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The Relationship Between Eating Disorder Symptoms and Satisfaction with Specific Life Domains in Female University Students

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Abstract

According to research, lower satisfaction with specific life domains seems to be related to more severe eating disorder symptoms in clinical and non-clinical samples. The current study examined whether satisfaction with and importance of specific life domains were predictive for eating disorder symptoms in a non-clinical sample. Female university students ($N = 112$) completed the Brief Multidimensional Students' Life Satisfaction Scale to measure satisfaction with and importance of seven specific life domains (family, friendships, school experience, self, where you live, romantic relationships, physical appearance) and overall satisfaction. To measure eating disorder symptoms, participants completed the Eating Disorder Examination Questionnaire. Linear regression analyses showed that average satisfaction with specific life domains was significantly predictive for and negatively related to eating disorder symptoms, and this prediction was predominantly driven by satisfaction with physical appearance. Furthermore, eating disorder symptoms were not significantly predicted by average importance of specific life domains, while further analyses showed that importance of physical appearance, friendships, and the self were significant predictors of eating disorder symptoms. To elaborate, the results indicated that individuals with lower satisfaction with specific life domains, especially lower satisfaction with physical appearance, and individuals that reported lower importance of the self, but higher importance of physical appearance and friendships showed more severe eating disorder symptoms. This research highlights the potentially relevant role of satisfaction with specific life domains in eating disorder symptoms. Further longitudinal research should examine the directionality of the relationships, and whether enhancing satisfaction with specific life domains could reduce eating disorder symptoms.

Keywords: eating disorder symptoms, non-clinical, life satisfaction, life domains, females, students

Introduction

Adolescents, including college students, are at high risk for developing eating disorders, (Budd, 2007; Matthews et al., 2012), about 12% of adolescents have experienced some form of an eating disorder (Góngora, 2014; Swanson et al., 2011). Disordered eating contains a variety of abnormal eating behaviours, for example eating too little, too much or too irregularly (Grieve et al., 2006; Milligan & Pritchard, 2006). Most research is nonetheless based on clinical forms of eating disorders, such as anorexia nervosa and bulimia nervosa. Therefore, it is important to conduct more research on non-clinical disordered eating, since non-clinical forms of disordered eating are estimated to occur at least twice as often as clinical eating disorders and may have some of the same negative consequences (Shisslak et al., 1995).

Several factors are known to be risk factors for developing disordered eating, such as body dissatisfaction, a history of depression, weight concerns, dieting, media influence, negative affect, and peer teasing (Góngora, 2014; Levine & Smolak, 2006; Stice et al., 2009). Although research on protective factors for eating disorders is limited, two studies have shown that high self-esteem, positive body image, positive self-evaluation, athletic participation, active rejection of the media image of thinness, and empowerment to express opinions and feelings could serve as protective factors for eating disorders (Gustafsson et al., 2009; Levine & Smolak, 2006). Since the positive focus in preventive interventions aimed at protective factors for disordered eating might potentially be useful in preventing eating disorders, more research on protective factors is important (Levine & Smolak, 2006).

Furthermore, a factor that has been examined as a potential protective factor for eating disorder symptoms and has been found to be correlated with disordered eating behaviours, is satisfaction with life (Góngora et al., 2014; Matthews et al., 2012). Satisfaction with life has been defined as one's subjective perception about the quality of one's own existence (Post et

al., 1998). Satisfaction with life can be considered as a subjective measure of quality of life (Zullig et al., 2007) and enhancing quality of life is often addressed as a fundamental aspect of health promotion (Diener, 2000). Furthermore, according to Frisch (2006), assessing satisfaction with life provides an indication of the subjective evaluation of the degree to which one's most important needs, goals and wishes have been fulfilled. These evaluations are expected to influence subsequent behavioural responses, and in the case of positive evaluations, are expected to increase resilience (Diener et al., 2004; Lazarus, 1991). For example, Suldo and Huebner (2004) found that high global satisfaction with life served as a protective factor against the development of behavioural problems throughout detrimental life experiences in adolescence. Moreover, it has been shown that low satisfaction with life was related to a variety of maladaptive health-related outcomes in adolescents, including higher rates of suicidal behaviour, substance use, and violent behaviour (Valois et al., 2001, 2004; Zullig et al., 2001).

Empirical research in clinical samples seems to show that lower overall satisfaction with life is related to eating disorders in young adults (Garcia et al., 2017; Kitsantas et al., 2003; Magallares et al., 2014). The lower satisfaction might be explained by the physical and mental health impairments which are associated with eating disorders, such as damage in the digestive and cardiac systems, feelings of depression, diminished self-esteem and poor social functioning (de la Rie et al., 2003; Swallen et al., 2005). Research with non-clinical samples showed similar results, namely that unhealthful weight perceptions and dieting behaviors were related to lower life satisfaction in middle school students (Esch & Zullig, 2008), high school students (Valois et al., 2003), and college students (Schnettler et al., 2017; Zullig et al., 2007).

Moreover, according to Diener and Seligman (2004) it is important that next to overall LS (life as a whole), satisfaction with specific life domains is identified (e.g., family, romantic

relationships, and school) to establish a correct and complete picture of one's satisfaction with life. So far, two studies examined the relationship between eating disorder symptoms and satisfaction with specific life domains, of which one in a non-clinical sample (Matthews et al., 2012) and one in a clinical sample (van Doornik et al., 2021). In the study of Matthews et al. (2012) with a non-clinical college student sample, body weight and dietary behaviour variables from the National College Health Risk Behaviour Survey (NCHRBS; CDC, 1997) and the American College Health Association's National College Health Assessment (NCHA; American College Health Association, 2004) were used to measure disordered eating symptoms. Satisfaction with specific life domains was measured with the Brief Multidimensional Students' Life Satisfaction Scale College Version (BMSLSS-C; Zullig et al., 2009), which includes the domains of family, friendships, school, self, environment, relationships, physical appearance, and global life. Satisfaction with physical appearance and the self were most strongly related to weight perception and disordered eating behaviour. Furthermore, the recent study of van Doornik et al. (2021) with a clinical sample examined whether adolescents with Anorexia Nervosa reported lower satisfaction with normative life domains than adolescents without an eating disorder. The severity of eating disorder pathology was measured with the Eating Disorder Examination Questionnaire (EDE-Q) and satisfaction with normative life domains was measured with the Brief Multidimensional Students' Life Satisfaction Scale-Peabody Treatment Progress Battery version (BMSLSS-PTPB; Bickman et al., 2007) with normative life domains family, friendships, school experience, living location, and an overall life item included. Van Doornik et al. (2021) also included importance of normative life domains next to satisfaction with normative life domains in order to broaden the body of research. They expected lower importance of normative life domains, since the striving for goals related to Anorexia Nervosa (e.g., losing weight) might cause patients to neglect other personal values and normative sources of life

meaning (Mulkerrin et al., 2016). However, the results indicated that there were no differences in reported importance of specific life domains between Anorexia Nervosa patients and the control group. The results also showed that individuals with Anorexia Nervosa reported lower satisfaction with life domains than individuals without an eating disorder, and this overall group difference was mainly caused by lower satisfaction with the self, school experiences, and life in general in individuals with Anorexia Nervosa. Thus, both the study of Matthews et al. (2012) in a non-clinical sample and the study of van Doornik et al. (2021) in a clinical sample show the relevance of examining satisfaction with specific life domains, instead of merely overall satisfaction with life, in relation to eating disorder symptoms. Since studies examining the relationship between eating disorder symptoms and satisfaction with specific life domains are limited, it is important to expand the body of research by conducting similar studies to draw stronger conclusions about the relationship.

Therefore, the aim of the current study is to add to the existing literature by examining whether results in previous research about the relationship between satisfaction with specific life domains and eating disorder symptoms are found again in a non-clinical sample of female university students. Additionally, the goal of the current study is to expand the existing literature by using a well validated and extensive measure of eating disorder symptoms (EDE-Q; Fairburn & Beglin, 2008), thus different than the measures used in the study of Matthews et al. (2012). Based on previous research (Matthews et al., 2012; van Doornik et al., 2021), it is expected that low average satisfaction with specific life domains is related to and predictive for more severe eating disorder symptoms (H1). Additionally, we will examine whether each of the specific life domains from the BMSLSS-C are individually related to disorder symptoms. Based on the study results of Matthews et al. (2012) and van Doornik et al. (2021), we hypothesize that satisfaction with the self and physical appearance are the strongest predictors of eating disorder symptoms (H2). Besides, since individuals with eating disorders

primarily guide their lives by values related to weight, shape, and eating behaviour (Fairburn et al., 2003), we also hypothesized that average importance of specific life domains is negatively related to eating disorder symptoms (H3), and that importance of the self and physical appearance are the strongest predictors of eating disorder symptoms (H4).

Method

Participants

The sample in this study consisted of 112 first-year female students ($M_{\text{age}} = 19.46$, $SD = 1.50$) between the ages of 17 and 24 from the University of Groningen, who participated as partial fulfilment of a first-year course requirement. Participants completed the study either in English ($n = 73$) or in Dutch ($n = 39$). Data collection occurred between October and December 2019. Only female participants were included and no other inclusion- or exclusion criteria were applied.

Materials

Eating disorder symptoms

To measure eating disorder symptoms, participants completed the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 2008). This questionnaire assesses self-reported eating disorder symptoms over the last 28 days. The EDE-Q covers four subscales: assessing restraint, shape concerns, weight concerns, and eating concerns. Items can be answered on a scale from 0 (no days/not at all) to 6 (every day/markedly). All scores of the 22 items were summed and averaged to indicate the severity of the eating disorder psychopathology, with higher scores indicating more severe eating disorder psychopathology (Aardoom, et al., 2012). The internal consistency of the EDE-Q was $\alpha = .86$.

Satisfaction with and importance of specific life domains

In order to measure satisfaction with specific life domains, the participants completed the Brief Multidimensional Students' Life Satisfaction Scale-College Version (BMSLSS-C;

Zullig et al., 2009). The BMSLSS (Huebner, 1994) was initially designed as a reliable measure for satisfaction with specific life domains, whilst keeping the scale as brief as possible. The BMSLSS-C is based on the BMSLSS, expanded with three supplementary domains relevant for college students. The BMSLSS-C assesses self-reported satisfaction with seven specific life domains: family, friendships, school experience, self, where you live, romantic relationships, physical appearance, and an eighth global LS item assessing satisfaction with overall life. There is one question per domain and the questions in the BMSLSS-C were stated as follows: 'For each of the items please rate: -how satisfied you are with it at this moment'. Items are answered on a five-point Likert-type scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Averages of the ratings of the eight satisfaction items were calculated, with higher scores indicating higher satisfaction with specific life domains (Athay et al., 2012). However, the internal consistency for the satisfaction items was questionable ($\alpha = .63$).

Next to self-reported satisfaction, self-reported importance of each life domain and overall life was also obtained. The questions were stated similarly as the satisfaction items: 'For each of the items please rate: -how important it is for you (how much meaning it gives to your life)' with a five-point Likert type answering scale ranging from 1 (very unimportant) to 5 (very important; Seligson et al., 2003). The items were scored in a similar way as the satisfaction items and higher scores indicated higher importance of specific life domains. The internal consistency for the importance items was acceptable ($\alpha = .71$).

Procedure

The current study was approved by the ethical committee of the department Psychology at the University of Groningen (ECP: PSY-1819-0294). Since this study was part of a bigger research about self-disgust and eating disorder psychopathology, not all details of the procedure will be noted thoroughly. All participants provided written informed consent

after receiving instructions about the study protocol (Appendix B). The participants completed several questionnaires via Qualtrics, including the EDE-Q (Fairburn & Beglin, 2008) and BMSLSS-C (Zullig et al., 2009). The design of the study was cross-sectional, there was one measuring moment and one group of participants.

Statistical analyses

SPSS was used to perform all the required statistic tests with a significance level of $\alpha = .05$. All assumptions were tested in advance.

The relationship between eating disorder symptoms and satisfaction with specific life domains was assessed by a simple linear regression and a multiple linear regression. An additional average score over all eight satisfaction with specific life domains items was calculated for the first analysis. A priori power calculations using G*Power (Faul et al., 2007) based on a linear simple regression with one predictor and an effect size of 0.15, indicated that a sample size of 55 is required to meet a power of .8 with $\alpha = .05$. Furthermore, a priori power calculations based on a linear multiple regression with eight predictors, an effect size of .15, and an alpha of .05, indicated that a sample size of 103 is required to meet a power of .8. In order to measure the relationship between eating disorder symptoms and importance of specific life domains, another simple linear regression analysis and multiple linear regression analysis were executed. For the simple linear regression analysis, an additional average score over all eight importance items was calculated.

Results

Participant characteristics

Participant characteristics (mean age, BMI, EDE-Q score, and BMSLSS-C scores) are presented in Table 1 and 2.

Table 1

Group characteristics.

Variable	<i>M</i>	<i>SD</i>
Age	19.46	1.50
BMI	22.31	3.57
EDE-Q	2.52	1.01

Note. BMI, Body Mass Index; EDE-Q, mean score on the Eating Disorder Examination Questionnaire (range 1-7); *N* = 112.

Table 2*Group characteristics BMSLSS-C.*

	Satisfaction		Importance	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Family life	4.11	1.14	4.64	.84
Friendships	4.24	.87	4.79	.56
School experience	3.73	1.07	4.39	.75
Myself	3.51	1.06	4.42	.79
Where I live	4.07	1.16	3.91	1.01
Romantic relationships	3.30	1.46	4.37	.94
Physical appearance	3.17	1.13	4.03	.83
Overall life	3.97	.86	4.72	.63
Average	3.76	.58	4.41	.46

Note. BMSLSS-C, mean scores on Brief Multidimensional Students' Life Satisfaction Scale-College Version, satisfaction and importance (range 1-5); *N* = 112.

Assumptions

In linear regression both the dependent variable and the independent variable(s) should be measured on a continuous level, residuals should be independent, the relationship between the dependent and the independent variable(s) should be linear, residuals should be homogeneous, residuals should be normally distributed, and outliers should be checked. In multiple linear regression, the assumption of no multicollinearity is added. The first three assumptions were met for all four analyses. The remaining assumptions were checked by various tests in SPSS.

Linear regressions with satisfaction with specific life domains

To explore whether average satisfaction with specific life domains could predict eating disorder symptoms, a simple linear regression analysis was computed. The remaining assumptions were checked by visual inspections of scatterplots and a normal probability plot (Appendix B), these indicated that the linearity, homoscedasticity, and normality assumptions were not violated. Furthermore, there were no outliers.

Subsequently, a multiple regression analysis was executed to examine how each individual satisfaction domain was related to eating disorder symptoms. Visual inspections of scatterplots and a normal probability plot suggested that the assumptions of homoscedasticity, linearity, and normality were not violated (Appendix B). Furthermore, relatively high tolerances for all predictors (i.e., all greater than 0.1) indicated that multicollinearity would not interfere with our ability to interpret the outcome of the multiple regression analysis (Frisch, 1935; Neter et al., 1983). There were no studentized deleted residuals greater than ± 3 , no leverage values greater than 0.2, and no values for Cook's distance above 1, thus no problematic outliers.

Simple regression analysis

Average satisfaction with life domains significantly predicted mean EDE-Q score, ($F(1, 110) = 11.92, p = 0.001$). Furthermore, this model accounted for 9.80% of the variation in

EDE-Q score with adjusted $R^2 = .09$ ($F(1, 110) = 11.92, p = 0.001$), a small effect size according to Cohen (1988). The regression coefficient was $-.54$ and significant, $t(110) = -3.45, p = .001$, hence higher and thus more severe eating disorder symptoms are associated with lower satisfaction with life.

Multiple regression analysis

The multiple regression model with satisfaction with eight specific life domains as independent variables significantly predicted mean EDE-Q score, $F(8, 103) = 5.51, p < 0.001$. R^2 for the overall model was $.30$ with an adjusted R^2 of $.25$, a small to medium effect size. As can be seen in Table 3, only satisfaction with physical appearance added significantly to the prediction.

Table 3

Multiple regression results for EDE-Q score and satisfaction with life domains.

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Family life	-.15	.08	-.17	-1.76	[-.31, .02]
Friendships	.15	.11	.13	1.39	[-.06, .35]
School experience	.04	.09	.04	.43	[-.15, .22]
Myself	-.02	.11	-.02	-.16	[-.24, .20]
Where I live	.002	.08	.002	.03	[-.16, .16]
Romantic relationships	-.02	.06	-.03	-.34	[-.14, .10]
Physical appearance	-.40	.09	-.45	-4.16***	[-.58, -.23]
Overall life	-.06	.14	-.05	-.43	[-.34, .22]

Note. CI = confidence interval for unstandardized coefficient *B*; $N = 112$; *** $p < .001$.

Linear regressions with importance of specific life domains

Assumptions

To examine whether average importance of specific life domains was able to predict eating disorder symptoms, a simple linear regression analysis was executed. The assumptions of a linear relationship between the variables and homoscedasticity and normality of residuals were not violated as indicated by visual inspections of plots (Appendix C). Finally, there were no outliers.

Additionally, a multiple regression analysis was conducted to examine which importance domains could predict eating disorder symptoms. Visual inspection of plots indicated that the assumptions of homoscedasticity, normality of residuals and linearity were not violated (Appendix C). Finally, no evidence for multicollinearity was found, as tolerance values were greater than 0.1. There were no studentized deleted residuals greater than ± 3 , however there were five leverage values greater than 0.2, yet no values for Cook's distance above 1, hence the outliers were not influential.

Simple regression analysis

Average importance of life domains did not significantly predict EDE-Q score, $F(1, 110) = .48, p = .492$, and explained only 0.4% of the variance in EDE-Q score with adjusted $R^2 = -.005$. The non-significant regression coefficient was $-.14, t(110) = -.69, p = .492$.

Multiple regression analysis

Although the simple linear regression model using average importance of life domains appeared not significant, a multiple regression was executed to examine the role of the specific life domains in eating disorder symptoms in order to check the hypothesis that importance of the self and physical appearance would be the strongest predictors of eating disorder symptoms. The multiple regression model with importance of eight specific life domains as independent variables significantly predicted EDE-Q score, $F(8, 103) = 3.59, p = 0.01$ with $R^2 = .23$, adjusted R^2 of .17, a small effect size. Physical appearance, friendships, and the self added significantly to the model, as shown in Table 4.

Table 4*Multiple regression results for EDE-Q score and importance of life domains.*

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Family life	-.22	.11	-.18	-1.93	[-.44, .01]
Friendships	.45	.18	.25	2.58*	[.11, .80]
School experience	-.02	.13	-.02	-.17	[-.28, .24]
Myself	-.38	.14	-.30	-2.77**	[-.66, -.11]
Where I live	-.13	.09	-.13	-1.43	[-.32, .05]
Romantic relationships	.06	.10	.06	.61	[-.14, .27]
Physical appearance	.46	.12	.38	3.91***	[.23, .70]
Overall life	-.18	.19	-.12	-.97	[-.56, .19]

Note. CI = confidence interval for unstandardized coefficient *B*; *N* = 112; **p* < .05; ***p* < .01;

****p* < .001.

Discussion

The purpose of this study was to examine the relationship between eating disorder symptoms and satisfaction with and importance of specific life domains in a non-clinical sample of female university students. We examined this by firstly exploring the relationship between eating disorder symptoms and average satisfaction with specific life domains, followed by an analysis of the relationship between eating disorder symptoms and satisfaction with the individual specific life domains. Subsequently, we examined the relationship between eating disorder symptoms and importance of specific life domains in a similar way. Consistent with our first hypothesis, less average satisfaction with specific life domains was related to more severe eating disorder symptoms. Additionally, in line with our second hypothesis, satisfaction with physical appearance appeared to be the strongest and only

significant predictor of eating disorder symptoms. However, in contrast to our second hypothesis, satisfaction with the self was not a significant predictor of eating disorder symptoms. Furthermore, results were not in line with the third hypothesis, as average importance of specific life domains did not significantly predict eating disorder symptoms. Finally, partly conform our fourth hypothesis, the results showed that importance of physical appearance was the strongest predictor of eating disorder symptoms, followed by importance of friends and importance of the self.

In the current study participants with more severe eating disorder symptoms reported lower average satisfaction with specific life domains, which is consistent with previous research (Schnettler et al., 2017; Zullig et al., 2007) in which disordered eating behaviour was found to be associated with lower life satisfaction among non-clinical female college students. The lower satisfaction might be related to the physical and mental health impairments which are associated with eating disorders (de la Rie et al., 2003; Swallen et al., 2005). Additionally, eating disorder patients experience less positive affect and higher negative affect than healthy individuals (Kitsantas et al., 2003). However, the scales in the previous studies were different than the scales used in the current study, since eating disorder symptoms were measured with the Revised Restraint Scale (Herman & Polivy, 1980) in the study of Schnettler et al. (2017), while Zullig et al. (2007) used a composite questionnaire about eating behaviour and weight concerns. Besides, Schnettler et al. (2017) measured overall life satisfaction with the Satisfaction with Life Scale (Diener et al., 1985). Thus, the current findings add support for the finding that lower average life satisfaction in non-clinical female university students is related to eating disorder symptoms, since this result is also found when measuring with different scales.

Besides this average satisfaction with life result, the analysis of satisfaction with the individual specific life domains showed that the more severe the eating disorder symptoms

were, the less satisfaction with physical appearance was experienced. This result is in accordance with previous research (Matthews et al., 2012), since they found the strongest relationship between students' weight perception and satisfaction with physical appearance. This prominent role of satisfaction with physical appearance in predicting eating disorder symptoms might be associated with the negative body image that individuals with eating disorders generally have (Prnjak et al., 2021). Negative body image is a key element in the development and maintenance of eating disorders which is also reflected in the transdiagnostic model of eating disorders, that states that in anorexia nervosa, bulimia nervosa, and atypical eating disorders there is a central cognitive disturbance concerning over-evaluation of eating, shape, and weight and their control (Fairburn et al., 2003). Additionally, this finding complies with the systematic review of Shagar et al. (2017) in which they highlighted that body dissatisfaction plays an important role in developing eating disorder symptoms. However, in contrast to our hypothesis, satisfaction with the self did not significantly predict eating disorder symptoms in the current study. Satisfaction with the self might be associated with self-esteem, which is often low in individuals suffering from eating disorders (Fairburn et al., 2003). Additionally, self-esteem seems to be strongly related to life satisfaction (Halvorsen & Heyerdahl, 2006). Therefore, it would be expected that lower satisfaction with the self would be related to more severe eating disorder symptoms. In contrary to our unexpected findings, Matthews et al. (2012) and van Doornik et al. (2021) found satisfaction with the self as one of the most strongly related domains to eating disorder symptoms. A possible explanation for this deviation could be that, unlike the study of van Doornik et al. (2021), our sample consisted of non-clinical participants instead of clinical participants, and there might be a difference between these samples in relation to satisfaction with the self. Since over-evaluation of weight and shape is a core feature of eating disorders (Fairburn et al., 2003), individuals suffering from eating disorders might associate the self

with their weight and shape, while non-clinical individuals might be able to associate the self with other aspects, such as personality. However, the samples of Matthews et al. (2012) and the current study were similar (i.e. non-clinical student samples), so the deviant result of satisfaction with the self compared to the study of Matthews et al. (2012) might be due to methodological differences between the studies, such as different measures for eating disorder symptoms and a larger sample size ($N = 570$) in the study of Matthews et al. (2012).

In contrast to our earlier findings of average satisfaction with specific life domains as significant predictor, average importance of specific life domains did not predict eating disorder symptoms in non-clinical female university students. We expected that for individuals with eating disorder symptoms, life domains other than weight and shape would be rated as less important, because individuals with eating disorders are mostly oriented towards life domains related to body shape and eating behaviour (Fairburn et al., 2003). This unexpected result is however in line with the study of van Doornik et al. (2021), in which importance of normative life domains could not differentiate between individuals with and without Anorexia Nervosa. A possible explanation for the unexpected result could be that since individuals with eating disorder symptoms are frequently striving for perfectionism (Bardone-Cone et al., 2007; Fairburn et al., 2003), they feel the urge to excel in all life domains and thus rate all life domains as relatively important (van Doornik et al., 2021). Despite this urge to excel in all life domains, the strong orientation towards body shape and eating behaviour might interfere with this desire to excel, which could explain the lower satisfaction with life domains in people with eating disorder symptoms.

Nevertheless, when adding all importance of specific life domains individually into the model, significant relationships were found in contrast to the model with overall importance of specific life domains. In line with the fourth hypothesis, results showed that the more severe the eating disorder symptoms were, the more important physical appearance was rated

by the participants. This implies once more that physical appearance plays an important role in eating disorder symptoms, which could be explained by the overvaluation and preoccupation with shape and weight in individuals with eating disorders (Christian et al., 2020). Although eating disorder symptoms were also significantly predicted by the importance of the self, which is in line with the fourth hypothesis, the importance of friendships predicted eating disorder symptoms to a larger extent. More specifically, the more severe the eating disorder symptoms, the more important friendships were rated, and the less important the self was rated by the participants. The unexpected prominent role of importance of friendships might be explained by research that shows that individuals with eating disorder symptoms attach great value to what other people think and believe about them, also referred to as the objectification theory (Fredrickson & Roberts, 1997). The finding of more severe eating disorder symptoms being related to lower reported importance of the self might be explained by the negative self-worth that individuals with eating disturbances often have (Overstreet & Quinn, 2012; Rieger et al., 2017).

The current study has several strengths, first of all it contained a substantial sample size of the group that is most likely to develop eating disorder symptoms, namely young women (Smink et al., 2014). Furthermore, eating disorder symptoms were measured with the EDE-Q (Fairburn & Beglin, 2008) instead of the NCHRBS (CDC, 1997) and the NCHA (American College Health Association, 2004) used in the study of Matthews et al. (2012). The use of the EDE-Q is considered as a strength, since it is a widely used questionnaire of which the validation and the reliability has been repeatedly established in systematic reviews (Allen et al., 2011; Berg et al., 2012). And finally, a strength of the current study is the use of specific life satisfaction and importance domains instead of overall life satisfaction and importance, because it provides a more complete picture of an individual's perception of their satisfaction with and importance of life (Matthews et al., 2012). Despite the important strengths of the

current study, limitations must be addressed as well. One limitation was that a cross-sectional design was used in this study, which implies that no judgements about causality can be made. Future research should longitudinally test the directionality of eating disorder symptoms and satisfaction with and importance of specific life domains, thus whether lower satisfaction levels contribute to the development or are a consequence of eating disorder symptoms or whether the relationship perhaps is bidirectional. This would be important, because a better understanding of those relationships could be helpful in designing interventions to counteract or reduce eating disorder symptoms. Moreover, the sample only consisted of female university students, while research shows that eating disorder symptoms, satisfaction with specific life domains, and the relationship between those variables can differ by gender (Matthews et al., 2012; Zullig et al., 2007). In future research, male participants should be included in order to examine whether satisfaction with and importance of life domains is also negatively related to eating disorder symptoms in males and which domains would be the most predictive in this respect. Furthermore, since our sample only consisted of female university students between the ages of 17 and 24, it may be useful to conduct a similar study with non-university students of different ages to generalize the results to a larger population. Another important limitation was that the Cronbach's Alfa of the BMSLSS-C scale in the current study was questionable ($\alpha = .63$), thus we are not entirely sure whether all items measured the same construct. However, this scale demonstrated good internal consistency ($\alpha = .80$) in previous research in college students (Zullig et al., 2009).

To conclude, average satisfaction with specific life domains was predictive for eating disorder symptoms and specifically satisfaction with physical appearance played an important role in this prediction. However, average importance of specific life domains appeared not predictive for eating disorder symptoms, while the analysis on importance of individual specific life domains showed that importance of physical appearance, friendships, and the self

predicted eating disorder symptoms. The current study provides preliminary evidence that satisfaction with specific life domains, predominantly satisfaction with physical appearance, and importance of physical appearance, friendships, and the self play a role in eating disorder symptoms in a non-clinical sample. The study of van Doornik et al. (2021) showed that lower life satisfaction, especially lower satisfaction with the self, school experiences, and life in general, is also present in a clinical sample with Anorexia Nervosa patients. An important subsequent step is to examine whether improving the satisfaction of these life domains by tailored interventions causes a reduction in eating disorder symptoms in order to investigate directions for eating disorder treatments.

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Appendix A

Study information for the participants

STUDY INFORMATION
(For participants, to take home)**“Empathy and the physiological reactivity for human and non-human stimuli”**
PSY-1819-S-0294

- **Researchers**

K. A. Glashouwer (postdoc researcher, department of Experimental Psychopathology)
I. Masselman (research assistant, department of Experimental Psychopathology)
Mona Müter (master student Clinical Psychology)
Siri Steinmann (master student Clinical Psychology)
Vania Vania Tjandradjaja (master student Clinical Psychology)

- **Contact information**

For practical questions please contact I. Masselman
i.masselman@rug.nl
050 36 37 369

- **Introduction**

You are invited to join our study into the relationship between empathy and the physiological reactivity to human and non-human stimuli. We are curious to see whether people that have high levels of empathy respond differently to seeing humans and non-human objects compared to people with low levels of empathy. We ask you to participate because you are part of the SONA or paid participant pool. Please read all information carefully and ask all the questions you might have. Please do so before agreeing to participate.

- **Purpose of the research**

In the current study we would like to examine the relationship between empathy and the physiological reactivity to human and non-human stimuli.

- **Summary of the research**

You will be expected to fill out multiple questionnaires as well as execute two short computer tasks (a task in which you view arousing pictures as well as a task in which you are asked to give your opinion about the pictures). During the computer tasks, small electrodes will be placed on your head and hand. You will also be asked to pose in standardized clothing for three pictures, that later will be presented to you in the computer tasks.

- **Detailed research procedures**

If you agree to participate in this study, we will invite you to the lab. Before participating you will be asked to give informed consent. Next, you will be asked to pose for three pictures in standardized clothing (i.e. a short-sleeved t-shirt and sports legging). You will then be asked to fill out multiple questionnaires with questions about yourself and your life. Afterwards, we will attach 7 small electrodes on your head and 2 small electrodes on your index finger and

middle finger (this is not painful and the experimenter will give a demonstration of the procedure before attaching the electrodes). These electrodes will measure your physiological reactivity to the stimuli. Next, you will view a series of pictures on a computer screen. Each picture is presented for 4 seconds and some of these pictures are meant to arouse you a little bit (e.g. they depict threatening or unhygienic things). Please note that some of the pictures are the pictures that are taken of yourself. These pictures are sometimes slightly edited. Subsequently, you will be presented with another computer task in which you will be asked to rate the pictures. After you have completed the second computer task, we will remove all electrodes. Lastly, we will ask you to fill out some personal data (e.g. age, nationality, race, educational level, etc.) and we will measure your weight (with clothes) and length.

N.B. The attached electrodes should not result in any discomfort. If they do, please let the experimenter know. You can stop participation at any time, without negative consequences.

- **Duration of the research**

The study will take approximately 75 minutes.

- **Risks**

You might momentarily experience arousal while viewing the pictures, but we expect there to be no long-term effects and risks of participation in this study.

- **Benefits**

By participating you make a valuable contribution to clinically relevant scientific research.

- **Compensation**

For your participation you will receive 2.1 SONA credits.

- **Your privacy**

The data that will be collected during this study will be treated confidentially. Your data will only be processed using a code number. This code number is not linked to personal information that might be used to directly identify you, such as your name and e-mail address.

Your research data will be analysed by the researchers. Research data that are published, for example in scientific journals, cannot identify you.

Fully anonymised research data may be shared with other researchers for scientific purposes. Your personal information will remain confidential and will not be shared with third parties without your explicit consent. Your other research data will only be shared if they cannot be used to identify you. Hence your privacy is guaranteed.

N.B. Your pictures will be stored at a safe location and apart from all other data (e.g. responses on the questionnaires). After publication of the results of this study, your pictures will be deleted.

- **Participation is voluntary**

Participating in the research is completely voluntary. It is your choice whether to participate or not. At any time you may withdraw from the research study, without having to provide a reason. Stopping to participate will not have consequences for you in any way. You can also ask for your data to be removed from the research database.

- **Further information**

Questions about the research may be asked to the researchers now, and at all times during the research. If you have questions about the research afterwards, you may contact the researchers via e-mail or phone.

If you have any questions or concerns regarding your rights as a research participant, you

may contact the Ethics Committee of the Department of Psychology of the University of Groningen, to be reached via ecp@rug.nl.

Upon request, you will be given a copy of this form to keep for your records.

Appendix B

Plots for assumption checks satisfaction analyses

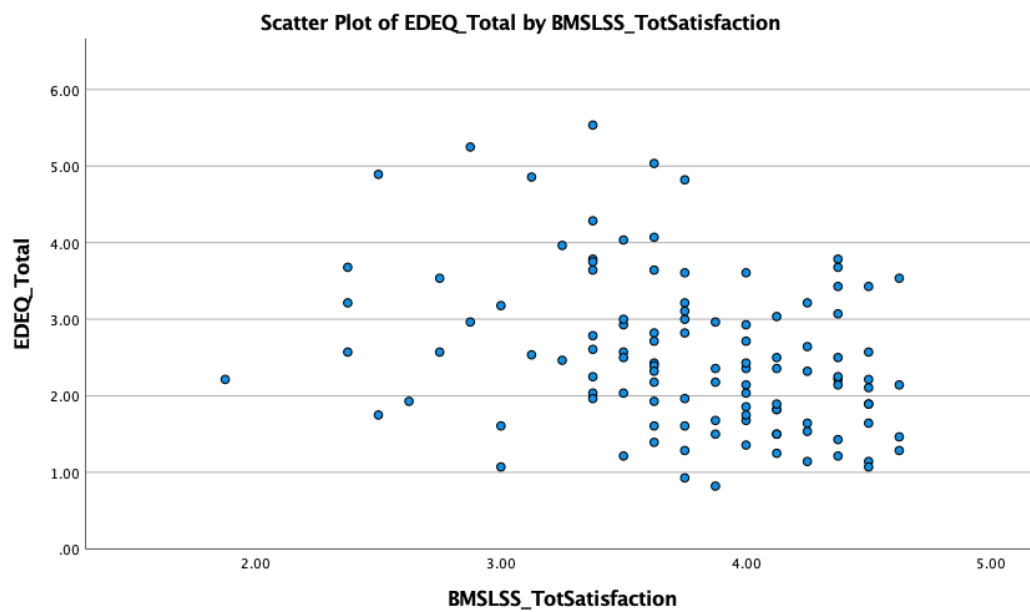


Figure 1B. Scatterplot mean EDE-Q score against average satisfaction with specific life domains (linearity check simple regression)

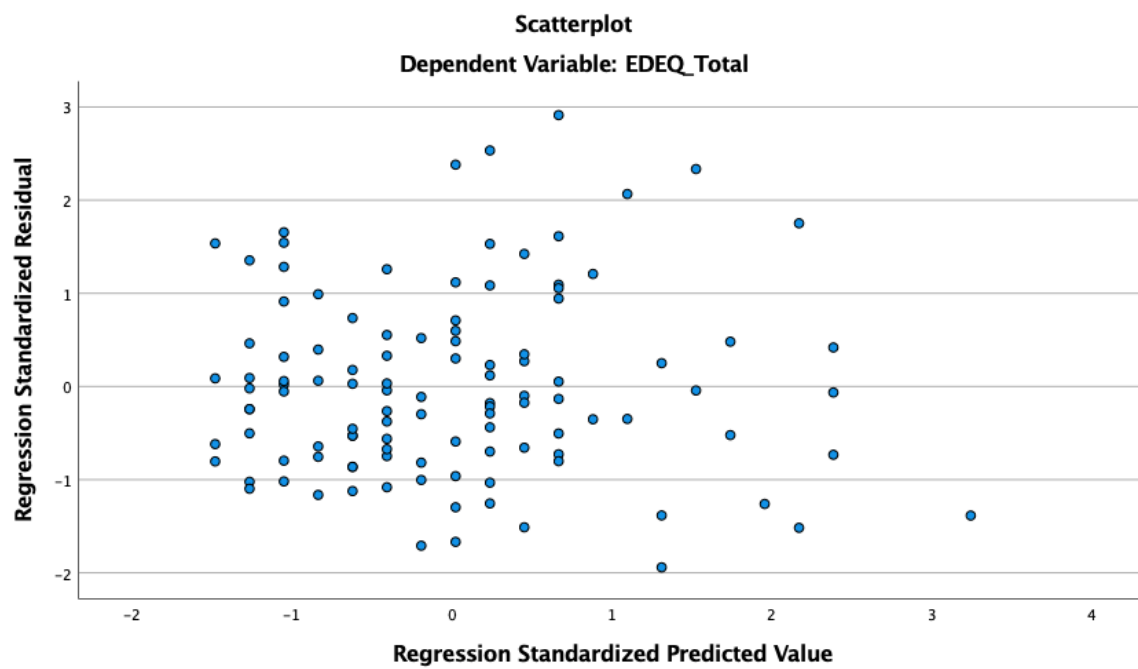


Figure 2B. Plot of standardized residuals versus standardized predicted values average satisfaction with specific life domains (homoscedasticity check simple regression)

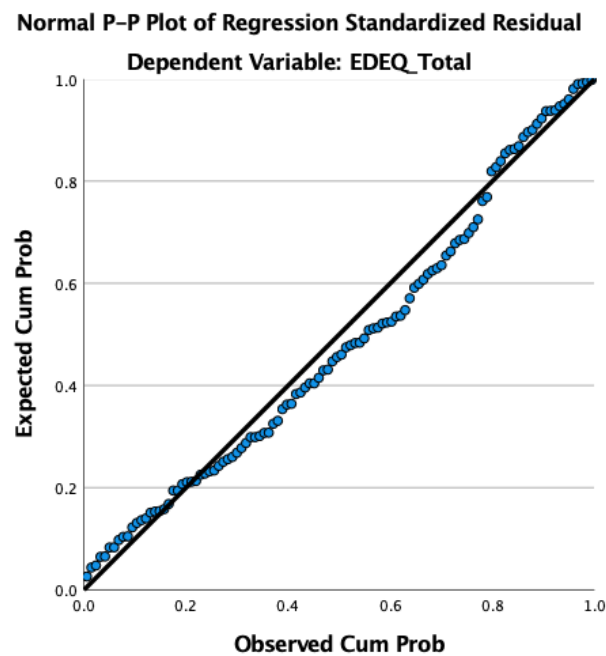


Figure 3B. Normal P-P plot of standardized residuals average satisfaction with specific life domains (normality check simple regression)

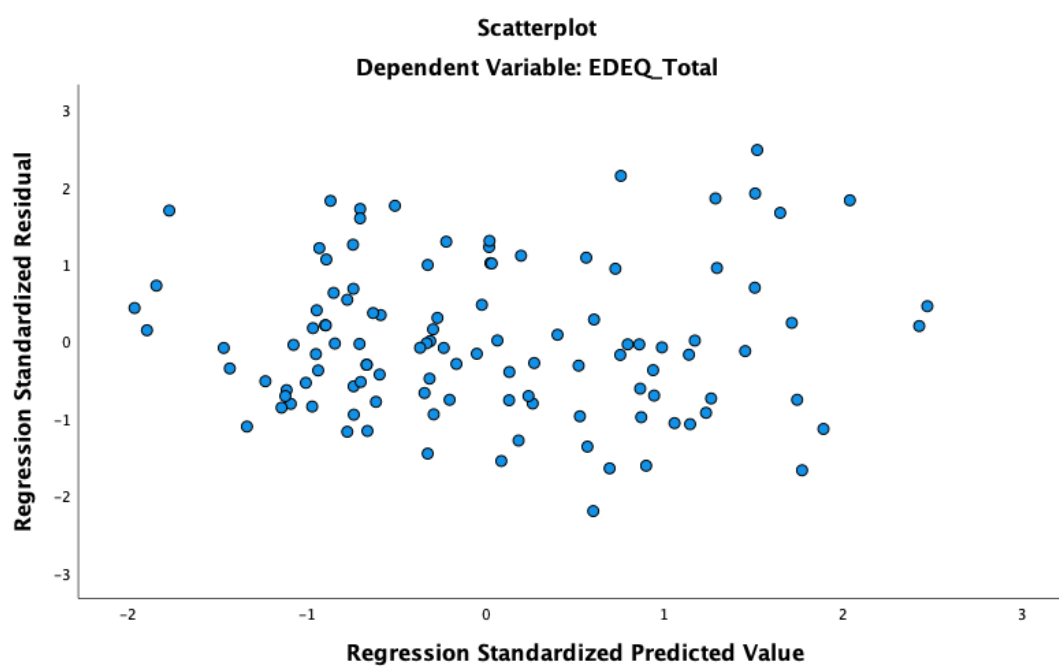


Figure 4B. Scatterplot of standardized residuals versus standardized predicted values satisfaction with specific life domains (homoscedasticity and linearity check multiple regression)

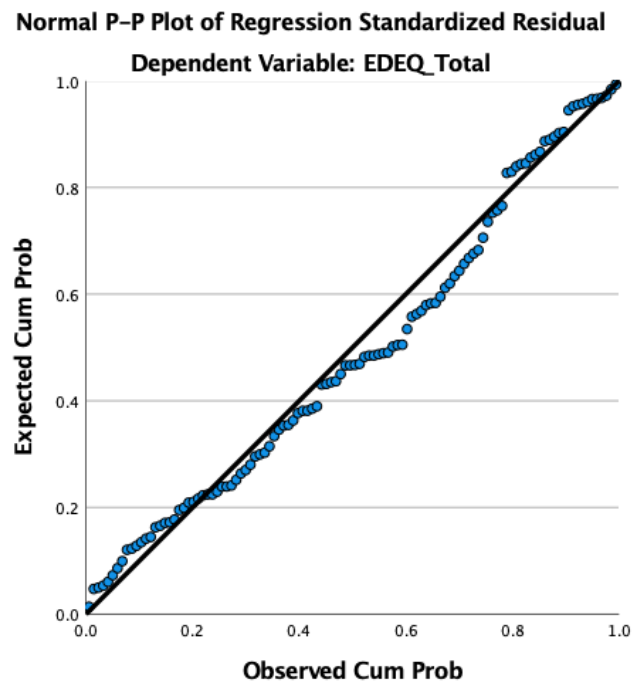


Figure 5B. Normal P-P plot of standardized residuals satisfaction with specific life domains (normality check multiple regression)

Appendix C

Plots for assumption checks importance analyses

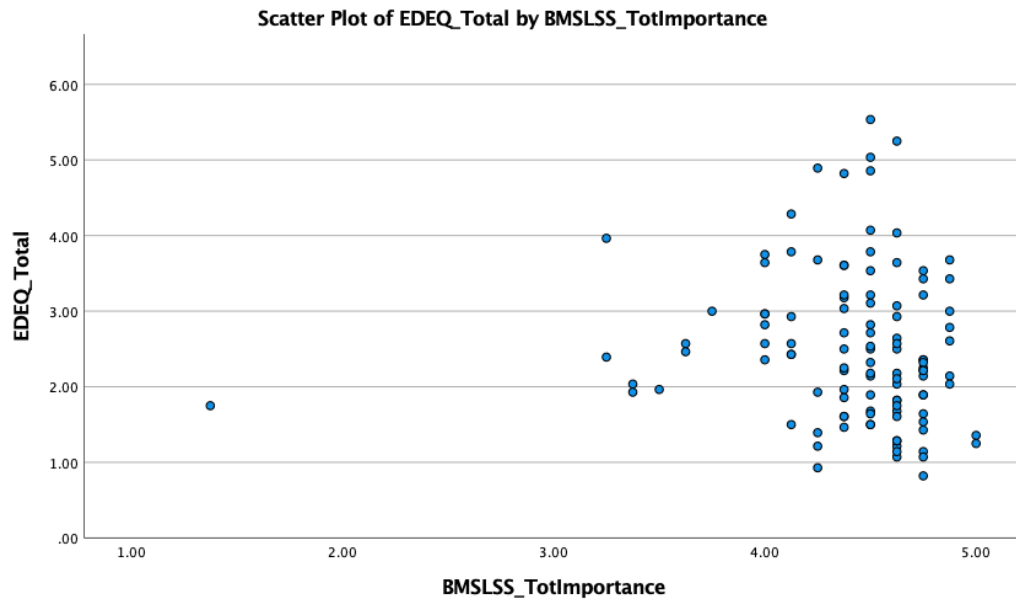


Figure 1C. Scatterplot mean EDE-Q score against average importance of specific life domains (linearity check simple regression)

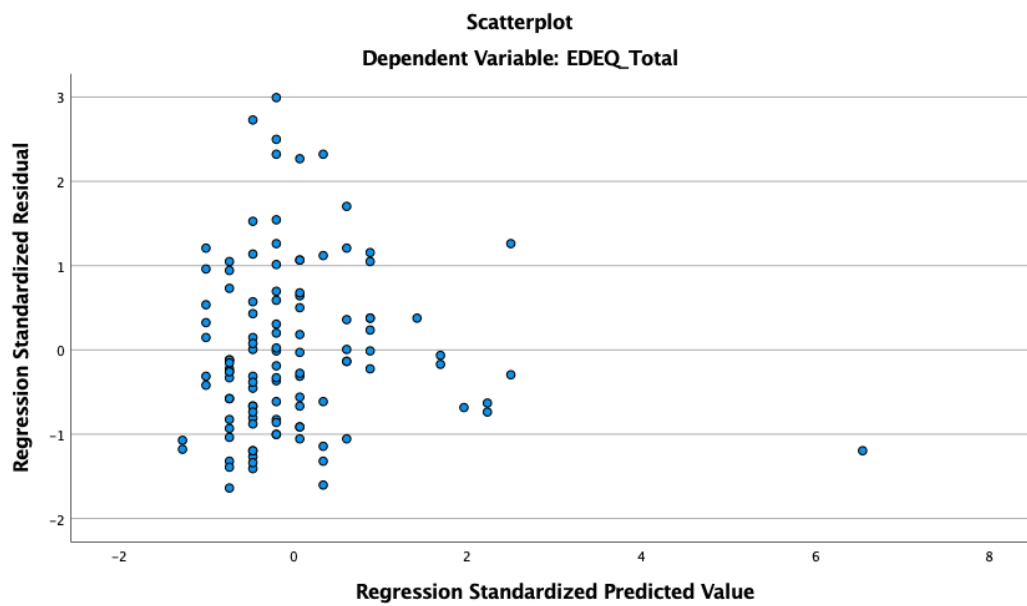


Figure 2C. Scatterplot of standardized residuals versus standardized predicted values average importance of specific life domains (homoscedasticity check simple regression)

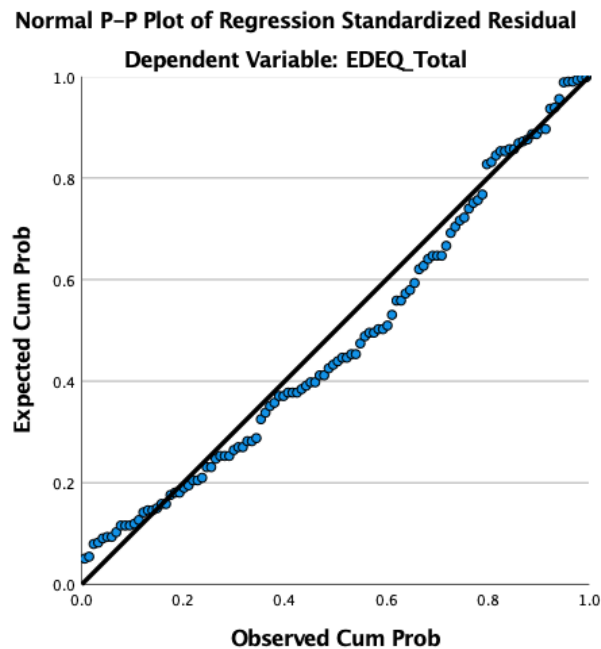


Figure 3C. Normal P-P plot of standardized residuals average importance of specific life domains (normality check simple regression)

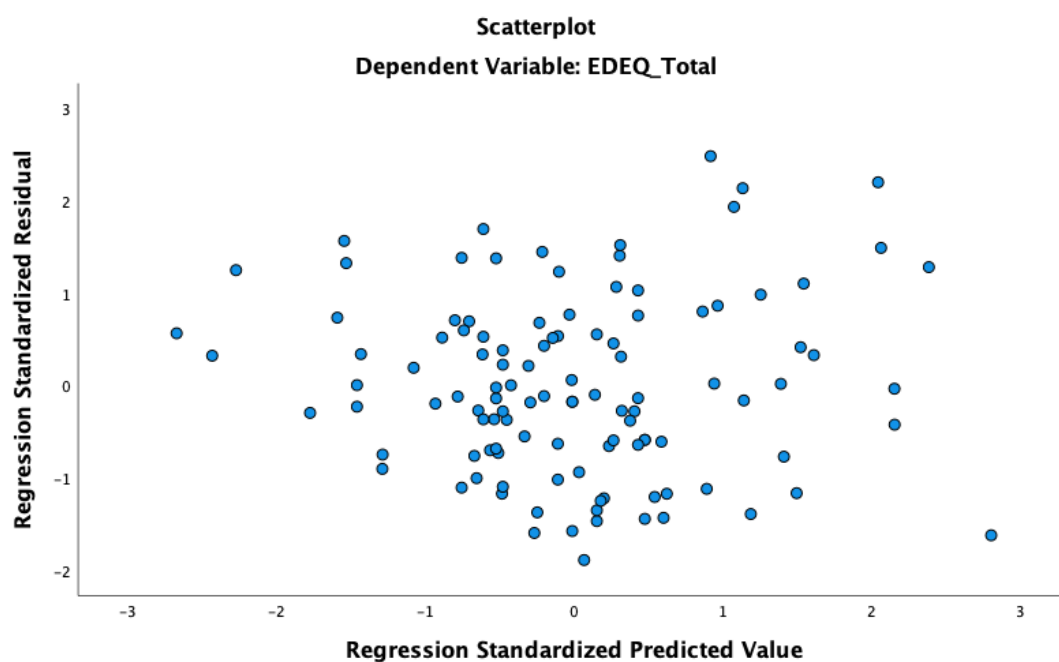


Figure 4C. Scatterplot of standardized residuals versus standardized predicted values importance of specific life domains (Homoscedasticity and linearity check multiple regression)

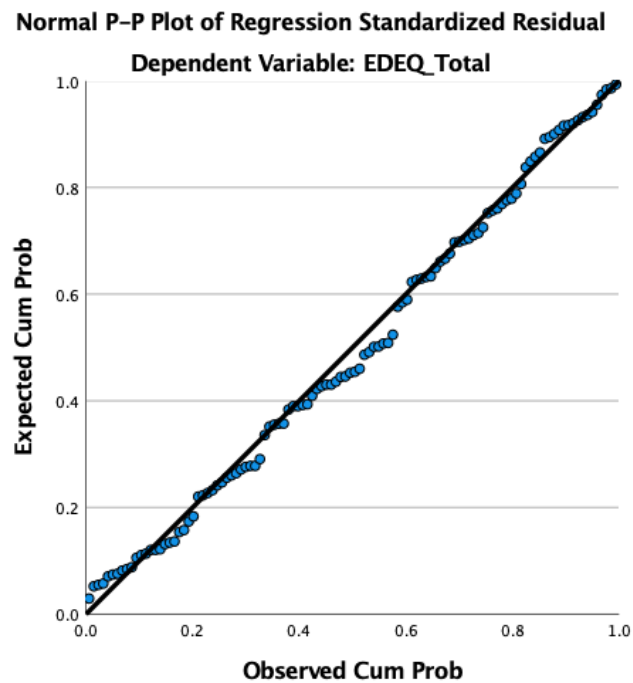


Figure 5C. Normal P-P plot of standardized residuals importance of specific life domains (normality check multiple regression)