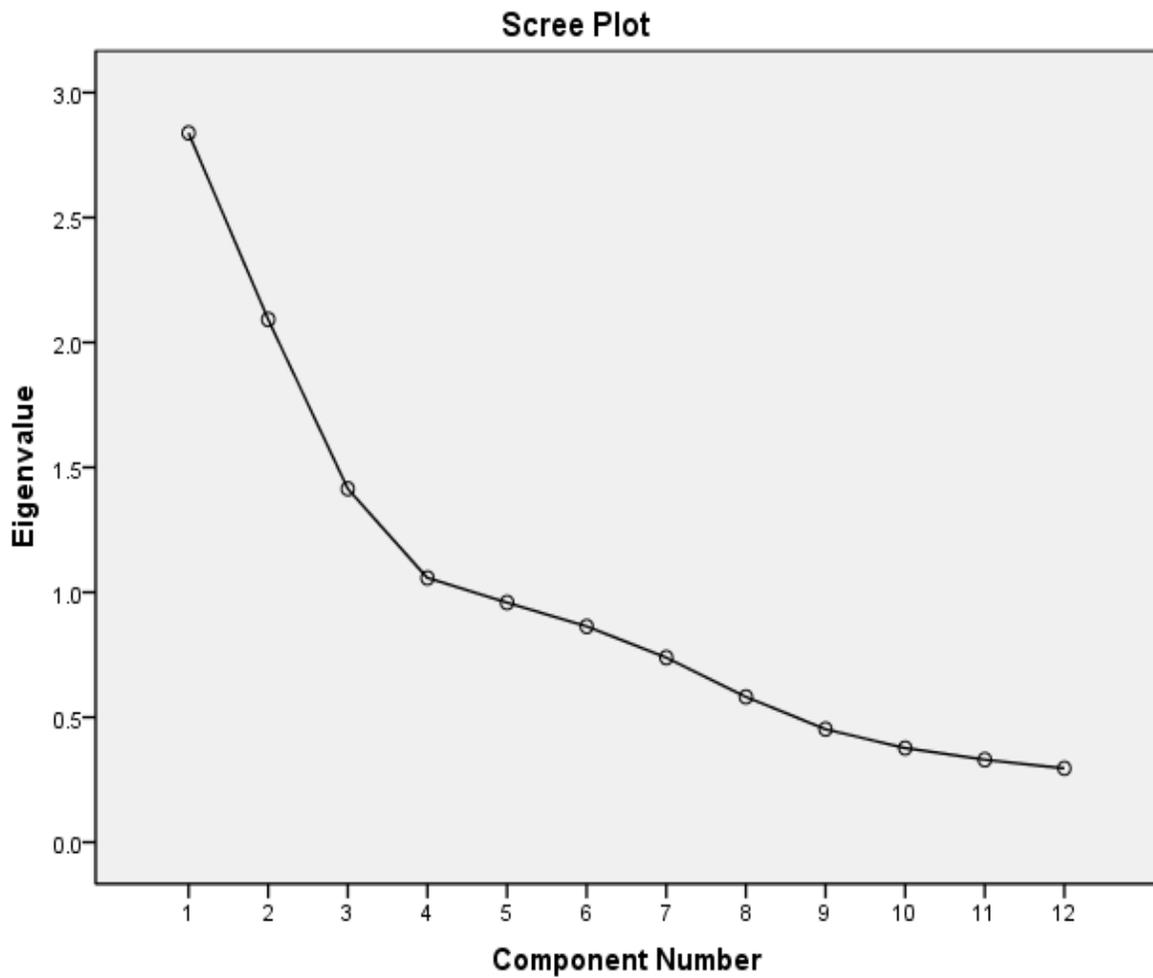


Figure 1. Screeplot

Table 8

Component Transformation Matrix

Component	1	2
1	.844	-.536
- 2	.536	.844

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 9

<i>Reliability Statistics</i>	
Cronbach's	
Alpha	N of Items
.157	12

Table 10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.1 I consider suicide as the easiest way to eliminate my life problems.	33.36	20.459	.010	.163
1.2 I did not fulfill my purpose in life before I die.	31.72	23.218	-.263	.283
1.3 "Live fast, die young" is a very valid statement.	33.04	18.942	.100	.117
1.4 I am mortal as anyone else, for me it is just easier to accept it rather than fight it.	31.50	18.535	.179	.080
1.5 Life is beautiful, I am not ready to lose it.	32.89	20.241	.005	.167
1.6 I believe in life after death in various forms: heaven & hell, reincarnation, etc.	31.81	19.370	.022	.162
1.7 I accept death and every aspect of it.	31.38	20.519	-.026	.182
2.1 It would be difficult to cope with the death of my family member / friend / significant other / pet.	30.65	19.216	.158	.099
2.2 I am afraid that everyone around me will die and I will be alone.	32.14	17.699	.158	.076
2.3 I try to avoid media information about death and dying (e.g., shooting, wars, etc.)	32.44	17.067	.241	.026
2.4 I consider that if person is in a long-term coma, family should keep him / her alive as long as possible.	31.99	22.352	-.196	.271
2.5 The death of others disturbs me, because I should deal with it emotionally.	32.08	17.232	.213	.042

Table 11

Reliability Statistics

Cronbach's	
Alpha	N of Items
.007	7

Table 12

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.1 I consider suicide as the easiest way to eliminate my life problems.	17.67	8.986	-.003	.010
1.2 I did not fulfill my purpose in life before I die.	16.03	10.168	-.194	.172
1.3 "Live fast, die young" is a very valid statement.	17.35	7.920	.076	-.073 ^a
1.4 I am mortal as anyone else, for me it is just easier to accept it rather than fight it.	15.81	7.314	.226	-.222 ^a
1.5 Life is beautiful, I am not ready to lose it.	17.19	7.877	.128	-.118 ^a
1.6 I believe in life after death in various forms: heaven & hell, reincarnation, etc.	16.11	11.227	-.335	.345
1.7 I accept death and every aspect of it.	15.68	6.728	.315	-.333 ^a

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 13

Reliability Statistics

Cronbach's Alpha	N of Items
.345	6

Table 14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1.1 I consider suicide as the easiest way to eliminate my life problems.	14.47	9.210	.149	.311
1.2 I did not fulfill my purpose in life before I die.	12.83	11.887	-.249	.543
1.3 "Live fast, die young" is a very valid statement.	14.15	8.244	.192	.278
1.4 I am mortal as anyone else, for me it is just easier to accept it rather than fight it.	12.61	8.044	.285	.213
1.5 Life is beautiful, I am not ready to lose it.	14.00	7.718	.337	.172
1.7 I accept death and every aspect of it.	12.49	7.803	.308	.192

Table 15

Reliability Statistics

Cronbach's	
Alpha	N of Items
.327	5

Table 16

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
2.1 It would be difficult to cope with the death of my family member / friend / significant other / pet.	11.35	8.286	.385	.126
2.2 I am afraid that everyone around me will die and I will be alone.	12.83	6.423	.426	-.013 ^a
2.3 I try to avoid media information about death and dying (e.g., shooting, wars, etc.)	13.14	8.544	.143	.293
2.4 I consider that if person is in a long-term coma, family should keep him / her alive as long as possible.	12.68	13.404	-.373	.652
2.5 The death of others disturbs me, because I should deal with it emotionally.	12.78	6.485	.440	-.021 ^a

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 17

Reliability Statistics

Cronbach's Alpha	Part 1	Value	-.333 ^a
		N of Items	6 ^b
	Part 2	Value	.091
		N of Items	6 ^c
		Total N of Items	12
Correlation Between Forms			.246
Spearman- Brown Coefficient	Equal Length		.395
	Unequal Length		.395
Guttman Split-Half Coefficient			.386

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

b. The items are: 1.1 I consider suicide as the easiest way to eliminate my life problems., 1.2 I did not fulfill my purpose in life before I die., 1.3 "Live fast, die young" is a very valid statement., 1.4 I am mortal as anyone else, for me it is just easier to accept it rather than fight it., 1.5 Life is beautiful, I am not ready to lose it., 1.6 I believe in life after death in various forms: heaven & hell, reincarnation, etc..

c. The items are: 1.7 I accept death and every aspect of it., 2.1 It would be difficult to cope with the death of my family member / friend / significant other / pet., 2.2 I am afraid that everyone around me will die and I will be alone., 2.3 I try to avoid media information about death and dying (e.g., shooting, wars, etc.), 2.4 I consider that if person is in a long-term coma, family should keep him / her alive as long as possible., 2.5 The death of others disturbs me, because I should deal with it emotionally..

Table 18

Correlations

		Total	Total (Re-Test)
Total	Pearson Correlation	1	.292
	Sig. (2-tailed)		.061
	N	42	42
Total (Re-Test)	Pearson Correlation	.292	1
	Sig. (2-tailed)	.061	
	N	42	42

Table 19

Correlations

		My Death	My Death (Re-Test)
My Death	Pearson Correlation	1	.219
	Sig. (2-tailed)		.163
	N	42	42
My Death (Re-Test)	Pearson Correlation	.219	1
	Sig. (2-tailed)	.163	
	N	42	42

Table 20

Correlations

		Death of Others	Death of Others (Re-Test)
Death of Others	Pearson Correlation	1	.327*
	Sig. (2-tailed)		.034
	N	42	42
Death of Others (Re-Test)	Pearson Correlation		1
	Sig. (2-tailed)	.034	
	N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

Validating a Questionnaire to Measure

Depression

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Abstract

Validation of questionnaires is a critical process to make sure that questionnaire is psychometrically sound. In this paper we have successfully attempted validation of questionnaire measuring depression. After thorough analysis of material considering depression, we have chosen fifteen questions, which we have then narrowed to eight after the expert panelists have provided feedback.

After running validation analysis, internal consistency, convergent and discriminant correlations scored high. The initial Cronbach alpha value was .668. However further analysis showed that if we deleted one question the Cronbach Alpha would move to .819 which could compete with tests that are considered industry standards.

Key words: depression, reliability, validation study, validity

Theoretical Considerations

In this paper we created and statistically analyzed a new Depression scale based on the depression criteria in DSM-V. This questionnaire is measured on Likert scale from one to seven (one meaning “strongly disagree”, seven “strongly agree”). We have considered other definitions of our construct, such as Cassidy’s definition from 1957 and Feighner’s in 1972, and other questionnaires, namely the Beck’s Depression Inventory, which we explored in later sections of this paper.

After creating and administering the questionnaire we have run the validation process in SPSS which is described in greater detail in both Methods and Results section. Lastly all the tables that are used for this analysis are in the appendix of this paper.

Importance of measuring Depression

In the modern world the psychological well-being is more and more rare. The world itself became very fast place to live in due to the new technologies that on one hand enhanced our living, but on the other hand caused the world to be lived faster than before. With innovations like computers or mobile phones the work load increased and so did stress levels in people all around the world. Stress is the main predictor when it comes to different mental disorders including depression.

Depression is very well-known mental disorder to the population; depressive states are very harmful to the people and can also even lead to death of the person. The biggest issue with this mental disorder is that the people suffering depression can hide their mental state, thus making the diagnosis well-hidden to their family, doctor and their surroundings. According to Simon, Goldberg, Von Korff and Üstün and their research on depression, the highest rates can be found in South American centers, whereas the lowest rates can be seen in Asia. The intermediate rates are overall present in the United States and Western Europe (Simon et al, 2002).

There are many ways how to measure depression, probably the most famous is Becks Depression Inventory which was used in our research as a core questionnaire for creating our new questionnaire that would well measure the depression in the population.

Dumb-Dumb Depression Scale

We have chosen this scale after careful examination of depression symptoms in DSM5. The manual helped us to use one question per symptom. Some questions were deleted after consulting experts during the Content Validity Analysis. We were also inspired by existing depression scales that have already been validated. In the next stage of the validation process we would delete a question number 8: I experienced a significant change in appetite. Deleting this item would bring the Cronbach Alpha to .819 (see Table 7). In hindsight this makes sense, since this is the only item that focuses on physical symptoms of depression. Other items focus on mental processes.

This scale had high Convergent and Discriminant correlation, as well as its internal consistency.

Methods

Participants

Sixty-five people from the University of New York in Prague and the Empire State College participated in this validation study. Participants were between the ages of twenty to thirty. These participants were international college students, their exact nationality, however, wasn't recorded.

Material

Operational definition of Depression

In this paper we looked in the DSM-5 for criteria of depression to see what an official diagnostic guide defines as depression. DSM-5 states, that individual must be experiencing "at least five or more symptoms during the same 2-week period and one of the symptoms should

be either (1) depressed mood or (2) loss of interest or pleasure” (DSM-5). We then investigated the list of symptoms and created questions based on these (American Psychiatric Association, 2013).

Other Author’s definition of Depression

Throughout history there have been many operational definitions of depression. One of the first definitions comes from Cassidy et al. from 1957. Cassidy et al. defined depression as patients experiencing depressed mood, as well as six out of ten symptoms (for example: insomnia, feeling tired, suicidal ideas, weight loss, and others), while excluding other medical or neurological disease (Cassidy et al, 1957).

Another definition of depression was proposed by Feighner et al. in 1972. In his definition Feighner presents the idea of primary and secondary depression. The difference between the two is that the former is defined as having dysphoric mood (sadness), at least five out of eight symptoms (loss of weight, loss of energy, decreased sexual drive and others), prevailing for at least one month without any prior medical or mental condition, that could affect this state. The latter on the other hand could be while experiencing some medical or mental condition prior, or during depression (Feighner et al, 1972).

Lastly, we will focus on the DSM. In the third edition of this manual, published in 1980 the first diagnostic criteria for depression were written. These took the criteria from the Research Diagnostic Criteria from 1975 into account and expanded upon them. DSM-3 stated that four out of eight symptoms must be present for someone to be diagnosed with depression for at least two weeks. The RDC criteria were: dysphoric mood, pervasive loss of interest or pleasure, as well as the criteria listed in Feighner’s proposal (American Psychiatric Association, 1987).

Other scales measuring Depression

To successfully create a questionnaire, we had to investigate existing literature and explore existing scales to see what aspects of given construct (in our case depression) to look at.

The two established scales we found were Beck's Depression Inventory and the Geriatric Depression Scale.

Beck's Depression Inventory, one of the most famous depression scales, lets patients rate their depression symptoms through twenty-one questions. These symptoms include irritability, lack of interest in sex, change of appetite and others. This scale works together with the symptoms listed in DSM-4. Each question is a set of four statements scored from zero to three (Farinde, 2013).

Geriatric Depression Scale is a thirty-question scale that assesses depression levels in elderly people. This scale also works with DSM-4 symptoms of depression but is more narrowly focused on elderly people and takes problems connected to old age into consideration (Benedetti et al. 2018).

Procedure

Validity Analyses

Face Validity

Cohen and Swerdlik explain that Face validity analysis is one of the first steps in validity analysis. During this analysis it is important to look at the test's face value. Do the questions seem to measure what they want to measure?

The test maker must look at the questions through the eyes of the test takers. The test instructions must be clear, the questions must be grammatically correct. If the test fails, Face Validity test takers can be left confused and thus the results might be skewed in one way or another. However, Cohen and Swerdlik argue, that even a test that fails Face Validity can be

useful. They explain this as Face Value can often be a marketing, or public relations issue, rather than psychometric one (Cohen & Swerdlik, 2009).

Criterion-related Validity

According to Cohen and Swerdlik Criterion-related Validity measures the degree to which our test is correlated to another test. In our case we have run Pearson correlation with the total scores of our original study and both Beck's Depression Inventory and the Oxford Happiness Scale. This correlation value shows how correlated our survey is to a survey of the same and opposite construct.

According to Cohen and Swerdlik there is no fixed value of the correlation coefficient that means that test is valid or not. Instead they argue that, generally, higher the value the better. However, there are other steps in the validation process that must be considered (Cohen & Swerdlik, 2009).

Content Validity

Three expert panelists examine the proposed questions. Through their decisions, whether the items are essential, useful, or not necessary and a mathematical formula $CVR = \frac{n - (N/2)}{(N/2)}$, where N is the number of panelists. The items with value of zero should be deleted.

There is also a problem when it comes to cultural issues with content validity. When creating questions researcher should have knowledge of the cultural norms. Cohen and Swerdlik say, that what can be a correct answer for one cultural group it isn't correct for another. Their example is a very specific question about history knowledge. It is about Gavrilo Princip and shows that people of Bosnian heritage will have a different answer than Austrians. This can apply to psychological testing as well. (Cohen & Swerdlik, 2009).

Construct Validity

Construct Validity is measured by Factor analysis. This is necessary to see if the test measures what it purports to measure. Originally construct validity was considered one of the three validity tests, but in contemporary literature it is an umbrella term, for validity tests combining content validity and criterion-related validity. Construct validity should show that there is a relation between the scores and the construct itself. Thus, if someone scores high on a test measuring a construct, they should have a greater amount of the construct in real life (Cohen & Swerdlik, 2009).

Factor Analysis

Factor analysis is another tool that helps us validating a questionnaire. The most important function of Factor Analysis is to show us on how many factors the items load. The factors often show us which items can be put together on a subscale. As well as it shows us if some items should be deleted if an item doesn't load on any factor.

In factor analysis there are four measures to consider. First is the Kaiser-Meyer-Olkin index which has a value from 0 to 1. For the purposes of this validation the KMO index needs to be higher than .5. Another is the Bartlett's test of sphericity. This shows whether the factor analysis is significant or not. Third is the Eigenvalues that show us how many factors loaded. To see how many factors have loaded we look at the Total Initial Eigenvalues higher than 1. Lastly, we look at how the items were distributed in terms of factors (Cohen & Swerdlik, 2009).

Reliability Analyses

Internal Consistency

Internal consistency is measured by Cronbach alpha coefficient. The alpha coefficient was developed by Lee Cronbach in 1951. It is the industry standard to measure internal consistency. This coefficient varies from 0 to 1. Six levels of Cronbach alpha coefficient exist to describe the number itself in the report. If α is less than 0.5 it is considered unacceptable. 0.5

to 0.6 is poor, 0.6 to 0.7 is questionable, 0.7-0.8 is acceptable, 0.8 to 0.9 is good, and 0.9 to 1 is excellent (Cohen & Swerdlik, 2009).

Split-half reliability

Split half reliability is measured by splitting the items at half and running a Pearson correlation between these. One of the most common and used ways of splitting a questionnaire is to use odd numbered questions as one half and even numbered questions as the other. There is no issue if one of them has more questions, as it would be in the case of odd number of questions in the questionnaire.

This is not an issue, because the next part of the split half analysis is the Spearman-Brown formula which takes this into account. This formula is used to estimate the internal consistency reliability from the correlation (Cohen & Swerdlik, 2009).

Test-retest Reliability

Test-retest reliability is measured by correlating scores of the same test administered to the same people in different times. This measures the reliability of the test over time. This is called the coefficient of stability. This can be used to measure many things and the test takers doesn't have to be looking for a direct correlation. For example, test-retest can be administered to see a change in some trait after intervention (Cohen & Swerdlik, 2009).

For the purposes of this class, however we are looking for a significant direct correlation to validate, that our questionnaire measures stable traits.

Results

Validity Analyses

Criterion-related Validity

For the Criterion-related Validity we have correlated the totals of our original survey with survey totals for both Depression and Happiness. We used Beck's Depression Inventory and the Oxford Happiness Scale to measure these correlations. As expected, the correlation of our survey and the BDI was positive, whereas the correlation with OHS was negative. Our

original survey didn't have any subscales and for the purposes of this paper we treated the BDI as not having subscales either.

Spearman correlation analysis for Convergent validity showed that there is a significant positive correlation between our original questionnaire and the Beck Depression Inventory $r(63) = .699, p = .000$ (see Table 1). The analysis for Discriminant validity showed that there is a significant negative correlation between our original survey and the Oxford Happiness Scale $r(63) = -.819, p = .000$ (see Table 2).

Content Validity

Three panelists each rated our selected questions to measure the content validity. These panelists were Professor Vartan Agopian, Professor Bethany Butzer, and our colleague Vladislav Kulikov. Each panelist scored the items as either a 1 or a 0 depending on if they deemed the items essential – 1, useful – 0, or not necessary – 0. Items that scored a 1 were considered essential, items that scored 0.33 were considered useful but not essential and items that scored less than a 0 were considered not necessary.

Questions: Other people are more worthwhile than me, I used to take better care of my appearance, I can't change the way I feel, I get easily irritated, I have experienced disruptive sleeping patterns, My relationships are as good as before, I've experienced decrease in sex drive were not selected as a result of the Content Validity Ratio.

Question: I wake up excited for new day was reworded to: I wake up excited for a new day.

The item discrimination showed that Question 6: I often think of suicide/self-harm had the lowest Corrected Item-Total Correlation $r = .264$ (see Table 7).

Construct Validity

Construct Validity is necessary to see if the test measures what it purports to measure it is measured by Factor analysis.

Factor analysis

An exploratory factor analysis using the Principle Component Extraction method with Direct Oblimin rotation was run on the questionnaire measuring Depression of 65 participants from University of New York in Prague and the Empire State College.

The Kaiser-Meyer-Olkin measure was .794, therefore the construct validity was high. Bartlett's test of Sphericity was statistically significant $\chi^2(26) = .794$, $p = .000$ (see Table 3).

According to Eigenvalues there were two factors, higher than 1 (see Table 4).

Items 1, 3, 4, 5, and 7 loaded on first factor and items 1, 2, 3, 6, and 8 loaded on the second factor (see Table 5).

Reliability Analyses

Internal Consistency

Internal consistency based on the Cronbach Alpha was high $r = .668$ (see Table 6)

This also showed that the Item 8 (I experienced significant change in appetite) could be deleted as the Cronbach Alpha would be higher $r = .819$ (see Table 7.)

Split Half Reliability

The split half reliability analysis showed that the Spearman-Brown Coefficient for Equal Length was not significant $r = .671$ (see Table 8)

Test-retest Reliability

Pearson correlation was run to see the Test-Retest reliability between the results of Dumb Dumb Depression scale totals in week 6 and week 14. Spearman correlation showed that there was a statistically significant correlation coefficient $r(69) = .752$, $p = .000$ (see Table 9).

Below are a number of statements about depression. Please indicate how much you agree or disagree with each by entering a number in the blank after each statement, according to the following scale:

- 1- STRONGLY DISAGREE
- 2- MODERATE DISAGREE
- 3- SLIGHTLY DISAGREE
- 4- NEITHER AGREE NOR DISAGREE
- 5- SLIGHTLY AGREE
- 6- MODERATE AGREE
- 7- STRONGLY AGREE

Please read the statements carefully, some of the questions are phrased positively and others negatively. Don't take too long over individual questions; there are no "right" or "wrong" answers (and no trick questions). The first answer that comes into your head is probably the right one for you. If you find some of the questions difficult, please give the answer that is true for you in general or for most of the time.

- 1. I wake up excited for a new day
- 2. I have problems focusing on tasks
- 3. I am sad most of the time
- 4. I enjoy my interests the way I used to
- 5. I am full of energy
- 6. I often think of suicide/self-harm
- 7. I am as active as I used to be
- 8. I experienced significant change in appetite

Discussion

Psychological construct scales are important area of research and validation for many reasons. Today's world changes in incredible pace. Thanks to technology and new findings in almost every aspect of life, be it academic or not, our mental processes change from generation to generation. Sometimes it is just the cultural norms that change how we view certain aspects of our mental health. For example what was called aggressiveness can now be differentiated into many different psychological constructs. Sometimes new research shows groundbreaking revelation.

Depression scales are one of the most crucial construct scales to research. There are many constructs that can have devastating consequences on human life, but depression can have some of the most severe ones.

In this research we have looked into the most common symptoms provided in newest research and diagnostic manuals up to date. There were some limitations to this study, however. Most importantly, the limited amount of participants we were provided with. This came with the limited time for this research, but also, since it was a validation study in English, the pool of people was limited as translating it to Czech language would require a new validation process. Another issue that comes with this is that the pool of people was selected mostly from university aged people coming from mostly higher socio-economic status. This could skew the data as this isn't the average picture of Czech, or even European society.

Our most unexpected finding was that the questionnaire needs little to no editing. The only are, where the questionnaire lacks is the Cronbach alpha values. This can be improved by deleting one question.

Conclusion

Various scientists are constantly trying to create the perfect questionnaire that would be appropriate and fit to any age group and more importantly culture. There is probably no such questionnaire that would be perfect in a sense that it would take away any bias, would be possible for use for any age group and be constructed in a way that any culture could understand and deal with wording of the questionnaire.

The “Original Survey” that was created based on different scientific articles and peer review knowledge turns out to be very successful as it scored high when running it thru statistical software and comparing it with the Becks Depression Inventory. This smaller version for diagnosing depression could very well be used in the real-world psychological setting and as the mental health appears to be more and more rare in the population it is important to create or remake new versions of existing questionnaires in order to make the psychological assessing more precise and reliable. It is also important to incorporate the new research findings so that the questionnaire is slowly becoming “perfect”.

It seems that the mental disorders are currently on their up-trend, it can be metaphorically perceived as a biological virus that is present in the whole world and spreads around slowly and depression is surely one of the “viruses” that the human mankind should be able to fight with.

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Table 1

Correlations

		Original Survey TO- TAL	Beck's De- pression In- ventory TO- TAL
Original Survey TOTAL	Pearson Correlation Sig. (2-tailed)	1	.699**
	N	65	65
Beck's Depression Inventory TOTAL	Pearson Correlation Sig. (2-tailed)	.000	1
	N	65	65

** . Correlation is significant at the 0.01 level (2-tailed).

Table 2

Correlations

		Original Survey TO- TAL	Oxford Hap- piness Scale TOTAL
Original Survey TOTAL	Pearson Correlation Sig. (2-tailed)	1	-.819**
	N	65	65
Oxford Happiness Scale TOTAL	Pearson Correlation Sig. (2-tailed)	.000	1
	N	65	65

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Adequacy.	.794	Sampling
Bartlett's Test Approx. Chi-Square	193.204	of
df	28	
Sig.	.000	

Table 4
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	3.666	45.825	45.825	3.666	45.825	45.825	3.145
2	1.351	16.889	62.713	1.351	16.889	62.713	2.704
3	.867	10.835	73.549				
4	.702	8.776	82.325				
5	.451	5.642	87.967				
6	.433	5.409	93.376				
7	.288	3.598	96.973				
8	.242	3.027	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 5
Structure Matrix

	Component	
	1	2
	.752	-.599
O1. I wake up excited for a new day		
O2. I have problems focusing on tasks		-.566
O3. I am sad most of the time	.533	-.843
O4. I enjoy my interests the way I used to	.825	
O5. I am full of energy	.883	
O6. I often think of suicide/self-harm		-.760
O7. I am as ac-		

.822 tive as I
 used to be
 O8. I experi- .705
 enced
 significant
 change in
 appetite

Extraction Method: Principal
 Component Analysis.
 Rotation Method: Oblimin
 with Kaiser Normalization.

Table 6
Reliability Statistics

Cronbach's Alpha	N of Items
.668	8

Table 7
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance Item Deleted	Corrected if Item-Total Correlation	Cronbach's Alpha if Item Deleted
O1. I wake up excited for a new day	23.42	43.247	.657	.570
O2. I have problems focusing on tasks	22.62	48.709	.322	.646
O3. I am sad most of the time	24.28	45.360	.590	.590
O4. I enjoy my interests the way I used to	23.72	42.047	.573	.579
O5. I am full of energy	23.14	40.121	.680	.549

O6. I often think of suicide/self-harm	24.88	49.922	.264	.659
O7. I am as active as I used to be	23.11	41.441	.589	.574
O8. I experienced significant change in appetite	22.12	67.485	-.375	.819

Table 8
Reliability Statistics

Cronbach's Alpha	Part 1 Value	.823
Cronbach's Alpha	N of Items	-.235 ^b
	Part 2 Value	.4 ^c
Cronbach's Alpha	N of Items	
	Total N of Items	8
Correlation Between Forms		.505
Spearman-Brown Coefficient	Equal Length	.671
Spearman-Brown Coefficient	Unequal Length	.671
Guttman Split-Half Coefficient		.624

a. The items are: O1. I wake up excited for a new day, O3. I am sad most of the time, O5. I am full of energy, O7. I am as active as I used to be.

b. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

c. The items are: O2. I have problems focusing on tasks, O4. I enjoy my interests the way I used to, O6. I often think of suicide/self-harm, O8. I experienced significant change in appetite.

Table 9

Correlations

		Original Survey TOTAL	Original Survey TOTAL - test retest
Original Survey TOTAL	Pearson Correlation Sig. (2-tailed)	1	.752** .000
	N	65	65
Original Survey TOTAL - test retest	Pearson Correlation Sig. (2-tailed)	.000	1
	N	65	65

** . Correlation is significant at the 0.01 level (2-tailed).

Demilitarisation: Implications & Impediments; A Case Study of Czechia

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Abstract

Why should people be concerned about the absence of peace and thus the lack of security when there are armies for their protection? That is to be the pivotal question of this paper as the need for the existence of national military forces and their dynamic expansion with regards to international peacekeeping efforts is to be challenged for its logical consistence. Aspirations for global peace cannot be predicated on the assumption that its attainment is possible through hard power. The world is to be peaceful insofar as its members are willing to lay down their weapons, rescue themselves from the burden of the realist mentality, and, finally, walk their walk. Understandably, such a sensitive process requires conditions conducive to its implementation as well as audacity of those nations, in which favourable conditions can be found. Therefore, upon shedding light on the concept of demilitarisation, analysing its implications, and acknowledging its impediments, Czechia, a Central European state, will be proposed as a pioneer of true promotion of peace in the Eastern Hemisphere.

Keywords: demilitarisation, Czechia, security, peace

Demilitarisation: Implications & Impediments; A Case Study of Czechia

I. Introduction

John Lennon (1971) dares challenge us, “imagine all the people living life in peace...” (1:58). What a seemingly daunting task nowadays and ever more during his time! Many great scholars addressed the polarising issue of human nature. Theories abound regarding the first occurrence of conflict among human beings. One’s inclination towards Hobbes’ or perhaps rather Rousseau’s theoretical proposals notwithstanding, human species, as an organised society, has experienced a long history of warfare, bloodshed, and decisions to resort to violence in lieu of alternative methods of conflict resolution.

A path marked by a myriad of transformations has led to the current state of affairs of the world’s militaries. As one of the milestones in the military revolutionary eras of the past is considered the change in the composition of armies generated by mobilisation of the general populace, thereby altering the relationship between military service and citizenship (Avant, 2000, p. 56). Standing armies composed of professionals, being at their lords’ service and standing still both when hostilities began and during peace since the 15th century, were substituted, partly through the influence of the liberal ideas of the Enlightenment (Avant, 2000, p. 43), for citizen armies three centuries later (Howard, 1976; Paret, 1986, 1992; Black, 1991, 1994; Posen, 1992; Bartov, 1996; Avant, 2000 as cited in Kestnbaum, 2009, p. 239). Ordinary citizens and often their quantitative dominance vis-à-vis the opponents then became the central factor determining success of a given state and its warmongering endeavor and thus “war again became the business of the people” (von Clausewitz, 1832 as cited in Kestnbaum, 2009, p. 239). Fast-forward to the late 20th century, fruits reaped from the nationalisation of warfare have lost their sweetness, while “the decline of foreign wars, the growth of civil rights, and industrial capitalism [have] elicited new expectations among the population with respect to the state”

(Mann, 1993b, p. 11 as cited in Joana & Mérand, 2014, p. 181). The abandonment of conscription in a growing number of countries has testified to the shift of the source of state legitimacy, which had been derived from a state's military prowess before it became a state's ability to provide for its people (Porter, 1994; Fortmann, 2010 as cited in Joana & Mérand, 2014, p. 181). Admittedly, such a trend has not been omnipresent, though.

With this in mind, contemporary states have retained their armed forces and some have even set out to bolster their military capacity. Under those circumstances, why should people be concerned about the absence of peace and thus the lack of security when there are armies for their protection? That is to be the pivotal question of this paper as the need for the existence of national military forces and their dynamic expansion with regards to international peacekeeping efforts is to be challenged for its logical consistence. Aspirations for global peace cannot be predicated on the assumption that its attainment is possible through hard power. As Marie Smyth (2004), an esteemed academic in the field of conflict studies, *inter alia*, stresses in her essay "The Process of Demilitarisation and the Reversibility of the Peace Process in Northern Ireland," the "global trend towards increasing military expenditure and the privileging of... 'security' solutions... makes a significant contribution to conflict's continuity and escalation" (p. 544). Furthermore, it is important to realise that one's view of human nature decides their view of the human race's future" (Taylor, 2016, para. 7). The world is to be peaceful insofar as its members are willing to lay down their weapons, rescue themselves from the burden of the realist mentality, and, finally, walk their walk. Understandably, such a sensitive process requires conditions conducive to its implementation as well as audacity of those nations, in which favourable conditions can be found. Therefore, upon shedding light on the concept of demilitarisation, analysing its implications, and acknowledging its impediments, Czechia, a Central European state, will be proposed as a pioneer of true promotion of peace in the Eastern Hemisphere.

II. The Concept of Demilitarisation

First and foremost, the phenomenon of demilitarisation will be defined. Varieties of the definition exist, yet consensus can be reached concerning the susceptibility of the term to dual and often conflicting uses (Willett, 1998, p. 412; Lamb, 1999, p. 13). For that reason, demilitarisation should be understood with the aid of antonymous phenomena and pertinent concepts; that is ‘militarism’, ‘militarisation’, ‘disarmament’, and ‘conversion’.

Militarism, as opposed to militarisation, represents

a static phenomenon...[which] in its purest form can be described as a set of attitudes and social practices, which regard war, and the preparation for war, as a normal and desirable activity. Furthermore, militarism implies a tendency to favour or to seek violent solutions to problems and conflicts. (Ohlson, 1988 as cited in Willett, 1998, p. 411; see also Bucholz, 1999 as cited in Smyth, 2004, p. 546; Lamb, 1999, pp 5-6)

Militarisation, on the other hand, is a process classifiable as a manifestation of militarism either by means of “excessive use of violence and increased importance attached to militaristic ideologies, values and beliefs about human nature and social relationships” (Lamb, 1999, p. 6) or through “increases in military spending, the size of armed forces, arms imports and production” (pp 6-7). Nevertheless, both phenomena tend to be accompanied by a rising influence of the military sector on the political decision-making associated with favouring of the military interests at the expense of the civilian (Ross, 1987, pp 563-4 as cited in Lamb, 1999, pp 6-7; Smyth, 2004, p. 546). It follows that the existence of armed forces and its maintenance constitute the process of militarisation. Regarding processes leading to the opposite outcome, clarity in definitions is necessary.

Viewed from the technical perspective, the concepts of demilitarisation and disarmament are often used interchangeably. The latter refers to a reduction in arms in its all-encompassing sense; be it reduction and destruction of stocks of certain weapons systems, a ban or limitation

on the production of certain types of military equipment, reduction in the numbers of military personnel, limitations on arms transfers, control of defence research and development, and/or lowering of military spending (SIPRI, 1988, pp 518-9; Hartley & Sandler, 1995, pp 261-2 as cited in Lamb, 1999, p. 3 & in Willet, 1998, p. 411). Importantly, elements of militarisation and disarmament may take place concurrently. Moreover, the process of conversion comes into play as an outcome of disarmament when resources no longer demanded by the military sector are transferred to other sectors of the economy (Lamb, 1999, p. 4). Both disarmament and conversion are an indivisible part of the radical process of demilitarisation.

Besides that demilitarisation includes the decommissioning of weaponry, demobilisation of military personnel, and other associated measures, it signifies a greater transformation of structural nature. Demilitarisation is broadly defined as “a multidimensional process that involves the reversal of militarisation through the sustained reduction in the size and influence of the military sector in state and society and the reallocation of military resources to civilian purposes (Lamb, 1999, p. 3; see also Willett, 1998, p. 412). Such a definition albeit implies the larger impact of demilitarisation vis-à-vis disarmament, however, it is devoid of an explicit representation of the entirety thereof. Hence, the process of demilitarisation ought to be approached with awareness of all its dimensions. The aforementioned processes are related primarily to the demilitarisation of state apparatus having implications in the political as well as economic dimensions (Lamb, 1999, pp 9-10). Yet, another fundamental aspect that is to be taken into consideration is the demilitarisation of society, which could be interpreted “as a psychological as well as practical process” (Farr, 2002 as cited in Smyth, 2004, p. 547). However, methods and instruments that are to foster development of a given nation in a weaponless fashion potentially facilitating a cultural change are unlikely to be universally applicable. This is due to the relativity of their usefulness caused by unique conditions of each case study.

In other words, geographic and demographic factors along with historical experience and stimuli affect the level of practicability for each country at a certain point in time. At the same time, based on hitherto conducted observations, conditions for demilitarisation have been established, though (“Mission,” 2015; Lamb, 1999, p. 11). Maximisation of the probability of success can be attained by meeting the following criteria when addressing both the external and internal dilemmas: regional security – positive relations between neighbouring states, developed military establishment under civilian control, stable and functioning political and law enforcement system, and public opinion in favour led by the media. An extensive academic study of a country’s demilitarisation potential and wide dissemination of its findings serve not only as a blueprint for action for all stakeholders, but also as an element mustering general support.

On that note, it is important to highlight the significance of a gradual demobilisation and reintegration of ex-combatants into a society. A sensitive procedure of such sort requires thorough cost management that may be contingent upon the state of macro-economic levels of a given country and its overall economic situation (Willett, 1998, p. 422), which is likely to have an impact on the timing. Nevertheless, states that have abolished their armed forces or decided not to lay their foundations on them do maintain national police or paramilitary forces for internal security and law enforcement purposes (Hinke, n.d.). The importance of law enforcement capacity in a demilitarised state will be discussed below. These organisations may become recipients of the resources being transferred within the process of conversion, including personnel. In spite of the unfriendly stance of a considerable portion of the international community towards demilitarisation, multiple countries demonstrate its feasibility.

III. The State of Play in the World

Significance of the realist school of thought has not diminished. Instead, it resisted the rise of liberalism, while it has contrived to embed its tenets into people's world paradigms unperceived. Realist view of the world has permeated societies in the majority of nations. Political rhetoric and action, perhaps being a response to this general sentiment among the populace or perhaps rather its cause, have contributed to the development of people's propensity to view the international arena as an anarchic realm wherein state survival is the basis of each national interest. There are few exceptions among the world nations, nonetheless, that will be introduced.

A major step towards liberation from the chains of constant insecurity and war has been taken by the European Union (EU). The European project has reached levels of relative regional security for many of its participants unprecedented. The EU embodies the ideals of the liberal school of thought as was recently demonstrated by its progressed defence policy changes, particularly in the form of reduced military spending, and reluctance to become engaged in foreign affairs by other than peaceful means (Witney, 2011, pp 2-3). Be that as it may, Europe's connection to the global hegemon arguably hinders its progress in rendering soft power the primary instrument of statecraft. Seemingly weakening unipolarity of the international system seems to drive major contestants to attempt to even out the might of the United States in order to shift the balance of power. There are, however, other factors that play a role as well.

It is unclear to what extent is the acceptance of the predominance of realist or neorealist interpretations, for that matter, a natural consequence of eventful history inducing fear and, possibly, resentment in different parties toward others; and to what extent is it a product of our own willful making propelled by needs of "military Keynesianism" and vested interests in the entire industry (Hinke, n.d., para. 9; Cohn, personal communication, December 5, 2017). There are states today, outside of the West, that are forthright about the Westphalian nature of their

military development, whereas the West hides behind the alluring veil of “moral militarism” (Joana & Mérand, 2014, p. 187-8). Regardless of the kind of justification declared in the public space, global military spending has risen again in 2017 (SIPRI, 2018). This is possible despite the palpable dissociation of great part of the public from the military ambitions of their protectors. Can demilitarisation succeed and be sustained anywhere in the contemporary world?

One indeed is entitled to provide an affirmative answer. There are multiple countries that do not have a standing army, the preponderance of which have decided to stay unarmed for its economic benefits, *inter alia*, and have pursued security assistance from their often powerful neighbours; these include, for instance, Andorra, Iceland, Liechtenstein, Marshal Islands, Monaco, Nauru, Palau, Samoa, and Vanuatu (Central Intelligence Agency, n.d.). The size and geographic location of these nations, however, may imply that their demilitarisation was a mere outcome of circumstances very likely justified by political calculations. Others, such as the standing armies of Grenada and Panama disbanded after U.S. invasion (Gordon & Rosenthal, 1989 as cited in Gilsinan 2014, para. 5). Admittedly, diversity of potential motivations prevents one from committing hasty generalisation, which may be overcome only by a detailed study of each case. For that reason, list with ‘demilitarised’ countries provided above is not comprehensive and contains only those states for which the ensuing statement applies. By the same token, it does not contain one more Central American country, which seems to account for the persistence of global hopes for the ultimate possibility of demilitarising.

Costa Rica serves as inspiration for what might be ahead of humanity. Being located in a region with a long history of military dictatorships fraught with civil wars, Costa Rica has been soldierless for 70 consecutive years (“Costa Rica,” n.d.; Central Intelligence Agency, n.d.; “Mission,” 2015; “Film: Costa,” n.d.). Upon having become victorious in a civil conflict in 1948, then Costa Rican President Figueres Ferrer manifestly marked the end of violence and thereupon declared renunciation of the country’s military through constitutional codification.

Considering the allegedly strategic incentive for Ferrer's course of action (Council on Hemispheric Affairs, 2011, para. 3; "Costa Rica," n.d.), Costa Rica has, nonetheless, grown to become a stable democracy (Democracy Index, 2017) with high participation rates, free social security provisions – education, health care, advanced commitment to sustainable growth, and extraordinarily happy citizenry ("Film: Costa," n.d.; Happy Planet Index, 2016). In addition, famous statement made by his descendant, President Rodrigo Carazo [2000] at the United Nations University of Peace situated in Colon, Costa Rica, "this century shall be peaceful or shall not be at all" ("Mission," 2015; "Honors and recognition," n.d., para. 6), testifies to the determination of the political leadership to pave the path for peace not only for its constituents, but also beyond its borders. As can be observed in the enlightening movie produced and directed by Matthew Eddy and Michael Dreiling (2017) *A Bold Peace: Costa Rica's Path of Demilitarisation*, Ticos have developed a culture of peace that is ingrained in their educational system. Yet, Costa Rica's resolve to resort to non-violent conflict resolution is not limited to political speeches. In fact, Costa Rica recently had to deal with a transnational issue because of a border dispute with Nicaragua, which has been entrusted to the International Court of Justice for arbitration (Central Intelligence Agency, n.d.). Concerns about Costa Rica's vulnerability in the event that a hostile neighbour decides to invade its territory have been disregarded. After all, "if sovereignty rested in the people, the defence of sovereignty was an obligation held by all" (Avant, 2000, p. 43). And here the focus of this paper shifts from a general study of the concept of demilitarisation and its implementation to a narrowed interest in the demilitarisation of an armed non-belligerent state that has experienced neither inter- nor intra-state military conflict throughout the past 30 years - Czechia.

IV. The Current State of Affairs in the Czech Security Environment

Security environment of the Czech Republic is to be analysed. Czechia, an EU member state since 2004, has joined the North Atlantic Treaty Organisation (NATO; the Alliance), after participating in the Partnership for Peace (PfP) programme (“Partnership,” 2017), together with Poland and Hungary in 1999 (“Czech republic,” n.d.). This was NATO’s first round of post-Cold War enlargement, which bore large significance for all parties concerned. Accession to the Alliance was aimed at ensuring the country’s external security and did not require popular approval because, constitutionally, there were and still are no provisions concerning referenda in Czechia. In effect, apart from the acquisition of a sense of bolstered security thanks to the collective defence mechanism, Czechia has assumed all obligations stemming from the NATO membership.

According to *The North Atlantic Treaty* (1949), ratified by each NATO member, besides that “the Parties undertake...to refrain in their international relations from the threat or use of force” (art. 1), they, essentially, commit to “separately and jointly...maintain and develop their individual and collective capacity to resist armed attack” (art. 3) and “agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all” (art. 5). Consequently, these provisions mean a country’s duty to maintain and strengthen its military capacity. However, that is not an easy task in an environment where the majority of population does not feel militarily threatened (Witney, 2011, p. 4) and where expanding economy renders competition on the labour market tough (Procházka & Dyčka, 2016, p. 38). Regional peace and prosperity, the trophies of the European project, are largely the cause of the dichotomy between financial and material contributions made by the U.S. and the rest of allies. Although, it is also a consequence of the decline in significance of the military sector and the subsequent marginalisation of the military functions of the individual European states,

which is symbolised in the creation of the *EU Common Security and Defence Policy* (CSDP) (EEAS, 2018).

In the light of increasing disparities between the burden born by the U.S. and particularly Europe, NATO members have reaffirmed their commitment under the climbing U.S. pressure in the *Wales Summit Declaration* (2014), whereby they stipulated their determination to “spend a minimum of 2% of their GDP on defence” (para. 14). These measures are reportedly intended to enhance the deterrence and defence capabilities of the Alliance. To clarify, European demilitarising tendency has not been evenly dispersed across the region since certain states regard their territorial integrity as being in imminent peril (Procházka & Dyčka, 2016, p. 37; Witney, 2011, p. 2). Atmosphere of insecurity on the eastern European periphery escalated in 2014 following the onset of the Ukrainian crisis. The Russian military intervention in Ukraine was the main subject of discussion in Wales and constituted the key reason for 18% increase of the Polish defence budget for 2015 (Day, 2015, para. 1). As a result, military academia has celebrated the termination of defence budget cuts and set out to improve its arguments in favour of European militarisation.

With the reoccurrence of the threat of conventional confrontation, scholars advocating the return of Europe to a more balanced power portfolio have been voicing their concerns louder and clearer. Some have built their appeal to refocus on a state’s military might on the premise that defence of its borders is a state’s basic responsibility (Novotný & Procházka, 2014, p. 104). Argumentation of a senior policy fellow at the European Council on Foreign Relations and the very first chief executive of the European Defence Agency, Nick Witney (2011), revolves around the notion of Europe’s opportunity to solidify and even increase its influence in the global affairs of multipolar world (pp 5, 7). Witney claims that the growing U.S. detachment will leave Europeans alone in a battle for the preservation of their values (2011, p. 5). Nevertheless, one may arrive to the conclusion that the European impulses to indeed redirect their

resources towards the military sector have been more prominent under the NATO banner than the EU. As opposed to the NATO security agenda specified in the *Wales Summit Declaration*, for example, the European Commission (2015) in *The EU Agenda on Security* lists its priorities as of emerging regional threats, which are “terrorism, organised crime, and cybercrime” (pp 2, 12-3). None of these three security threats need to pose real military danger, let alone danger equal in seriousness for each EU member state. Though, while the EU should stay vigilant, it should equally consider potential magnitude of the effect that demilitarisation of its member might have on the global peacebuilding efforts.

V. The Case for Czech Demilitarisation

With regards to the internal as well as external enabling environments analysis, Czechia might be soon poised to demilitarise. Demilitarisation is unlikely to be a phenomenon taking place by default, given the nature of the international system; and therefore, planned actions and policies are a prerequisite for its achievement. In this area, progress is required. However, in reality, a clear identity and purpose of the Czech military is absent nowadays. A century has passed since the Czechoslovakian Legion fought and won the support of the Allied Powers for the independence of Bohemia, Moravia, and Slovakia from the Austro-Hungarian Empire (Becherelli, 2018). This was, undoubtedly, a crucial moment for the future of the nation. Yet, since then, the merit along with the size of its armed forces have begun to decline. Therefore, acknowledging all likely disincentives, this is to argue that Czechia should submit its notice of denunciation to the government of the United States of America as provided in “Article 13” of *The North Atlantic Treaty* (1949), thereby ceasing to be committed to its objectives after one year thenceforth, and commence demilitarising. This proposal is contingent upon a number of factors that are to be addressed prior to its adoption.

The process of demilitarisation would initially entail a shift in the public opinion, to a great extent facilitated by a coordinated and politically-led initiative, enactment of a comprehensive reform of the private security sector, constitutionalisation of Czech Republic’s status of neutrality providing for the abolishment of the Czech Army, and the ensuing implementation of a demobilisation and reintegration program. Such a long-term deliverable has to be driven by a gradual and steady collective action of a top-down character inspired by the notion that a country’s standing army can only be an implied threat for other nations.

Concerning the public opinion, militarised mindsets prevail as it is the norm worldwide for an army is considered to be a state’s essential shield. How essential is, however, the Czech Army truly for its citizens? Defence spending is classified as ‘quasi-mandatory’ expenditure,

yet Czechia has been facing issues when deciding on how to allocate resources in their promised quantity, which is also an issue for other European nations (Sklenký, 2018, para. 25). As discussed above, declining importance of the military sector across the region has rendered defence budgets follow the same downward slope. Since 1993 when the Czech defence spending reached its all-time high - 2.61% of the Czech GDP (Sklenký, 2018, para. 8), investments in the military have been steadily shrinking to fall well below 1% of GDP in 2014 (Ministry of Defence of the Czech Republic as cited in Sklenký, 2018). Moreover, an explanation for continuous defence budget reductions might be found in the actual size of the sector, which, according to the records of the Ministry of Defence of the Czech Republic (MOČR) (2018), employed 28,351 men and women with only a subtle increase to 32,120 in 2017. Still, the latter represents a mere 0.3% of the entire population with professional soldiers comprising three quarters of that number (MOČR, 2018). With this in mind, in the light of the outcomes of the NATO Wales Summit, Czechia also expressed its commitment to assume responsibility for “a more equitable cost-sharing on collective defence...[and] gradually increase defence spending to 1.4% of GDP by 2020 (“Czech republic,” n.d., para. 3; see also Army of the Czech Republic^a), 2014). In other words, Czech political leadership has committed itself to prevent already fulfilled scenario of Czechia being a “free rider of NATO” (Pavel as cited in Army of the Czech Republic^b), 2014) from becoming an internationally recognised fact. How impactful can this reality be on the Czech aspirations to demilitarise is difficult to assess. Yet, unless Czechia leaves the Alliance and frees itself from the influence of its more militarily ambitious allies, the prospect of that happening is little.

NATO membership, in contrast to how it is commonly portrayed, presents to Czechs many reasons to feel concerned about their security and security in general. As it is being communicated, the possibility that some of the NATO allies or EU member states might be invaded cannot be ruled out (Procházka & Dyčka, 2016, p. 36), thereby keeping this landlocked country

surrounded by friendly states in an unceasing state of alertness. It is arguably easy to develop an argument opposing the general proposition of this paper, making prudence the most valuable trait of a statesman and emphasising the “unpredictability of events” (Witney, 2011, p. 6) used as justification for the retention of armed forces. It is, nevertheless, no less rational to give up one’s arms when they are no longer needed and refocus one’s resources on areas where contribution unrestrained by the need to project one’s power is possible and due. Czech strategic interests seem to be preoccupied with its own survival, but a list of security threats composed by the Czech Ministry of Interior (2018) refutes the claim for the need of stronger military capacities as it does not considerably differ from the one created on the EU level. Importantly, Czechia would be, in spite of the absence of a national army, capable of making significant contribution to endeavours ensuring its own and other EU member states’ wellbeing benefiting from as well as fulfilling the “Solidarity Clause” (TFEU, art. 222 as cited in European Commission, 2015, p. 9). By detaching itself from NATO, Czechia will become the seventh EU member state that is not a NATO member (“Member countries,” 2018). Theoretically, participation in the PfP is a possibility as the programme allows countries to choose “their own priorities for cooperation (“Partnership,” 2017). Support from the media and general public will play a fundamental role for these challenging steps.

The absence of a plebiscite and any form of public debate prior to Czechia’s accession to NATO might prove decisive. Low level of influence that the public has had on decision-making concerning security matters could be a source of Czech hesitation towards NATO, provided that a sufficient amount of political support has been already mustered. To reiterate, feelings of insecurity induced by a military threat are lacking among Czechs. Results of a *Gallup World Poll* (2015) show that only 15% of Czechs see Russia as the “biggest threat,” as opposed to Poland and Estonia, for instance, where the Russian Federation is regarded as the most dangerous by 69% and 58% of citizens, respectively. Then, if neither the political community nor the

people feel seriously threatened, what fuels the continued influence of militarisation on political ideology and culture might be, to some extent, a strategy of fear-mongering as part of political opportunism. The correctness of such a conclusion is rather unclear as there has not been a proper political discussion that would allude to the rejection of NATO.

What has been on the political agenda for the past few years is a piece of legislation that would finally bridge the critical gap between the private security sector and the law. Czech private security companies (PSCs), providing predominantly passive security services (for instance, property & personal protection, detective services, inter alia) domestically, have been since their initial formation at the end of the Cold War given little attention (Bureš, 2012; 2014). Consequently, 7,000+ Czech PSCs organised into at least 16 professional associations (Bureš, 2014, p. 95) are not regulated by a specific legal act (Bureš, 2012, p. 54; “Návrh zákona,” n.d.). This is a real security issue that the Czech government needs to resolve in any case. However, such an opportunity would allow for facilitation of a closer alignment between the public and private security providers, meaning the Police of the Czech Republic and the Union of Security Services of the Czech Republic. Internal order and law enforcement would thus be guaranteed and contradictory processes possibly generated by demilitarisation of the state (Lamb, 1999, p. 12) would be avoided.

In like manner, the majority of criteria describing the internal and external enabling environments will be satisfied since Czechia’s geographic location and economic and security situation allow it and its people to assume the responsibility for building global peace in its purest sense. Provided that Czech representatives to institutions concerned will be eloquent enough to formulate the motivations for such a decision, Czech Republic may serve as a role model for other nations to come. Nevertheless, the Czech people and their leaders must first adopt an unrelenting attitude and become the adherents of a credo reminding of the fact that if war is illegal under the international law, so should be armies. Their retention in the 21st century

is only a bad habit cultivated by ill-defined concepts of national interests often privileging national pride over people. And that is the message Czechia is to convey via its actions.

VI. Conclusion

As shown above, demilitarisation may transform from being only a theoretical concept, practiced temporarily with the aim of ceasing hostilities in a conflict as part of foreign intervention, to a reality, permanently embedded in the world culture. Costa Rica has demonstrated the feasibility of this plan and Czechia has what it takes to be able to follow suit. Nevertheless, areas that the Czech society needs to address in order to create an enabling internal environment have been identified; that is namely to produce a regulatory legal framework for the private security sector and to facilitate a supportive public opinion propelling the national administration towards its peaceful objectives. Although it may at first seem as an unattainable goal for the rest of the world is unlikely to embrace such a post-modern view and may thus pose a threat, the Czech external enabling environment does provide for a successful transition. Furthermore, His Holiness the 14th Dalai Lama (1988) reminds us in his “Address to the Members of the European Parliament”, that the unthinkable has once become a reality when Germany and France, after centuries of bloody animosities, joined forces and began to co-create a peaceful Europe (para. 1 as cited in “Strasbourg Proposal,” 1988). History is teaching us that “peace through strength” is, essentially, an oxymoron as the belief that the larger a nation’s military is, the more secure the nation is, is the opposite of truth (Hartmann, 2015). For that reason, demilitarisation is the way to achieve global peace. In conclusion, “you may say that I am a dreamer, but I am not the only one” (Lennon, 1971, 2:12).

Contents

I. Introduction.....	3
II. The Concept of Demilitarisation.....	5
III. The State of Play in the World	8
IV. The Current State of Affairs in the Czech Security Environment	11
V. The Case for Czech Demilitarisation	14
VI. Conclusion	19

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Influence of Mood on Creativity

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Abstract

This research focuses on the link between good/bad mood and enhanced/impaired creativity. It compares creativity levels of people with bad mood and of people in good mood to compare effects of the two groups of moods. The researcher induces different mood in each group of the participants and asks them to fill out a Kaufman Domains of Creativity Scale (K-DOCS) before and after the mood induction. The means of creativity scores of every group from before the mood induction will be compared to the means of scores after the mood induction. The aim of this research is to support the hypothesis that bad mood will significantly hamper participants' creativity level. The author concluded that mood does influence creativity. Subjects shown positive video demonstrated increased creativity scores and subjects shown negative video had decreased creativity scores.

Keywords: mood, creativity, K-DOCS, mood induction

Influence of Mood on Creativity

Although there are numerous definitions to the concept, creativity can be summed up as an ability of an individual to produce novel and useful products (Mumford, 2003). According to Robert Sternberg, creative individuals generate ideas that may be considered ridiculous by the others, before they are generally accepted (Sternberg, 1991). Mood of humans often fluctuates and therefore has an impact on people's daily life. According to Forgas mood is defined as "low- intensity, diffuse and relatively enduring affective states without a salient antecedent cause and therefore little conscious cognitive content (Forgas, 2006, p. 110)." The author of this research paper is interested in how different mood can impact one's creativity, since both are crucial parts of daily life.

Literature Review

The author of this paper found that a number of studies have been done to evaluate the influence of mood on creativity. However, most of the studies yield conflicting results. Based on the studies and their contradictions, the author developed the hypothesis for this research.

Generally, studies support the influence of positive mood on creativity. For instance, Zenasni and Lubart (2002) concluded that in participants with good mood the creative performance was stimulated. Similarly, a meta-analysis by Matthijs Baas, Carsten K. W. De Dreu, and Bernard A. Nijstad concluded that positive mood is associated with higher scores in creativity, in form of value of creative output, more abundant associations between concepts, and originality of ideas (Baas, De Dreu, & Nijstad, 2008). More studies, results of which confirm positive mood enhancing creativity are, for instance, the study of 220 employees of a manufacture which found that employee mood and job complexity were linked with better

performance through the mediator creativity (Liu, 2016). In a like manner, in the study of Tang and Naumann, creativity of employees with team- positive mood was positively affected (Tang, Naumann, 2016).

Neutral results with no clear standpoint include but are not limited to the following studies; Chermahini and Hommel found that different levels of dopamine influence one's mood in different ways; high levels of this neurotransmitter supports convergent thinking and low levels impair divergent thinking (Akbari Chermahini, Hommel, 2010). As well as the research of Chen, Wu, and Plucker which suggest that there was no difference between the effects of neutral mood on creativity and the effects of bad mood on creativity (Chen, Wu, Plucker, 2016).

However, there are a few contradictory conclusions as well. Anderson, Arlett, and Tarrant (1995) found that positive mood showed a significantly inhibitory effect on creativity compared to neutral mood. Additionally, Szymanski and Repetto (2000) concluded that negative mood helps in creative problem solving; similarly to the findings of Mraz and Runco (1994), whose research deduced that significantly negative mood based on suicidal thoughts positively contributed to one's ability to solve problems.

In sum, most of the reviewed literature supports the effect of positive mood on creativity, but some studies yield neutral and contradictory results as well. Therefore, the author concludes the previous research in this area is inconsistent.

Research Question

What is the influence of mood on creativity?

Hypothesis

The author predicts that participants in the group with ‘good’ mood will report higher creativity levels than the participants in the group with ‘bad’ mood.

Method

Participants

The participants of this research were recruited with the help of professor Bethany Butzer, Ph.D., who sent the links to the online survey to her students. Additionally, the author distributed the same questionnaires to more students that she approached during her free time. The participants were undergraduate students of different universities in Prague. They are young adults, aged between nineteen and twenty-six years old. They were chosen through random sampling, with no preference of gender, major, or age. The sample size is fifty-eight participants, twenty-nine students in each experimental group. All of the subjects participated voluntarily.

Procedure

The participants were given an informed consent before they participated in the study (see appendix). This study was reviewed by the course professor Bethany Butzer, Ph.D. in order to recognize any potential ethical risks.

The participants were randomly assigned a condition. The random assignment was ensured by telling participants to choose only one of the two links provided (two experimental groups). According to their random choice, they were shown either a positive, funny video (cats filmed in awkward situations by their owners), or a sad, negative one (a story of a little boy thinking about his deceased father) (see appendix). Both videos were three minutes in length. This way, the researcher tried to induce mood in participants. Before as well as after seeing the

Running head: MOOD AND CREATIVITY

video, they were asked to fill out Kaufman Domains of Creativity Scale (K-DOCS) (see appendix). K-DOCS was split equally in half, so before seeing the video the participants answered twenty-five questions, and after seeing the video they answered another twenty-five questions.

After the experiment finished, every participant was appropriately debriefed with a debriefing form (see appendix).

Instrumentation

The questionnaire used in this study is Kaufman Domains of Creativity Scale (K-DOCS) (Kaufman, 2012). This scale lists creative behaviors in different domains. There are five domains: everyday, scholarly, performance, science, and the arts. There is a total of fifty items on the questionnaire. Each participant records the extent to which they rate their creativity in that area. The rating is done through a five-point Likert scale: 1 (much less creative), 2 (less creative), 3 (neither more nor less creative), 4 (more creative), 5 (much more creative). The example of an item is as follows:

1. Finding something fun to do when I have no money _____

According to McKay, Karwowski, and Kaufman, the Kaufman Domains of Creativity Scale is reliable, based on its factor structure. (McKay, Karwowski, Kaufman, 2017). Additionally, the same authors confirmed convergent and discriminant validity of this scale (McKay, Karwowski, Kaufman, 2017).

Research Design

This study appoints an experimental design. The mood of participants was induced to create two experimental groups; participants in a bad mood and participants in a good mood.

Running head: MOOD AND CREATIVITY

Both of the groups were then describing their creativity using a questionnaire with a Likert-scale rating. The independent variable in this study is the mood of the participant (good vs. bad). The dependent variable is the creativity score.

Data Analysis

A related-samples t-test was used to analyze the collected data and determine the difference between the level of creativity before and after the mood induction. To characterize the sample, descriptive statistics were used, namely number of valid responses, standard deviation, and standard error of the mean.

Results

Descriptive Statistics

Fifty-eight subjects voluntarily participated in this study ($N_1=29$, $N_2=29$). The standard deviation for the group with positive mood induction was $SD = 47.677$, and for the group with the negative mood induction was $SD = 28.369$ (see tables 2 and 4). Standard deviation of the mean in the first and second experimental group was $SE = 8.853$ and $SE = 5.268$ respectively (see tables 2 and 4).

Test of Hypothesis

A related-samples t-test was used to determine whether there was a statistically significant mean difference between participants' scores on KDOCS before and after mood induction.

For the first group, in which positive mood was induced, participants scored higher on creativity test after the mood induction ($M=115.86$) than before the mood induction ($M=79.14$),

the mean increase of 36.72 points on creativity scale, $t(28) = 4.148$, $p = .000$ (see tables 1 and 2).

For the second group, in which negative mood was induced, participants scored slightly lower on creativity test after the mood induction ($M=76.83$) than before the mood induction ($M= 89.72$), the mean decrease of 12.89 points on creativity scale, $t(28) = 2.448$, $p = .021$ (see tables 3 and 4).

Discussion

Summary of Findings

This study found that mood does influence creativity, as suggested in the hypothesis. After they saw a positive video, participants scored significantly higher on creativity test than before the video. When a negative video was shown, participants scores did not change rapidly, but there was a slight decrease in creativity scores after the video. Therefore, the hypothesis proposed by the author was supported.

Interpretation of Findings

The previous research in this area yielded inconsistent results. However, the results of this study showed that both positive and negative mood influence creativity. Positive mood caused an increase in creativity scores and negative mood caused a decrease in creativity scores.

Limitations

The limitations of this study are relatively small sample size, unknown mood before the video was shown and self-reported data.

The sample size was $N=29$ for each experimental group, which should be increased to obtain results more applicable to general population.

The mood of participants before the experimental condition was not evaluated and therefore, their initial mood could be a confounding variable causing skewed scores.

Lastly, the mood was evaluated by self-reporting, which is a technique known to be prone to errors due to biases, mainly exaggeration. Participants may try to report better scores than the actual scores.

Implications and Future Research

The author of this study suggest further research should be done in the area, mainly in larger samples and with better mood and creativity evaluation method.

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Appendix

Videos used for mood induction

Positive Mood: <https://www.youtube.com/watch?v=WP4Uh66FA3A>

Negative Mood: <https://www.youtube.com/watch?v=OUDIF4dkhJM>

Running head: MOOD AND CREATIVITY

Kaufman Domains of Creativity Scale (K-DOCS)

Instructions: Compared to people of approximately your age and life experience, how creative would you rate yourself for each of the following acts? For acts that you have not specifically done, estimate your creative potential based on your performance on similar tasks.

1 = Much less creative

2 = less creative

3 = neither more nor less creative 4 = more creative

5 = much more creative

1. Finding something fun to do when I have no money _____
2. Helping other people cope with a difficult situation _____
3. Teaching someone how to do something _____
4. Maintaining a good balance between my work and my personal life _____
5. Understanding how to make myself happy _____
6. Being able to work through my personal problems in a healthy way _____
7. Thinking of new ways to help people _____
8. Choosing the best solution to a problem _____
9. Planning a trip or event with friends that meets everyone's needs _____
10. Mediating a dispute or argument between two friends _____
11. Getting people to feel relaxed and at ease _____
12. Writing a non-fiction article for a newspaper, newsletter, or magazine _____
13. Writing a letter to the editor _____
14. Researching a topic using many different types of sources that may not be readily apparent _____
15. Debating a controversial topic from my own perspective _____
16. Responding to an issue in a context-appropriate way _____

17. Gathering the best possible assortment of articles or papers to support a specific point of view _____
18. Arguing a side in a debate that I do not personally agree with _____
19. Analyzing the themes in a good book _____
20. Figuring out how to integrate critiques and suggestions while revising a work _____
21. Being able to offer constructive feedback based on my own reading of a paper _____
22. Coming up with a new way to think about an old debate _____
23. Writing a poem _____
24. Making up lyrics to a funny song _____
25. Making up rhymes _____
26. Composing an original song _____
27. Learning how to play a musical instrument _____
28. Shooting a fun video to air on YouTube _____
29. Singing in harmony _____
30. Spontaneously creating lyrics to a rap song _____
31. Playing music in public _____
32. Acting in a play _____
33. Carving something out of wood or similar material _____
34. Figuring out how to fix a frozen or buggy computer _____
35. Writing a computer program _____
36. Solving math puzzles _____
37. Taking apart machines and figuring out how they work _____

38. Building something mechanical (like a robot) _____
39. Helping to carry out or design a scientific experiment _____
40. Solving an algebraic or geometric proof _____
41. Constructing something out of metal, stone, or similar material _____
42. Drawing a picture of something I've never actually seen (like an alien) _____
43. Sketching a person or object _____
44. Doodling/Drawing random or geometric designs _____
45. Making a scrapbook page out of my photographs _____
46. Taking a well-composed photograph using an interesting angle or approach _____
47. Making a sculpture or piece of pottery _____
48. Appreciating a beautiful painting _____
49. Coming up with my own interpretation of a classic work of art _____
50. Enjoying an art museum _____

Running head: MOOD AND CREATIVITY

Demographics Questionnaire

Your Gender:

Male

Female

I want to describe: _____

Your Age: _____

Please select the race/ethnicity category that best describes you:

Black / African American

Native American / American Indian / Alaskan Native White or Caucasian

Asian / Indian

Latino / Hispanic

Middle Eastern

Other:

Informed Consent Form

1. **Summary:** This research study will examine link between one's mood and creativity. If you agree to participate, you will be shown a short video, and given a questionnaire to evaluate your level of creativity in different areas.
2. **Your right to withdraw/discontinue:** You are free to ask questions or to discontinue your participation at any time without penalty. You may also skip any survey questions or study procedures that make you feel uncomfortable.
3. **Benefits:** Participation in this research study does not guarantee any benefits to you. However, possible benefits include the fact that you may learn something about how research studies are conducted and you may learn something about this area of research (i.e., how mood influences creativity).
4. **Additional information:** You will be given additional information about the study after your participation is complete.
5. **Time commitment:** If you agree to participate in the study, it may take up to 15 minutes to complete the survey.
6. **Guarantee of Confidentiality:** All data from this study will be kept from inappropriate disclosure and will be accessible only to the researchers. The researchers are not interested in anyone's individual responses, only the average responses of everyone in the study.
7. **Risks:** *The present research is designed to reduce the possibility of any negative experiences as a result of participation. Risks to participants are kept to a minimum. However, if your participation in this study causes you any concerns, anxiety, or distress, please contact the UNYP Student Counseling Center at counseling@unyp.cz to make an appointment to discuss your concerns.*

8. **Researcher Contact Information:** This research study is being conducted by Nikoleta Demcakova for a Research Methods course. The course instructor is Dr. Bethany Butzer, Lecturer in the Psychology department at the University of New York in Prague. If you have questions or concerns about your participation in this study, you may contact the researcher at xdemcakovan@student.unyp.cz
9. **Results of the Study:** You may obtain information about the outcome of the study at the end of the Fall 2018 semester by contacting the researcher listed above.
10. **Verification of Adult Age:** By signing below, you attest that you are 18 years old or older.
11. **Verification of Informed Consent:** By signing below, you are indicating that you have freely consented to participate in this research study.

PARTICIPANT'S FULL NAME (printed): _____

PARTICIPANT'S SIGNATURE: DATE: _____

Debriefing Form

Title of Research: Influence of Mood on Creativity

Thank you for participating in this research. You have made an important contribution to a developing body of knowledge in Psychology. Now that your participation is complete, we can tell you more about the study you have just participated in.

This study was designed to find links between good/bad mood and enhanced/impaired creativity. According to previous research, there has been inconsistency in the results of similar studies. However, all studies showed that mood impacts creativity in a certain way.

The participants were randomly assigned a condition, according to which they are shown either a positive, funny video, or a sad, negative one. This way, the researcher induced certain mood in participants. After seeing the video, they were asked to fill out Kaufman Domains of Creativity Scale (K-DOCS). This scale lists creative behaviors in different areas of interest. Each participant recorded the extent to which they rate their creativity in that area.

If you have any further questions, please feel free to contact Nikoleta Demcakova (e-mail: xdemcakovan@student.unyp.cz).

For more information on this topic, some references are provided below.

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Running head: MOOD AND CREATIVITY

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Tables

Table 1.

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 creativity_before	79.14	29	12.112	2.249
creativity_after	115.86	29	45.016	8.359

Table 2.

Paired Samples Test

	Paired Differences							
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pair 1 creativity_before - creativity_after	-36.724	47.677	8.853	-54.860	-18.589	-4.148	28	.000

Table 3.

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 creativity_before	89.72	29	30.805	5.720
creativity_after	76.83	29	12.459	2.314

Table 4.

Paired Samples Test

	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1 creativity_before - creativity_after	12.897	28.369	5.268	2.105	23.688	2.448	28	.021	