Master Thesis

Finding Love or Self-Affirmation? Exploring Online Dating Applications Usage And its Multifaceted Consequences on Users' Well-Being

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Abstract

Online dating has become increasingly popular in today's society. However, its positive and negative impact on users' well-being has not yet been thoroughly investigated. Therefore, the current cross-sectional study aimed to examine if the frequency of usage of online dating applications predicts users' well-being, with low frequency usage assumed to be associated with high well-being and high frequency usage with low well-being. These different effects are expected to occur due to increased self-esteem and body satisfaction following low frequency usage and increased self-objectification, body image concerns, and decreased self-esteem following high frequency usage. Participants (N = 178) were identified as users of online dating applications and anonymously completed measures via an online survey. Through a series of regression and mediation analyses, online dating frequency usage was found to be associated with users' well-being. However, the chosen mediators body satisfaction, self-esteem, self-objectification, and body image concern were not found to significantly mediate the relationship between frequency usage and users' well-being. Even though the association between frequency usage and well-being could not be explained by the chosen mediators, this study can be seen as groundwork for future research by testing the proposed theoretical frameworks while exploring potential other mediators. A tentative suggestion for online dating providers is to integrate warning signs against highly frequent use with suggestions to take a break or connect with existing matches. As online dating has led to a reconfiguration of the dating world, further research is needed to assess how users' well-being might be both positive and negatively affected.

Keywords: online dating applications, well-being, frequency usage, self-objectification, self-esteem, body image

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Contents

Finding Love or Self-Affirmation? Exploring Online Dating Applications Usage And its Multifaced Consequences on Users' Well-Being

The use of online dating applications (ODA) has become increasingly popular over the last decades. Online dating has developed into a mainstream social activity and has been recognized as an appropriate way to meet a new partner (Smith & Anderson, 2016). In a survey by Madden and Lenhart (2005) of the general public in the U.S., 74% of respondents noted that they have used the internet in some manner to find a romantic partner. Between 1995 and 2017 the number of U.S. couples that met online has increased from 2% to 39%. In fact, worldwide 239.9 million people between the age of 24-35 years use ODA daily (Rosenfeld, Thomas, & Hausen, 2019; Smith, 2016) and this number is expected to rise to 279.8 million people in 2024 (Statista, n.d.).

One example of an ODA is Tinder, which launched in 2012 and has reached 50 million users in 196 countries in two years (Ellison, Gibbs, & Heino, 2006; Smith, 2016). Tinder is a picture-based mobile dating app where users review profiles in their geographical vicinity and either like the profile with a swipe to the right or reject it with a swipe to the left. If another user also swiped right the user gets a notification that they matched, and they can chat or potentially meet offline to pursue a short- or long-term relationship (Strubel & Petrie, 2017).

A lot of positive aspects are connected with the ever-rising ODA. First, the success of ODA is rooted in its ease of use, described as being quick and effortless (David & Cambre, 2006). Users have unrestricted access to their mobile devices, which allows them to scan profiles 24 hours a day, 7 days a week in trains, buses, bars, restaurants, and other places (Rege, 2009). The user-friendly nature of ODA such as Tinder (i.e. swipe right or left) with rewarding features (e.g. notification of receiving a like or match) makes them an attractive tool to use (Rochat,

Bianchi-Demicheli, Aboujaoude, & Khazaal, 2019). Secondly, users get the opportunity to easily contact available singles in their area of interest. Users can set a geographical region in which they want to search for potential partners. This GPS-based dating strengthens the connection between online and offline dating, the opportunity to meet in 'real-life' and enables casual, sexual, short-lived, or potential long-term relationships (Sales, 2015). Thirdly, ODA gives the user a significant power over their self-presentation. Self-presentation strategies are especially important during relationship initiation, as others will use the information given to decide whether to pursue a relationship or not. When users can alter how they want to be perceived by potential partners by highlighting information that can be desirable, their chances of receiving a match may exceed (Toma, 2015).

Not surprisingly, the mobile dating environment, with its ease of use, connectivity, and impression management attracts millions of customers, as it enables short-term gratification of users' needs, which has resulted in the proliferation of the online dating sector (Rege, 2009). Numerous ODA have arisen to provide these services to users, who often pay substantial fees for their membership. Providers of ODA started to claim that meeting romantic partners online is not only different from, but also better than, searching offline for potential partners (Finkel, Eastwick, Karney, Reis, & Sprecher, 2012). For example, the ODA eHarmony asserts to offer "singles who have been pre-screened on … scientific predictors or relationship success" (eHarmony.com, 2020, para.1). Furthermore, ODA have grown into a billion-dollar industry and in pursuit of new customers, they spend millions of dollars to promote the value of their services (Finkel et al., 2012). So far, ODA has attracted millions of customers spending their time on these applications. One estimate suggests that users spend 12 hours per week on ODA (Frost, Chance, Norton, & Ariely, 2008), and another suggests that users spend an average of 22

minutes each time they visit an ODA (Mitchell, 2009). Across millions of users, this suggests a significant time spent on online dating. Questions concerning the impact on users' health arising that can be answered empirically and addressing those questions is of great public importance (Finkel et al., 2012). For example, does the frequent usage of ODA impact users' well-being?

Online dating applications usage and the impact on well-being

Building relationships and engaging in meaningful interaction with other people has an important influence on an individual's well-being (Her & Timmermans, 2020). The addition of online dating application to offline dating has created new ways of finding a partner and these may impact the users' health and well-being (Rochat et al., 2019). Well-being has been defined as not merely the absence of mental illness, but the presence of positive feelings (emotional well-being), positive functioning in individual's life (psychological well-being) and community life (social well-being; Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes 2011). Literature reports mixed findings indicating both positive effects of ODA usage on well-being as well as negative effects (Stevens & Morris, 2007; Bonilla-Zorita, Griffiths, & Kuss, 2020) which will be discussed below.

Low frequency usage and its positive influence on well-being

The Uses and Gratifications Theory (U&G) provides a framework for understanding the popularity of ODA by examining users' behaviours, outcomes, and perceptions. The theory clarifies why and how individuals actively use certain types of media. It is assumed that individuals are not passive consumers of media but rather, have power over their media consumption and a clear intent of usage in mind to fulfil specific needs and desires (Katz, 1959). Although the U&G theory was previously developed for studying mass media, it can also be applied to understand why people use ODA (Sumter, Vandenbosch, & Ligtenberg, 2017). Based

on this theory, ODA users can be characterized as active and motivated in their usage to satisfy social needs (e.g. finding a romantic relationship or friend), physical needs (e.g. intimacy or sexual pleasure), and psychosocial needs (e.g. validation of physical attractiveness; Sumter et. al., 2017; Timmermans & De Caluwe, 2017).

In the short run, this satisfaction of needs has been shown to improve well-being by making users' lives pleasant, exciting, and fulfilling (Bartsch & Oliver, 2016). Research found that matching and befriending others on dating apps can make users feel happy and may ameliorate feelings of loneliness (Sumter et al., 2017). Moreover, a study by Orosz et al. (2018) established a link between Tinder usage and reduced users' anxiety. In line with this, studies suggest that Tinder usage can evolve as a coping mechanism intended to regulate depressive affect (Laier & Brand, 2014; Sumter et. al., 2017) and improve self-esteem (Orosz, et al., 2018).

High frequency usage and its negative influence on well-being

Despite the gratifications that ODA have to offer, there seems to be a difference based on its usage and its consequences on the individual's well-being when utilizing ODA with high frequency. Jung, Umyarov, Bapna, and Ramaprasad (2014) found that the positive user experience ODA have to offer (i.e. higher accessibility, flexibility, self-presentation management, and short-term gratification of users' needs) is associated with greater engagement in dating apps. The variety of immediate rewards users receive through likes and matches results in continued and increase usage with the consequence of exacerbating problems (Kuss & Griffiths, 2017). Several studies established a link between increased engagement in online dating and a myriad of negative outcomes that affect the mental well-being of the users (e.g. Stevens & Morris 2007; Couch, Liamputtong, & Pitts, 2012; Strubel & Petrie, 2017). For example, Her and Timmermans (2020) found that using Tinder frequently trigger more negative

than positive affect and that compulsive Tinder usage is associated with poorer well-being and life satisfaction in turn. In fact, excessive usage of ODA may reinforce dysfunctional coping styles to deal with unpleasant emotions (e.g. anger, sadness, frustration) as well as dysfunctional responses (e.g. mood regulation, attentional bias; Bonilla-Zorita et al., 2020). Consequently, this satisfaction of needs might in the long-run lead users to become addicted to the application (Haug et al., 2015; Kuss & Griffiths, 2017), which is associated with lower self-esteem (James, 2015), anxious attachment (D'Arienzo, Boursier, & Griffiths, 2019) and depressive symptoms (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2014).

Leading to the assumption that the frequency of using ODA may predict users' well-being with (1) low frequency usage and its possibility to fulfil gratification of users' needs resulting in high well-being, and (2) high frequency usage, which is expected to lead to several mental health problems and low well-being.

Underlying psychological mechanisms

So far, the association between online dating and various aspects of mental well-being have been studied in isolation, however, these aspects are known to interact and accumulate in mental health risks. Consequently, this study aims to close this gap, by pointing out both the positive and negative effects ODA frequency usage has on the users' well-being by examining the joint influences of underlying psychological mechanisms. For this, the possible influence of self-esteem, body image, and self-objectification on the relationship between frequency usage and well-being will be investigated.

Self-esteem

Self-esteem is considered an essential predictor of well-being and has been defined as the positive or negative attitude towards oneself (Rosenberg, 1965). The level of self-esteem has a significant influence on the individuals' well-being, as low self-esteem is correlated with diverse mental disorders such as depression or eating disorders whereas high self-esteem promotes psychological wellbeing and success (Zeigler-Hill, 2011). According to the evolutionary psychological perspective, specifically the sociometer theory by Leary (2012), individuals measure their self-esteem by the extent to which they are relationally valued and socially accepted by other people. Therefore, high self-esteem is the result of the individual experiencing great acceptance by others, whereas experiencing rejection will lead to low levels of self-esteem (Leary & Baumeister, 2000).

It is still unclear in how far ODA frequency usage may influence users' self-esteem. Although some studies have examined the association between Tinder and self-esteem, their findings have been mixed. Namely, Shimokobe and Miranda (2018) found no difference in self-esteem between users and non-users, while Strubel and Petrie (2017) found that men, actively involved on Tinder, reported lower levels of self-esteem then non-users.

Consequently, grounded on the potential link between ODA frequency usage and the sociometer theory, this study assumed that low frequency ODA users might experience an enhancement in self-esteem. This assumption is based on the idea that users may profit from the advantages of developing an online identity, in which they try to present an ideal version of their self to ensure a greater likelihood of receiving acceptance and validation by others (i.e. greater amount of likes and matches; Strubel & Petrie, 2017). With obtaining matches, ODA can provide immediate

positive social feedback and reward from many potential partners, which enhances the self-esteem of the users (Orosz, et al., 2018).

However, it is questionable whether this enhancement in self-esteem based on the created online identity will hold with increased usage of ODA. Research by Strubel and Petrie (2017) found that the repetitive exposure to positive self-presentation on social media sites results in high levels of depressed mood and lower self-esteem. This might occur due to the assumption that when users are creating an online identity, the difference between the ideal self and the perceived self expands, leading to a high level of self-criticism and possibly decreased self-esteem. Additionally, a negative relationship was found between self-esteem and excessive Internet use and problematic or addictive mobile phone use (Orosz, et al., 2018). Therefore, self-esteem enhancement through ODA frequently use might be a potential predictor of problematic ODA use, resulting in decreased well-being of the users.

Body Image

Body image is defined as individuals' perception of and attitudes towards their own body, especially its appearance (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). The popularity and use of ODA, such as Tinder, has grown since its interception in 2012 as an avenue for 'hit it and quit it' relationships, where the focus is to present the self by uploading several pictures (Newall, 2015; Sales, 2015). Given that 239.9 million people between the age of 24-35 years use ODA on a daily basis (Rosenfeld, Thomas, & Hausen, 2019; Smith & Anderson, 2016), users are continuously exposed to pictures where the physical attractiveness is the major evaluation criteria in order to be successful (i.e. receiving many likes and matches).

This suggests that, merely the presence or absence of receiving matches can influence a user's perception of their body. Courtois and Timmermans (2018) found that those who are

successful on ODA may experience body satisfaction, which is positively associated with users' well-being. Taking this into account it is proposed that low frequency usage might lead to body satisfaction as users receive approval by others based on their physical appearance. Nevertheless, it has been suggested that the more time people invest in online dating, the more they are likely to feel unvalidated based on their physical attractiveness, which negatively affect the body image and level of self-esteem (Holland and Tiggemann, 2016; Strubel & Petrie, 2017).

Self-objectification

One explanation for the negative affect on users' body image as well as self-esteem can be explained by utilizing the objectification theory by Frederickson and Roberts (1997). Based on the objectification theory, objectification emerges when individuals are reduced to their physical appearance grounded on societal beauty ideals (Frederickson & Roberts, 1997; Moradi & Huang, 2008). The emphasis is on the importance of how one's appearance is perceived by others, which determines one's own worth. The socialization and pervasiveness of women and men seen as sexualized objects can encourage self-objectification, which results in acculturating to and internalizing observers' attitudes that they are merely objects to look at. Empirical research has demonstrated that self-objectification leads to depersonalization, a heightened awareness of the body, body shame, appearance anxiety and lower self-esteem (Chaiton et al., 2009; Choma et al., 2010).

In fact, ODA like Tinder are said to represent a contemporary medium for appearance pressure with increases in individual's likelihood to internalize appearance ideals associated with a variety of negative perceptions about body and self (Strubel & Petrie, 2017). As previously discussed, ODA users' success is primarily based on other users' judgment of their physical appearance. This might lead users to compulsively check and monitor their bodies, which can

result in appearance anxiety and body shame (Filice, Raffoul, Meyer, & Neiterman, 2019). Therefore, consistent with the objectification theory, it can be assumed that high frequency usage might lead to self-objectification of users by steadily focusing on physical appearance and developing a heightened awareness of their bodies, which is associated with an increase of body image concern and decrease of self-esteem and well-being.

The current study

To date, research of the problematic usage of ODA is still in its infancy and considering the ever-rising popularity of ODA in the society, the question arises whether the frequency usage of ODA may have an impact on users' well-being. To the author's knowledge, the present study is the first to examine the positive and negative effect of ODS frequency usage and multiple mediating psychological mechanism on well-being. Therefore, based on the theoretical discussion, two theoretical frameworks will be tested. Figure 1 shows the first theoretical framework illustrating the proposed effect of low frequency usage on the well-being of ODA users. Table 1 indicates the hypotheses proposed for the first theoretical framework. Thereby, low frequency usage is assumed to be associated with high well-being as well as leads to an increase in self-esteem which, in turn, leads to increase body satisfaction and indirectly to high well-being.

Figure 1

Hypothesized theoretical framework 1 of ODA low frequency usage on users' well-being

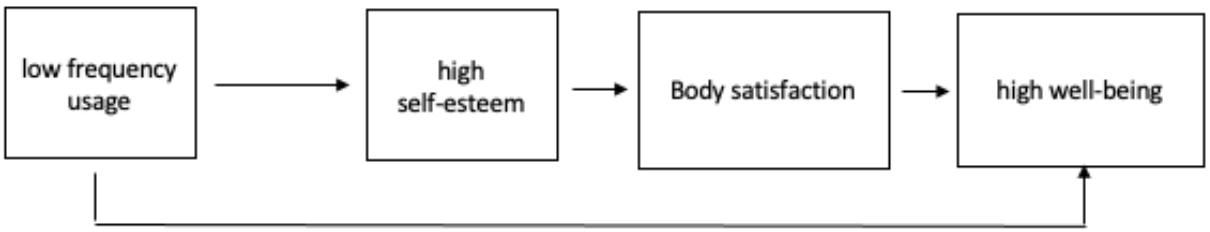


Table 1

Hypotheses overview of theoretical framework 1

Hypothesis	Independent variable	Dependent variable	Direction
1.1	low frequency	well-being	Negative
1.2	low frequency	self-esteem	Negative
1.3	self-esteem	body satisfaction	positive
1.4	body satisfaction	well-being	positive
1.5	low frequency	well-being	mediated by self-esteem and body satisfaction

Figure 2 shows the second theoretical framework illustrating the hypothesized effect of high frequency usage on well-being. As can be seen in Table 2 high frequency usage is assumed to lead to self-objectification which, in turn, lead to body image concern and low self-esteem. These psychological consequences then lead to low well-being of the user.

Figure 2

Hypothesized theoretical framework 2 of ODA high frequency usage on users' well-being

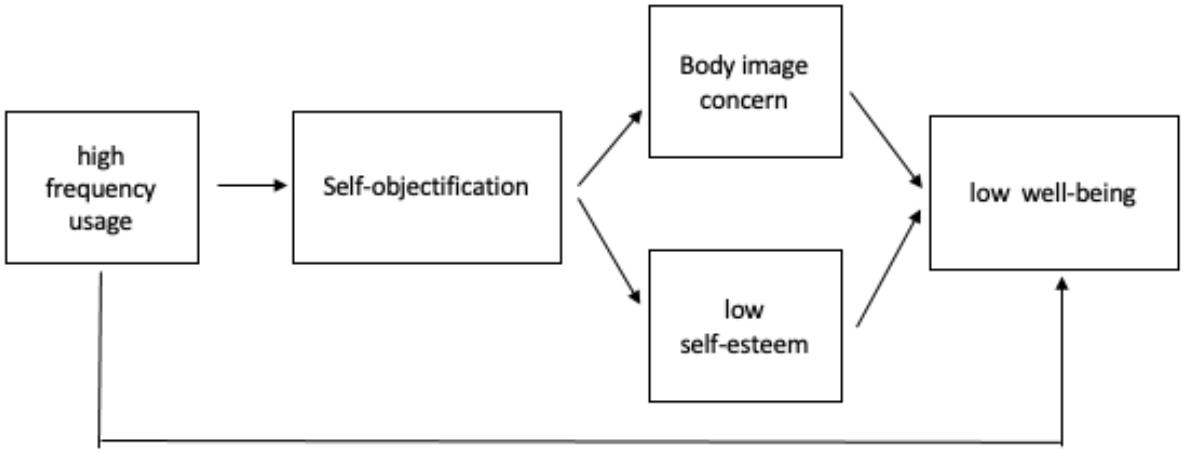


Table 2

Hypotheses overview of theoretical framework 2

Hypothesis	Independent variable	Dependent variable	Direction
2.1	high frequency	well-being	negative
2.2	high frequency	self-objectification	positive
2.3	self-objectification	body image concern	positive
2.4	self-objectification	self-esteem	negative
2.5	self-esteem	well-being	positive
2.6	body image concern	well-being	negative
2.7	high frequency	well-being	mediated by self-objectification, body image concern and self-esteem

Method

Research design and sample

The design is a secondary analysis based on a cross-sectional survey. The obtained data was recently gathered by bachelor students for their thesis (see for example Chie, 2020; Faesing, 2020; Sanhai, 2020). This study was approved by the Ethics Committee of the Behavioural, Management and Social Science Faculty of the University of Twente, Netherlands (registration number 201257).

Participants were recruited using a convenience sample via social media platforms (i.e. WhatsApp and Facebook) and the University of Twente psychology student participant pool 'SONA' system and were given partial course credit for their participation. Prior to starting the survey, participants gave their informed consent by agreeing to participate in the study after being informed about the aim, confidentiality and ability to withdraw from the study without mentioning reasons (see Appendix A). In total, 260 participants were recruited from (a) the undergraduate students' population at the University of Twente and (b) the general population. Participants age ranged from 18-55 years (M = 22.78; SD = 4.40), 61.9% female, 33.5% male and 4.6% of the participants indicate no gender. Participants were of mostly German (69.2%) and Dutch (8.1%) nationality. 18.1% of participants indicated other nationalities, and 4.6% did not specify their nationality. The sample was considered both convenient and purposive for the current study, especially given that the demographic profile overlaps with that of an average ODA user (Madden & Lenhart, 2006).

The available data was considered to be of high quality for the current study: all data was recently collected by psychology students with a training in behavioural research, the employed measures were both reliable and valid, and the methodology was sufficient for examining associations and mediations.

Participants

The current study adopted all existing eligibility criteria of the original study with the exception of the upper age limit of 44, as the effect ODA frequency usage on well-being is considered important to study in all users of all ages. However, it was decided to exclude participants who indicated that they never used ODA before, as this data is not relevant for the current study focused on frequency of use (rather than use alone), resulting in a final sample size of N=178.

Procedure and Materials

The online survey was previously distributed to potential participants in the period of 3rd of April 2020 until the 30th of April 2020. The survey included: the informed consent, demographical questions (i.e. gender, age and nationality) and questions about users' online dating frequency. Additionally, items from six original questionnaires were included (see Appendix B).

Online Dating Frequency

In order to assess ODA frequency usage, participants were asked five questions. Firstly, '*Do you use ODA or mobile dating apps?'* which could be answered with (1) '*Yes, I use it currently',* (2) '*Yes, I use it in the past,'* (3) '*No, I never used it.'* If participants indicated that they had used ODA they were directed to the next questions concerning the frequency of usage (Rosen, Whaling, Carrier, Cheever, & Rokkum, 2013): '*How often do you make use of ODA? '*and '*How often have you made use of ODA in the past?',* with possible answers ranging from '*Once a month*' to '*Daily'.*

Self-esteem

To measure self-esteem, the Rosenberg's Self-Esteem Scale (RSES) developed by Rosenberg (1965) was used. It consists of 10 statements related to overall feelings of self-worth and self-acceptance. The items were answered utilizing a 4-point Likert-type scale, where 0 indicated '*strongly disagree'* and 3 *'strongly agree'*. Examples of the items included *"On the whole, I am satisfied with myself"* or "*I wish I could have more respect for myself.*' Half of the items were reversed before calculating the final sum score, where a total sum score of 25-30 indicated a higher level of self-esteem, a score of 15-25 an average level, and scores below 15 a low level of self-esteem (Ryan, 2020). Excellent reliability (Cronbach's alpha of .85 and .88) has been reported in previous studies (Ciarrochi & Bilich, 2006). However, in the current sample a poor Cronbach's Alpha of .51 was calculated.

Body Image Concern

Body image concern was measured utilizing the 9 items of the Body Image Concerns subscale taken from the Body Unease Test (BUT; Cuzzolaro, Vetrone, Marano, & Garfinkel, 2006). All items were measured using a 6-point Likert-type scale, where 1 refers to '*never'* and 6 refers to '*always'*. Examples of the items included '*I am dissatisfied with my appearance'* or '*I spend a lot of time thinking about some defects of my physical appearance'* (Cuzzolaro et al., 2006). A high score on body image concern was indicated by a high sum score per participant (Cuzzolaro, Garfinkel, & Spera, 2007). Previous research of internal consistency, convergent and discriminant validity suggest that the BUT provides an accurate measure of body image concern with a Cronbach's alpha of .90 (Cuzzolaro et al., 2006). In the current sample, an excellent Cronbach's alpha of .91 was found.

Body satisfaction

Body satisfaction was measured using the body-cathexis scale of Secord and Jourard (1953), which is a simple designed scale where the participants have to rate their satisfaction concerning 16 body parts (e.g. face, chest, legs, head) based on a rating of a 7-point Likert-type scale, ranging from 1 '*very satisfied'* to 7 '*very unsatisfied'* (Slade, Dewey, Newton, Brodie, & Kiemle, 1990). The total score consists of the mean of all 16 items, with higher scores indicating a high degree of body satisfaction. Concerning this study, the internal consistency was found to be good with a Cronbach's alpha of .87.

Self-Objectification

To assess self-objectification, the 8-item Surveillance subscale of the Objectified Body Consciousness Scale OBCS (McKinley & Hyde, 1996) was used. The surveillance subscale is a validated measure of self-objectification (Wiseman & Moradi, 2010), and therefore chosen for use in this research. It consists of an 8-item measure designed to assess the extent to which an individual monitors the own physical appearance. Participants had to respond on a 7-point Likert-type scale, where 1 represents *'strongly disagree'* and seven *'strongly agree'*. Examples of items are: '*During the day, I think about how I look many times'* and reverse scored items like '*I rarely think about how I look.*' The total score consisted of the mean of all reversed items, except item 5 which was not reversed. High scores indicating high levels of self-objectification and low scores represent lower levels of self-objectification (McKinley & Hyde, 1996). The subscale has demonstrated strong internal consistency (alpha = .76 to .89) in college-age participants (McKinley & Hyde, 1996). In this study, the internal consistency was found to be poor with Cronbach's alpha of .59.

Mental Well-being

In order to measure users' well-being, the Mental Health Continuum-Short Form (MHC-SF) was applied (Keyes et al., 2008). The questionnaire consists of 14 items testing three dimensions; emotional well-being, such as '*In the past month, how often did you feel happy?',* social well-being '*In the past month, how often did you feel that you belong to a community?',* and psychological well-being '*In the past month, how often did you feel confident to think or express your own ideas and opinion?'.* All items were ranked using a 6-point Likert-type scale, where scores of 1 indicates '*never'* and 6 '*every day'*. The total score was used to assess well-being, with low scores indicating low well-being and high scores indicating high well-being. Previous psychometric research revealed that the properties of the MHC-SF has a good validity and internal reliability (Lamers et al., 2011). In the current study the scale showed a good Cronbach's alpha of .89.

Statistical analysis

The data was analysed using the statistical software SPSS version 24. Prior to the analysis, the original dataset was checked for missing data and outliers. Nine outliers resulted from participant response error were deleted from the dataset. It was decided to remove them from the dataset as the same answers were continuously given by these participants. To handle missing data and to obtain complete datasets, this study utilized the maximum likelihood estimation. According to Little's MCAR test, 25% data of each variables of interest were missing completely at random (X^2 [1, N= 178] = 1817, p = .227) and therefore maximum likelihood estimates were computed with the use of each cases available data, as recommended by Baraldi and Enders (2010). To obtain an overview of the dataset prior- and after estimation of parameters, descriptive statistics were generated including means and standard deviations (see

Appendix C). Moreover, Cronbach's alpha reliability was assessed using the rule of thumb by Glen (2020), which in general state that a Cronbach's alpha score of more than 0.7 is acceptable and scores below 0.7 are questionable. The assumptions for linear regression analysis including linearity, homoscedasticity, multicollinearity and normality were examined by residual plots and accepted (see Appendix D). Correlations were calculated using Pearson's correlation to test correlations between users' mental well-being and the frequency usage of ODA. The statistical significance level for the tests of correlation was set at a *p*-value of below 0.05. The correlation coefficient provided information on the degree and type of association between the variables of interest, with higher values indicating a very strongly considerable correlation (Senthilnathan, 2019). Further, to test the hypotheses, regression analysis and mediation analysis distinguished per model were applied. In order to test Model 1, a serial mediation analysis with SPSS macro-PROCESS (model 6) was used. Model 2 was analysed utilizing two multiple mediation analysis, SPSS macro-PROCESS (model 4) separately. The advantage of conducting a multiple mediation analysis is that it allows all mediators to be investigated simultaneously as well as examining the individual effects of each mediators while controlling for the others. The indirect effects of the mediation analyses were tested utilizing the non-parametric bootstrapping approach, which enables an accurate test even in small samples and provides additional statistical power (Preacher & Hayes, 2008). Therefore, the indirect effect is considered significant if the upper and lower bounds of the 95% bias corrected CIs does not contain zero. Additionally, indirect effects were computed for each of 5000 bootstrapped samples. Mediation is established if the indirect effect of the independent variable on the dependent variable via the mediator is significant. If the direct effect is non-significant after controlling for the mediator, full mediation can be inferred (Hayes, 2013).

Result

Descriptive statistics

Table 3 lists the frequencies, mean values and standard deviations for the sociodemographic characteristics and variables of interest. This study consists of a sample of 178 ODA users (M_{age} = 23.26, *SD* = 4.91) of which 54% (*N*=96) were female, 39% (*N*=69) male and 12% (*N*=7) did not specify their gender. The majority of participants indicated that they used ODA 2-3 times per weeks (*N*=55) and daily (*N*=40).

Table 3

Characteristics of the participants (N=178) and descriptive statistics of study variables

Characteristic	Total sample (*N*= 178)			
	N	*%*	*M*	*SD*
Gender				
Female	96	54		
Male	69	39		
Not specified	12	7		
Nationality				
Dutch	16	9		
German	115	65		
Other	34	7		
Age, years				
Mean			23.26	4.91
Range			18-55	

Characteristic	Total sample (*N*= 178)			
	N	*%*	*M*	*SD*
Self-esteem			23.05	2.14
Body Image concern			23.86	8.11
Body Satisfaction			2.88	0.73
Self-objectification			3.85	0.59
Well-being			54.71	10.74
Frequency usage				
Once a month	22	12		
2-3 times a month	18	10		
Once a week	25	14		
2-3 times per week	55	30		
4-5 times per week	17	10		
Daily	40	22		

Correlation analysis

All proposed mediators for model 1, including self-esteem and body satisfaction, were analysed with predictor frequency usage of ODA and criterion variable mental well-being, to establish their significance. As shown in Table 4, the correlation analysis revealed that frequency usage was significantly negative correlated with well-being, $r(175) = -.16$, $p = .027$. Next, frequency usage was not found to correlate with either of the mediator body satisfaction, $r(175) = .08$, $p = .284$ nor self-esteem, $r(175) = .00$, $p = .913$. Further, the first mediator self-esteem was not significantly correlated with the second mediator body satisfaction, $r(175) = .00$, $p = .935$ and well-being, $r(175) = .06$, $p = .412$. However, the second mediator body satisfaction was significantly negative correlated with well-being, $r(175) = -.39$, $p = .000$.

To identify significant correlations for the second model, all proposed mediators, including self-objectification, body image concern and self-esteem, were analysed with predictor frequency usage of ODA and criterion variable users' mental well-being (see Table 4). Based on this analysis frequency usage and the proposed mediators were found to be uncorrelated: self-objectification, $r(175) = -.07$, $p = .304$, body image concern, $r(175) = .07$, $p = .307$, and self-esteem, $r(175) = .00$, $p = .913$. Well-being was found to be significant positive correlated with self-objectification, $r(175) = .20$, $p = .007$, significant negative correlated with body image concern, $r(175) = -.27$, $p = .000$, but not significant correlated with self-esteem, $r(175) = .06$, $p = .412$. The mediator self-objectification was significantly negative correlated with body image concern, $r(175) = -.34$, $p = .000$ but not significantly correlated with self-esteem, $r(175) = .05$, $p = .500$. However, body image concern was significant negative correlated with self-esteem, $r(175) = -.14$, $p = .048$.

Table 4

Correlation Matrix Model 1 and 2

	1	**2**	**3**	**4**	**5**	**6**
Frequency	1					
Well-being	-.16*	1				
Body Satisfaction	.08	-.39**	1			
Self-esteem	.00	.06	.00	1		
Self-Objectification	-.07	.20**	-.37**	.05	1	
Body Image concern	.07	-.27**	.52**	-.14*	-.34**	1

Note: *Correlation is significant at the .05 level and **Correlation is significant at the .01 level (2-tailed)

Test of the models

Implications for the proposed hypothesised theoretical framework 1

Frequency usage of ODA was used to predict users' well-being, with self-esteem and body satisfaction mediating the relationship. See Figure 3 for visual diagram of the serial mediated relationship.

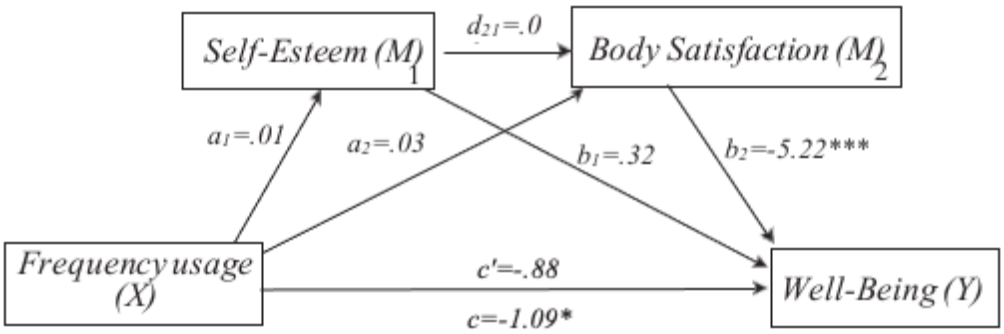
Firstly, from the values given in Table 6, frequency usage was found to be a significant direct predictor of well-being, b =-1.09, t(176) = -2.13, p = .034. Secondly, frequency usage was used to predict the first mediator variable self-esteem (the *a1* pathway) and second mediator body satisfaction (the *a2* pathway). It was found that the frequency of usage did not predict self-esteem, b = .01, t (176) =.10, p =.919 nor body satisfaction, b =.03, t (175) =1.09, p = .277.

Thirdly, the relationship between the two mediator's self-esteem (the *b1* pathway) and body satisfaction (the b*2* pathway) on users' well-being was examined. Mediator 1 'self-esteem' did not significantly predict well-being, b = .32, t (174) = .88, p =.376, whereas mediator 2 'body satisfaction' did significantly predict well-being, b = -5.22, $t(174)$ =-5.19, p = .000. Forth, the relationship between the mediator's self-esteem and body satisfaction (the d_{21}pathway) was examined, which showed that self-esteem did not significantly predict body satisfaction, b = .00, $t(175)$ =.07, p = .945. Lastly, the mediated relationship between frequency and well-being was examined for a drop in prediction when the mediators were added to the model (the *c'* pathway). There was no significant indirect effect of frequency on well-being through self-esteem and body satisfaction, b = .00, BCa [-.594, 1.83], R^2 = .027. Therefore, self-esteem and body satisfaction were not found to mediate the effect of frequency usage on well-being.

Based on the above-mentioned results of the serial mediation analysis, Table 7 displays the implication it had on the proposed hypotheses.

Figure 3

Serial mediation model of frequency ODA usage as a predictor of well-being, mediated by self-esteem and body satisfaction. Causal chain according to model (X-> M1-> M2-> Y).



Note. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000; Asterisks denote * = p<.5; ** = p< .01; *** = p<.001

Table 6

Path coefficients, indirect effects, and 95% bias-corrected confidence interval of frequency usage (X), self-esteem (M_1), body satisfaction (M_2) predicting well-being scores (Y; N= 178)

Path	Effect	BootLLCI	BootULC	SE	t	P - value
Total effect (c)	-1.09	-2.10	-0.08	0.51	-2.13	0.034
Direct effect (c')	-0.08	-1.80	0.20	0.46	-1.91	0.057
a_1	0.01	-0.20	0.22	0.10	0.10	0.919
a_2	0.03	-0.03	0.11	0.03	1.09	0.277
b_1	0.32	-0.39	1.05	0.36	0.88	0.376
b_2	-5.22	-7.21	-3.24	1.00	-5.19	0.000
d_{21}	0.00	-0.05	0.05	0.02	0.07	0.945
Indirect effects						
Total	-0.20	-0.59	1.83	0.20		
a_1b_1	0.00	-0.11	0.11	0.53		
a_2b_2	-0.20	-0.58	0.17	0.19		
a_1 d_{21} b_2	0.00	-0.04	0.02	0.01		

Note. Abbreviations: BootLLCI, bootstrapping lower limit confidence interval; BootULCI, bootstrapping upper limit confidence interval; SE, standard error.

Table 7

Overview results of the hypotheses model 1

Hypothesis	Independent variable	Dependent variable	Direction	Result
1.1	frequency	well-being	negative	Accepted
1.2	frequency	self-esteem	negative	Rejected
1.3	self-esteem	body satisfaction	positive	Rejected
1.4	body satisfaction	well-being	positive	Rejected
1.5	frequency	well-being	mediated by self-esteem and body satisfaction	Rejected

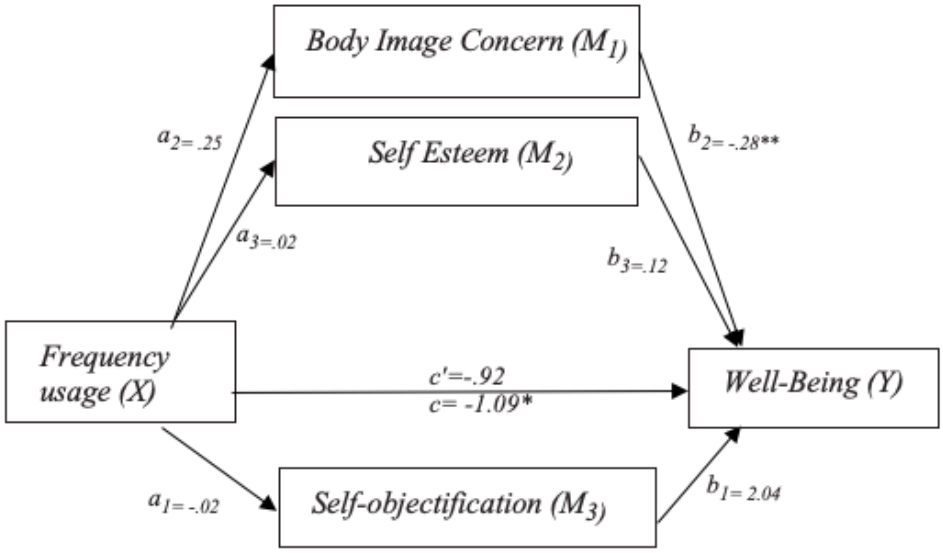
Implication for the proposed hypothesised theoretical framework 2

A parallel multiple mediation model was used to evaluate if self-objectification, body image concern and self-esteem mediate the relationship between frequency usage and well-being. See Figure 5 for visual diagram of the parallel multiple mediation model. Firstly, as also shown in the previous analysis, frequency usage of ODA was a significant predictor of users' mental well-being (the *c* pathway), b =-1.09, $t(176) = -2.13$, $p = .034$. Secondly, frequency usage was used to predict the mediator self-objectification (the a_1 pathway). However no significant association between frequency usage and self-objectification, b =-.02, $t(176)= -1.05$ $p = .291$ was found. Moreover, it was found that frequency usage did not significantly predict body image concern (the a_2 pathway), b =.25, $t(176)= .73$, $p = .466$, and self-esteem (the a_3 pathway), b =-.02, $t(176)= .25$ $p = .803$. Third, it was assumed that the three mediators predicted users' well-being (the *b* pathways). Self-objectification was not found to predict users' well-being (the b_1 pathway), b =2.04, $t(173)= 1.50$, $p = .135$, whereas body image concern significantly negatively predicted users' well-being (the b_2 pathway), b =-.28, $t(173)= -2.93$, $p = .004$ and self-esteem (the b_3 pathway), b =.12, $t(173)= .31$, $p = .752$ was not significantly related to users' well-being. Lastly, there was no significant indirect effect of frequency ODA usage on well-being through self-objectification, body image concern or self-esteem, b = -.16, BCa [-.51, .12], $R^2 = .02$ (see Table 8). Therefore, self-objectification, body image concern and self-esteem were not found to mediate the effect of frequency usage on well-being. To test whether the effect of self-objectification on well-being would be mediated by body image concern and self-esteem, a second parallel multiple mediation model was conducted (see Figure 6). As seen in Table 9 the total indirect effect indicated a mediation effect between self-objectification and users' well-being, b = 1.43, BCa [.41, 2.80], $R^2 = .04$. The direct effect of self-objectification on well-being was no longer significant, b = 2.19, p=.115. The indirect effects excluded zero for the mediator body image concern, b = 1.431, BCa [.38, 2.76] but not for self-esteem, b = 0.02,

BCa [-.23, .37], indicating that body image concern served as the mediator of the relationship between self-objectification and well-being. Based on the above-mentioned results of the mediation analyses, Table 10 displays the implication it had on the proposed hypotheses for the second theoretical framework.

Figure 5

Parallel multiple mediation model 1 of frequency usage as a predictor of well-being, mediated by body image concern(M_1), self-esteem (M_2) and self-objectification (M_3)



Note. The confidence interval for the indirect effect was a BCa bootstrapped CI based on 5000; Asterisks denote * = p<.5; ** = p< .01; *** = p<.001

Table 8

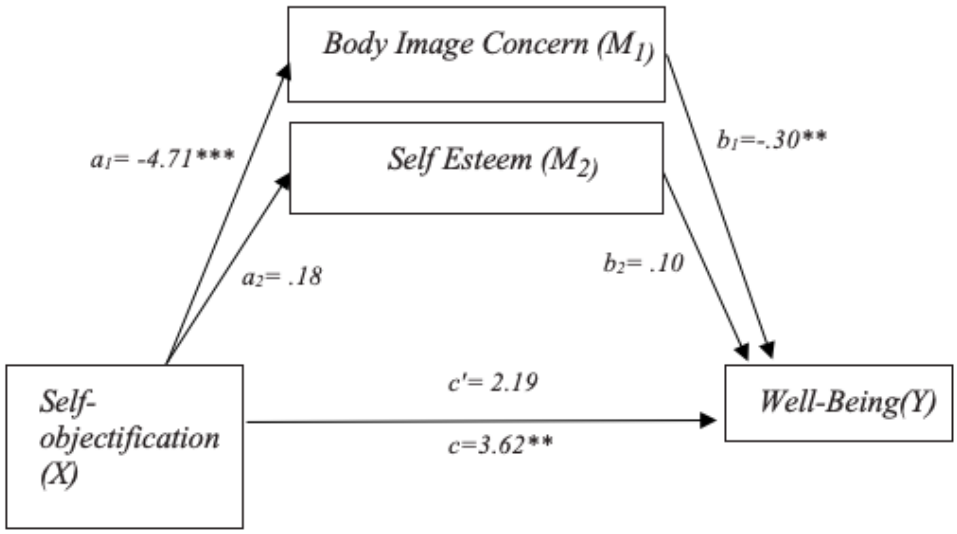
Path coefficients, indirect effects, and 95% bias-corrected confidence interval of frequency usage (X), body image concern(M_1), self-esteem (M_2) and self-objectification (M_3) *predicting well-being scores (Y; N= 178)*

Path	Effect	BootLLCI	BootULC	SE	t	P - value
Total effect (c)	-1.09	-2.10	-0.08	-0.51	-2.13	0.034
Direct effect (c')	-0.92	-1.89	0.04	0.49	-1.88	0.062
a_1	-0.02	-0.08	0.02	0.02	-1.05	0.291
a_2	0.25	-0.42	0.93	0.34	0.73	0.466
a_3	0.02	-0.18	0.23	0.10	0.25	0.803
b_1	2.04	-0.64	4.74	1.36	1.50	0.135
b_2	-0.28	-0.48	-0.09	0.09	-2.93	0.004
b_3	0.12	-0.64	0.89	0.39	0.31	0.752
Indirect effects						
Total	-0.16	-0.51	0.12	0.16		
a_1b_1	-0.05	-0.26	0.06	0.08		
a_2b_2	-0.07	-0.32	0.12	0.11		
a_3b_3	0.00	-0.10	0.09	0.04		

Note. Abbreviations: BootLLCI, bootstrapping lower limit confidence interval; BootULCI, bootstrapping upper limit confidence interval; SE, standard error.

Figure 6

Parallel multiple mediation model 2 of self-objectification as a predictor of well-being, mediated by body image concern (M_1) and self-esteem (M_2)



Note. The confidence interval for the indirect effect was a BCa bootstrapped CI based on 5000; Asterisks denote * = p<.5; ** = p< .01; *** = p<.001

Table 9

Path coefficients, indirect effects, and 95% bias-corrected confidence interval of and self-objectification (X), body image concern(M_1) and self-esteem (M_2) predicting well-being scores (N= 178)

Path	Effect	BootLLCI	BootULC	SE	t	P - value
Total effect (c)	3.62	1.00	6.24	0.32	2.73	0.006
Direct effect (c')	2.19	-0.54	4.93	1.38	1.58	0.115
a_1	-4.71	-6.60	-2.81	0.95	-4.90	0.000
a_2	0.18	-0.35	0.71	0.27	0.67	0.500
b_1	-0.30	-0.50	-0.09	0.10	-2.90	0.004

Path	Effect	BootLLCI	BootULC	SE	t	P - value
b_2	0.10	-0.61	0.83	0.36	0.29	0.752
Indirect effects						
Total	1.43	0.41	2.80	0.61		
a_1b_1	1.41	0.38	2.76	0.60		
a_2b_2	0.02	-0.23	0.37	0.14		

Note. Abbreviations: BootLLCI, bootstrapping lower limit confidence interval; BootULCI, bootstrapping upper limit confidence interval; SE, standard error.

Table 10

Overview results of the hypotheses theoretical framework 2

Hypothesis	Independent variable	Dependent variable	Direction	Results
2.1	frequency	well-being	negative	Accepted
2.2	frequency	self-objectification	positive	Rejected
2.3	self-objectification	body image concern	positive	Rejected
2.4	self-objectification	self-esteem	negative	Rejected
2.5	self-esteem	well-being	positive	Rejected
2.6	body image concern	well-being	negative	Accepted
2.7	frequency	well-being	mediated by self-objectification, body image concern and self-esteem	Rejected

Discussion

Considering the popularity of online dating (Smith & Anderson, 2016), it appears to be important to investigate its positive and negative impact on user's well-being by examining psychological mechanisms behind its usage. The importance of this research is also underscored by studies conducted in relation to the increased engagement in online dating and a myriad of negative outcomes that affect the mental well-being of the users (e.g.Stevens & Morris 2007; Strubel & Petrie, 2017; Orosz, et al., 2018). Therefore, this study was the first step in the identification of the potential influence of online dating frequency (low frequency vs. high frequency) on the mental well-being of the users.

Effect of low frequency usage on users' well-being

It was proposed that low frequency usage is associated with high well-being due to a raise in self-esteem and body satisfaction. This proposed theoretical framework was based on the Uses and Gratification Theory by Katz (1959) and the Sociometer Theory by Leary (2012). Based on these theories, online dating users are defined as active and motivated in their usage to satisfy social needs (e.g. finding a romantic relationship or friend), physical needs (e.g. intimacy or sexual pleasure), and psychosocial needs (e.g. validation of physical attractiveness; Sumter et. al., 2017; Timmermans & De Caluwe, 2017). In low frequency of usage, this satisfaction of needs, as well as validation of receiving likes and matches by others, was suggested to result in increased self-esteem and body satisfaction, which in turn should contribute to users' high well-being. The findings revealed that low frequency usage is associated with a high well-being in ODA users, but that self-esteem and body satisfaction did not mediate this relationship.

Results of the present study on self-esteem were consistent with past studies reporting mixed findings between ODA usage and self-esteem (e.g.Strubel & Petrie, 2017; Shimokobe & Miranda, 2018) as well as this study extends previous research by adding that there was no difference found in self-esteem between frequent and less frequent users of ODA. There are

several explanations for this missing association; however, all need further research: Orosz et al. (2018) found that the lack of association can be attributed to the fact that any self-esteem enhancing experience of ODA (i.e. Tinder) usage might be temporary and has no or a relatively small effect on one's global self-esteem. In fact, a negative feedback is practically non-existent in ODA, as users only see their matches, but do not experiencing that other users reject them. Consequently, as there is no explicit measure of rejection, it might be that the perceived personal value of receiving a 'match' has a temporally small positive affect on the user's well-being but does not influence the global self-esteem.

The present results on body satisfaction contradict with previous research. Courtois and Timmermans (2018) found that those who are successful on ODA may experience body satisfaction as they receive approval from others based on their physical appearance. Nevertheless, body satisfaction was not found to mediate the relationship between frequency usage and users' well-being. Taking this into consideration, it can be assumed that body satisfaction did not contribute to the relation between frequency usage and well-being, but either to the perceived success, resulting in an increased well-being.

While this research was unable to find explanation of why low frequency usage is associated with high well-being, further research in this direction is needed. A qualitative study by Kallis (2020) investigated the motivations for using Tinder. Based on in-depth interviews, two emerging themes were found to explain Tinder's function for the users. The first theme represents ODA usage for self-entertaining purposes in terms of passing time, in a way that almost resembles a game. Studies revealed that entertaining pastimes can contribute to an exciting, fulfilling, and pleasant life (LeFebvre, 2018; Van De Wiele & Tong, 2014; Whiting & Williams, 2013). The second theme includes ODA usage as a way to make interpersonal connections. ODA provides its users with a unique and simple way to connect and can be used to meet new people, making friends, hooking up, and finding long-lasting relationships (Kallis, 2020). Therefore, Bartsch and Oliver (2016) claimed that when people

use ODA to fulfil their social, physical, and psychosocial needs and use it as a tool for entertainment experiences, its usage is associated with increased well-being.

Taking this into consideration, the association between low frequency and high well-being found in this study might be better explained by its direct function (i.e. satisfaction of needs, entertainment experiences, forming connections) or indirectly by other mechanism that were not included (i.e. perceived success), but neither by its mediating effect of increased self-esteem nor increased body satisfaction.

Effect of high frequency usage on users' well-being.

The study also explored the effect of high frequency usage on users' well-being. It was proposed that high frequency usage is associated with low well-being in ODA users due to an increase in self-objectification, body image concern and decreased self-esteem. Findings confirmed that high frequency usage is associated with low well-being of the users. However, low well-being followed high usage could not be explained by a mediation effect of self-objectification, self-esteem and body image concern.

Contrary to the expectation, it was found that the frequency usage of ODA is not associated with self-objectification. However, self-objectification was found in users of online dating and body image concern was found to mediate the relationship between self-objectification and well-being. When considering the objectification theory (Frederickson & Roberts, 1997), objectification was expected to emerge as ODA users might be reduced to their physical appearances and internalizing an observer attitude. Several studies equate ODA with a contemporary medium for appearance pressure, where users are consistently faced with idealized images of other users (Strubel & Petrie, 2017; Filice et al., 2019). As ODA such as Tinder, can be compared with scrolling through a magazine with a line-up of options to choose from, objectification processes are likely to emerge (Kallis, 2020). Further, several studies have found that the process of objectifying others may increase self-objectification. The associated mental health consequences of self-objectification have been noted in previous

literature including clinical symptoms of depression and eating disorders (Jones & Griffiths 2015; Register, Katrevich, Aruguete, & Edman, 2015).

Nevertheless, in this study, this objectification effect was not predicted by the frequency of usage. Hence, it might be that the time actively spent using ODA poses a threat to objectification and not the number of logins as assumed within this study. In addition, several studies have pointed out that individual differences, such as personality, often contribute to how objectification affects individuals (Miner-Rubino, Twenge, & Frederickson, 2002; Fox & Rooney, 2015). For example, neuroticism was linked to self-objectification, as people possessing this trait may be more prone to internalize outsider views of their bodies and subsequently place an increase emphasis on their physical appearance (Carrotte & Anderson, 2018). Thus, it might be valuable for future research to include the time spent actively on ODA as well as to test if personality traits might serve as additional moderators. On the other hand, it might be that ODA does not explicitly serve as an environment for self-objectification and that it just happened to be the case that self-objectification occurs in users of online dating.

Conclusively, this study found no explicit explanations of why high frequency usage is associated with low well-being. Frequency of ODA usage was not found to be a significant predictor of self-objectification; nevertheless, self-objectification was found to occur in the current sample of online dating users, suggesting that it might be important to consider other influencing factors in future research. Possible questions surrounding the influence of frequency usage on the user's well-being might include; When is the point reached ODA usage positive effects decline and negative effects appear? When is the point ODA usage leads to significant mental health problems of the user? Is there a point when individuals might become addicted to the usage?

Limitations and recommendation for future research

Although this research is among the first to identify that frequency of use of ODA is associated with users' well-being, several limitations need to be mentioned. First, the issue of overpathologization has to be stressed (Orosz et al., 2018). Although high frequency usage of ODA was found to be associated with low well-being, statements about its detrimental health consequences need to be considered with caution. On the basis of the present study, it is not clear at what exact point ODA usage negatively affects user's well-being. Nevertheless, it is suggested that it is important to consider ODA usage in today's era, in which online dating receives more emphasis in the everyday life.

Secondly, the internal consistency of self-esteem of the RSES scale and self-objectification of the OBCS scale were not adequate; therefore, it is possible that the low level of internal consistencies might distort the present findings as it may decrease associations between the variables of interest. Consequently, findings associated with self-esteem and self-objectification should be regarded with caution. Moreover, as this was a secondary research, data gathered was based on an existing data set of self-reported nature with 25 % of the variables missing. Future studies should decline the possibility that users can skip through the questionnaires without answering items to prevent inconclusive data. Additionally, causal interpretations of the associations are limited because of the cross-sectional study design. Hence, no conclusion about the temporality of the associations can be drawn and a longitudinal research design (e.g., experience sampling) encompassing more aspects of ODA effects on well-being could further aid to a better understanding of this topic.

Further, data was gathered during the SARS-CoV2 pandemic, which may have affected the measured variables. First, the pandemic situation might has impacted the way of initiating relationships and consequently the online dating behaviour of the users. In fact, the usage of ODA has increased during times of social distancing, as other forms of dating were possible not given (Karantzas, 2020; Sullivan, 2020). Secondly, the pandemic situation might

have affected the well-being of users. Several studies found that the pandemic's perceived threat has a significant negative impact on an individual's mental well-being (e.g. Paredes, Apaolaza, Fernandez-Robin, Hartmann, & Yañez-Martinez, 2021). Consequently, findings need to be considered with caution, as the frequency of usage and the low well-being might be overestimated in comparison to times without a pandemic situation. It may be valuable to replicate this research after restrictions are lifted to compare if measures such as social distancing or perceived threat may have influenced the results.

Additionally, the results may have several implications for future research in terms of testing the proposed theoretical frameworks. This study took a first important step in showing a relationship between ODA frequency usage and users' well-being. From a theoretical point of view, the chosen mediators (i.e. self-objectification, self-esteem, body image concern and body satisfaction) were expected to impact users' well-being, although results could not confirm this to be the case. Therefore, there is a need for further research exploring different potential mediating, moderating and confounding variables, explaining why frequency of usage is associated with users' wellbeing. An example of a possible confounding variable might be a users' underlying motivations of ODA usage. As previous study found, entertainment and building connections are the two main motivations of ODA usage (Kallis, 2020), it could be argued that the type of motivation might have an impact on users' well-being. For example, seeing online dating mainly as an act of joy and entertainment might positively affect users' well-being. However, seeing it as a form of building a relationship and then experiencing negation of other users might imply a greater negative effect on users' well-being.

Strengths & practical implications

So far, existing research focused on the association between online dating and various aspects of decreased mental well-being in isolation, however, these aspects are known to interact and accumulate in mental health risks. This study was the first to test theoretical

predictions concerning ODA frequency usage on users' well-being, compromising multiple psychological variables. Accordingly, this study provided the opportunity to compare mechanisms and theories within two theoretical frameworks. It extends existing literature of the effect ODA have on users' well-being and highlights the essential need for further research in this field.

In terms of practical implication, there is a need to educate users and providers about possible positive and negative effects the frequently usage of ODA has on well-being. Even though this study could not explain why frequent use of ODA was associated with low well-being, this study encourages users to consider possible limitation before investing the resources and time to join an ODA. Moreover, online dating app providers need to understand that they have a significant influence on users' well-being and consequently they have a responsibility to prevent users of mental health risks. Therefore, a tentative suggestion could be to integrate warnings against highly frequent use directly in the app. One example of such a warning sign provided the social networking app Instagram, which sends users a signal "You're all caught up- You've seen all new posts from the past 48 hours", to slow users' engagement down (Constine, 2018). This concept could be integrated and extended for ODA. A warning sign explicitly for ODA could include suggestions to take a break, connect with already existing matches per chat or in person. This would switch the attention away from negative behaviour pattern (e.g. scrolling through a magazine, which may alter objectification processes) towards positive behaviour (e.g. satisfaction of physical, social, and psychosocial needs and forming long- or short-lasting relationships).

Conclusion

Considering the prevalence and popularity of online dating in today's society and the continuously increasing number of online daters, ODA deserves more attention from the scientific community. The present study was the first to identify that ODA frequency usage affects users' well-being. Specifically, low frequency usage was found to be associated with

high well-being and high frequency with low well-being. Even though its' association could not be explained by the chosen mediators, this study can be seen as groundwork for future studies searching for potential influencing and mediating factors. As online dating has led to a reconfiguration of the dating world and affect individual's well-being, further research is needed to assess what types of impact are produced through the frequent usage of ODA on users' well-being. In fact, findings of this paper stress the importance to focus on both positive and negative effects of ODA on users' well-being in order to avoid telling only part of the story. By only focusing on the negative aspects, we might underestimate the positive effects ODA has to offer for its users.

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Appendix A

Informed consent

Dear participant,

You are being invited to participate in a research study about "Mental wellbeing in an era of online dating". This study is being done by a group of third-year Psychology students from the University of Twente from the Faculty of Behavioural, Management, and Social Sciences at the University of Twente.

The purpose of this research is to investigate the relationship between online dating and different facets of mental wellbeing and will take approximately 20-30 minutes to complete. The data collected in this online survey will be treated strictly confidential. As such, all analysis of the collected data occurs anonymously and only for the purpose of this study. If the data is published, measures will be taken to ensure that no data of any individual is recognizable as such.

Your participation in this study is entirely voluntary and you can withdraw at any time. There are no right or wrong answers to the questions. Try to go along with the first thoughts you have.

We believe there are no known risks associated with this research study. We will minimize any risks by safely storing the data and anonymize all of your answers. However, during the study you are asked to individually self-reflect upon different constructs of your current mental well- being level. If you have the feeling that your current level of mental well-being is at risk we kindly invite you (if you are a student of the University of Twente to contact the student psychologist (please contact the secretariat of SACC on office hours: +31 53 489 2035 or visit the desk in the Vrijhof, 3rd floor, room 311) or your study advisor) to get help

by contacting self-help hotlines (https://www.nhs.uk/conditions/stress-anxiety-depression/mental-health- helplines/).

Study contact details for further information were given.

Thank you for your participation.

In compliance with the EU General Data Protection Regulation GDPR for collection of new data active, informed consent is required.

I understand and consent that:

1. I am 18 years old or older.
2. The procedure will approximately take 20-30 minutes.
3. I understood the content and agreed to contribute my data for the use of this research.
4. I can withdraw from this research at any time by informing the researchers and all my data will be deleted.
5. My personal information will be anonymised to protect my privacy.
6. With my permission, I agree that all my data can be evaluated and used for the research. 7. I have been given the guarantee that this research project has been reviewed and approved by the BMS Ethics Committee. For research problems or any other questions regarding the research project, the Secretary of the Ethics Commission of the faculty Behavioural, Management and Social Sciences at the University of Twente may
be contacted through ethicscommittee-bms@utwente.nl

In the case of questions or ambiguities, the researchers will be available in order to help.

o Yes, I do consent.

o No, I do not consent.

Appendix B

Online survey

Please fill in the following questions on your demographics. What is your age? _____

What is your gender?

- Male
- Female
- Other, namely: _____
- Prefer not to answer

What is your nationality?

- Dutch
- German
- Other, namely: _____

Do you use online dating sites or mobile dating apps?

- Yes, I use it currently
- Yes, I used it in the past ○ No, I never used it

Which site or app do/did you use?

- Tinder
- Lovoo
- Bumble
- Badoo
- Other, namely _____

How often do you make use of online dating apps/websites? How often have you made use of online dating apps/websites in the past?

- Once a month
- 2-3 times a month ○ Once a week
- 2-3 times per week ○ 4-5 times per week ○ Daily

How often do you make use of online dating apps/websites per day? How often have you made use of online dating apps/websites per day in the past?

- 2-3 times per day
- 4-6 times per day
- Once an hour
- 2 or more times per hour

Body Uneasiness Test (BUT) - subscale "body image concerns"

Please mark the answer which best expresses your experience at the moment.

	Never	Seldom	Sometimes	Often	Very often	Always
I like those clothes which hide my body.	○	○	○	○	○	○
I spend a lot of time thinking about some defects of my physical appearance.	○	○	○	○	○	○
I think my life would change significantly if I could correct some of my aesthetic defects.	○	○	○	○	○	○
I would do anything to change some parts of my body.	○	○	○	○	○	○
I feel I am laughed at because of my appearance.	○	○	○	○	○	○
I am dissatisfied with my appearance.	○	○	○	○	○	○
My physical appearance is disappointing compared to my ideal image.	○	○	○	○	○	○
I can't stand the idea of living with the appearance I have.	○	○	○	○	○	○
I am ashamed of my body.	○	○	○	○	○	○

Body-satisfaction Scale

Please rate how satisfied you are with the following body-party of you

	Very satisfied	Moderately satisfied	Slightly satisfied	Neither satisfied nor unsatisfied	Slightly unsatisfied	Moderately unsatisfied	Very unsatisfied
Head	○	○	○	○	○	○	○
Face	○	○	○	○	○	○	○
Jaw	○	○	○	○	○	○	○
Teeth	○	○	○	○	○	○	○
Nose	○	○	○	○	○	○	○
Mouth	○	○	○	○	○	○	○
Eyes	○	○	○	○	○	○	○
Ears	○	○	○	○	○	○	○
Shoulders	○	○	○	○	○	○	○
Neck	○	○	○	○	○	○	○
Chest	○	○	○	○	○	○	○
Tummy	○	○	○	○	○	○	○
Arms	○	○	○	○	○	○	○
Hands	○	○	○	○	○	○	○
Legs	○	○	○	○	○	○	○
Feet	○	○	○	○	○	○	○

Self-Objectification - surveillance scale

Please check how much you argee or disagree with the following statements.

1. I rarely think about how I look.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

2. I think it is more important that my clothes are comfortable than whether they look good on me.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

3. I think more about how my body feels than how my body looks.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

4. I rarely compare how I look with how other people look.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

5. During the day, I think about how I look many times.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

6. I often worry about whether the clothes I am wearing make me look good.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
	○			○	○	

[illegible]

○	○	○	○

7. I rarely worry about how I look to other people.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

8. I am more concerned with what my body can do than how it looks.

Strongly disagree	Disagree	Slightly disagree	Neither agree or disagree	Slightly agree	Agree	Strongly agree
○	○	○	○	○	○	○

Mental Health Continuum - Short Form

Place a checkmark in the box that best represents experiences and feelings during the past month.

During the past month, how often did you feel . . .

	Never	Once or twice	About once a week	About 2 or 3 times a week	Almost every day	Every day
...happy	○	○	○	○	○	○
...interested in life	○	○	○	○	○	○
...satisfied with life	○	○	○	○	○	○
...that you had something important to contribute to society	○	○	○	○	○	○
...that you belonged to a community (like a social group, your school, or your neighborhood)	○	○	○	○	○	○

During the past month, how often did you feel . . .

	Never	Once or twice	About once a week	About 2 or 3 times a week	Almost every day	Every day
...that our society is a good place, or is becoming a better place, for all people	○	○	○	○	○	○
...that people are basically good	○	○	○	○	○	○
...that the way our society works makes sense to you	○	○	○	○	○	○
...that you liked most parts of your personality	○	○	○	○	○	○
...good at managing the responsibilities of your daily life	○	○	○	○	○	○
...that you had warm and trusting relationships with others	○	○	○	○	○	○
...that you had experiences that challenged you to grow and become a better person	○	○	○	○	○	○
...confident to think or express your own ideas and opinions	○	○	○	○	○	○
...that your life has a sense of direction or meaning to it	○	○	○	○	○	○

Rosenberg Self-Esteem Scale

Please rate how strongly you would agree or disagree with the following statements

	Strongly Agree	Agree	Disagree	Strongly Disagree
On the whole, I am satisfied with myself.	○	○	○	○
At times I think I am no good at all.	○	○	○	○
I feel that I have a number of good qualities.	○	○	○	○

	Strongly Agree	Agree	Disagree	Strongly Disagree
I am able to do things as well as most other people.	○	○	○	○
I feel I do not have much to be proud of.	○	○	○	○
I certainly feel useless at times.	○	○	○	○
I feel that I'm a person of worth, at least on an equal plane with others.	○	○	○	○
I wish I could have more respect for myself.	○	○	○	○
All in all, I am inclined to feel that I am a failure.	○	○	○	○
I take a positive attitude toward myself.	○	○	○	○

Appendix C

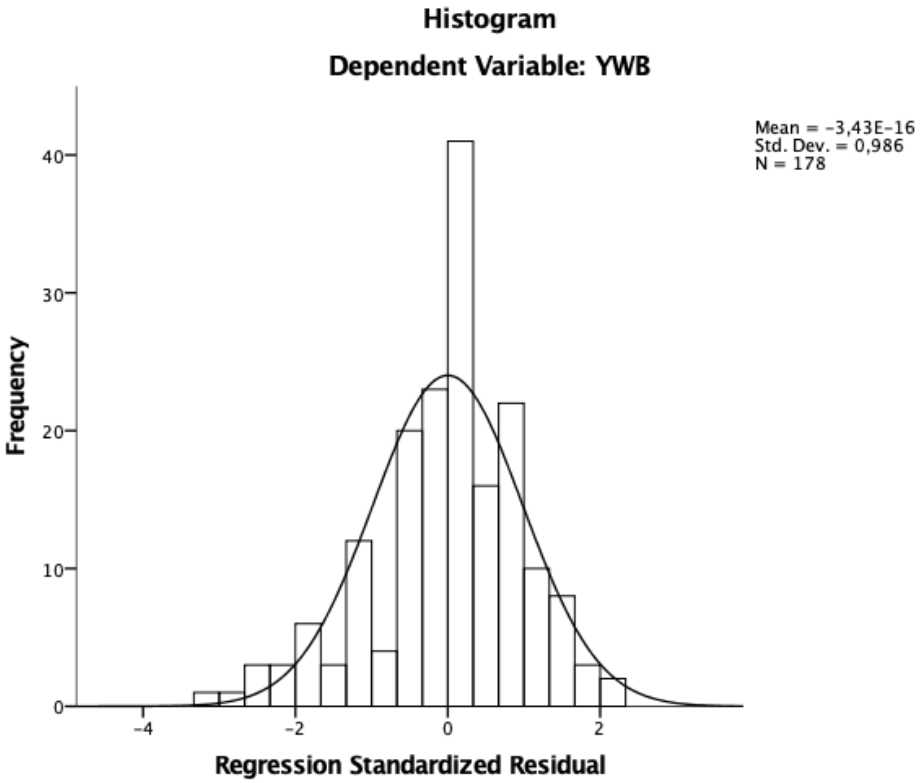
Table 11
Characteristics incomplete, complete and imputed data

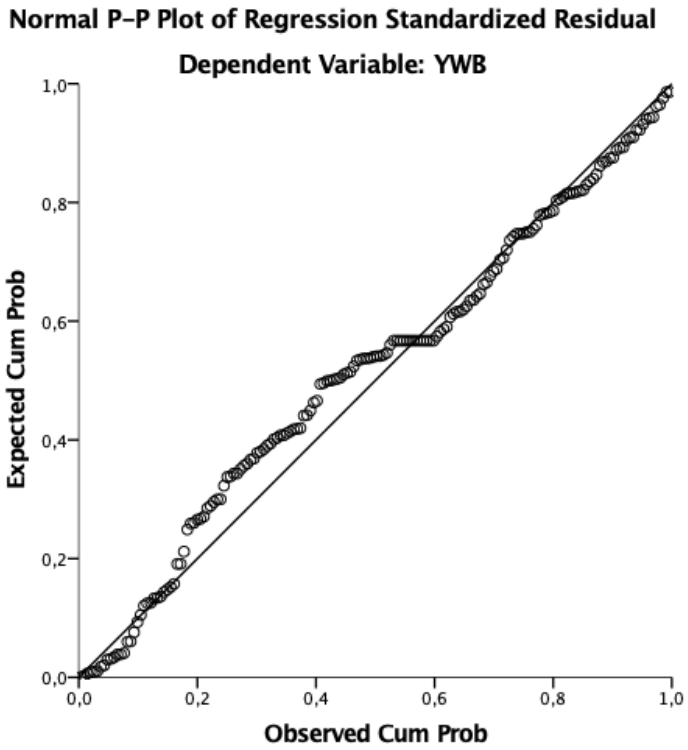
Characteristics	Incomplete data (*N* = 178)				Complete data (*N* = 136)				Imputed data (*N* = 178)			
	N	*%*	*M*	*SD*	*N*	*%*	*M*	*SD*	*N*	*%*	*M*	*SD*
Gender												
Female	94	53			80	59			96	54		
Male	69	39			56	41			69	39		
Not specified	13	7			-	-			12	7		
Nationality												
Dutch	15	9			13	10			16	9		
German	115	65			97	71			115	65		
Other	33	19			26	19			34	19		
Age, years			23.28	4.93			23.46	5.28			23.26	4.91
Range			18-55				18-55				18-55	
Self-esteem	153		23.04	2.31			22.97	2.32			23.05	2.14
Body Image concern	137		23.88	8.89			23.78	8.85			23.86	8.11
Body Satisfaction	153		2.88	0.85			2.87	0.84			2.88	0.73
Self-Objectification	136		3.85	0.66			3.85	0.66			3.85	0.59
Well-being	150		54.60	11.64			54.46	11.73			54.71	10.74

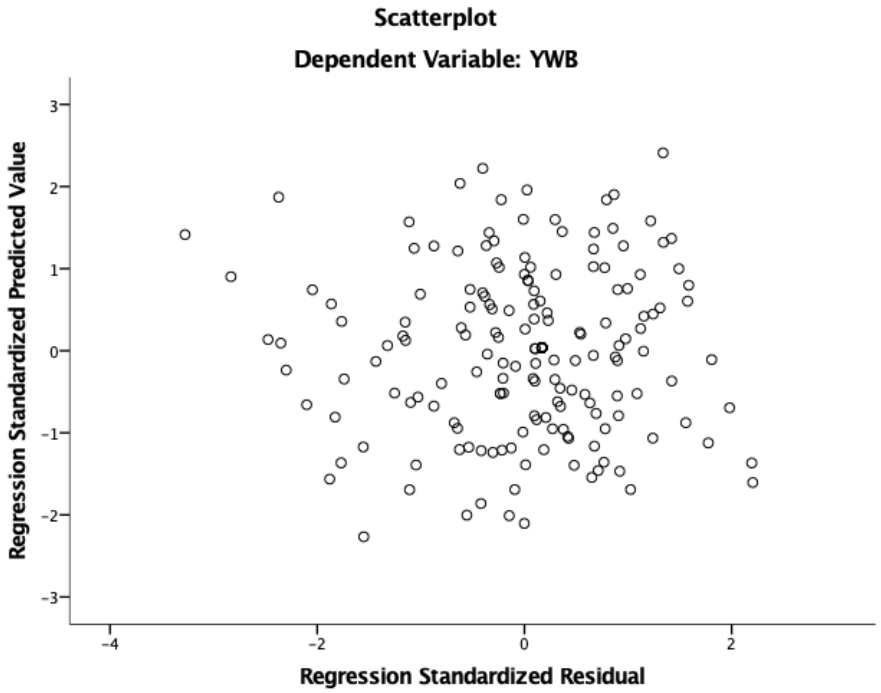
Note. Abbreviations: SD, standard deviation; M, mean

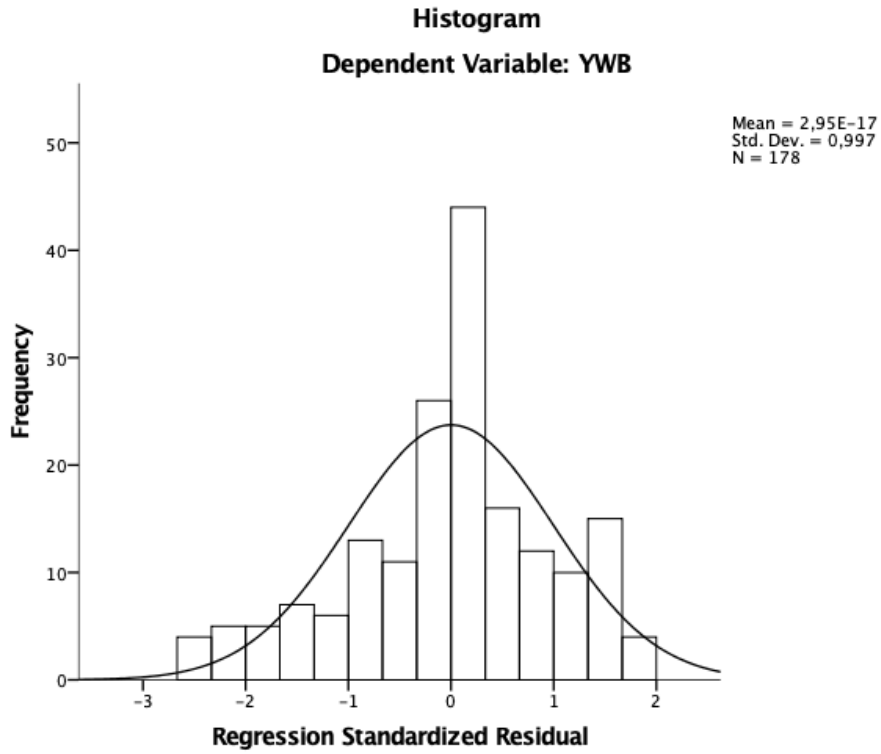
Appendix D

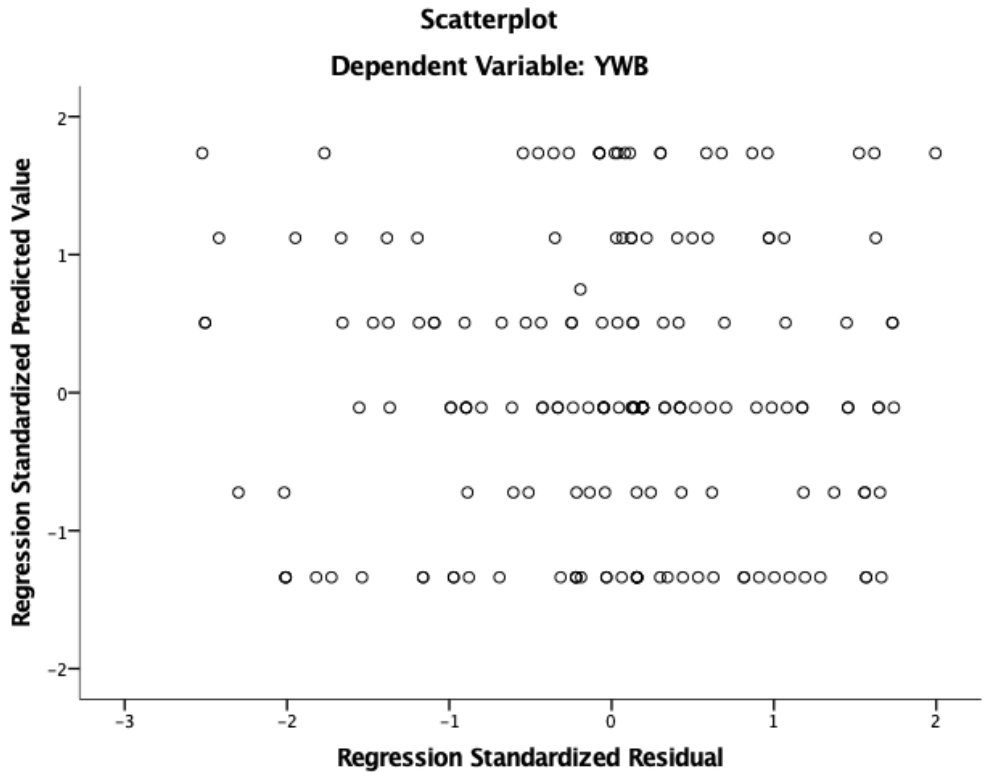
Assumptions

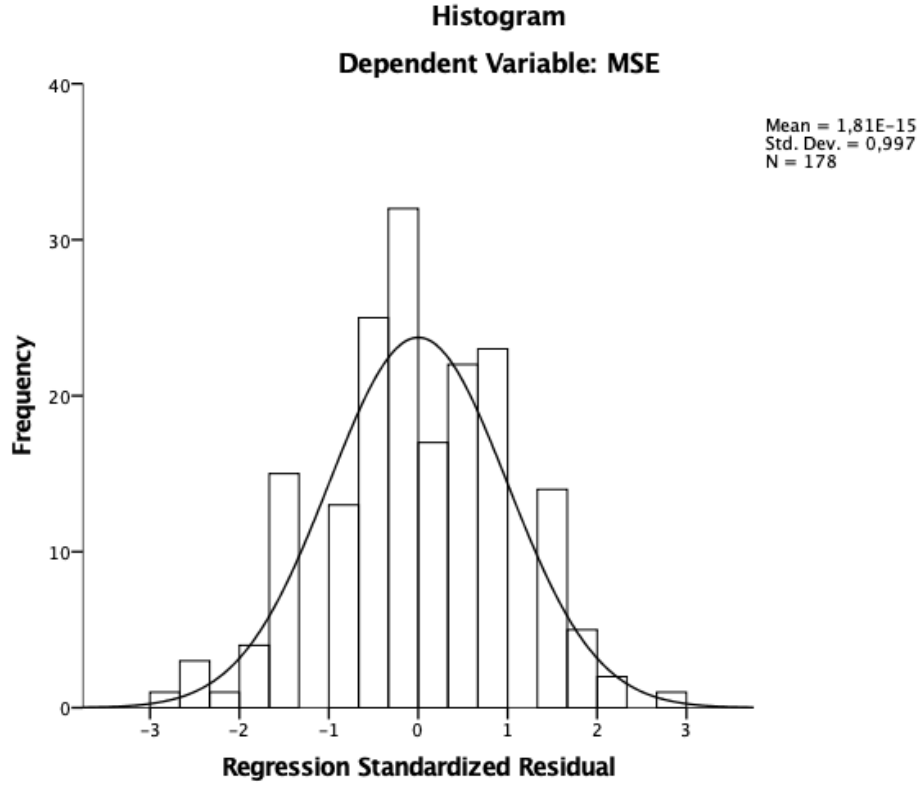


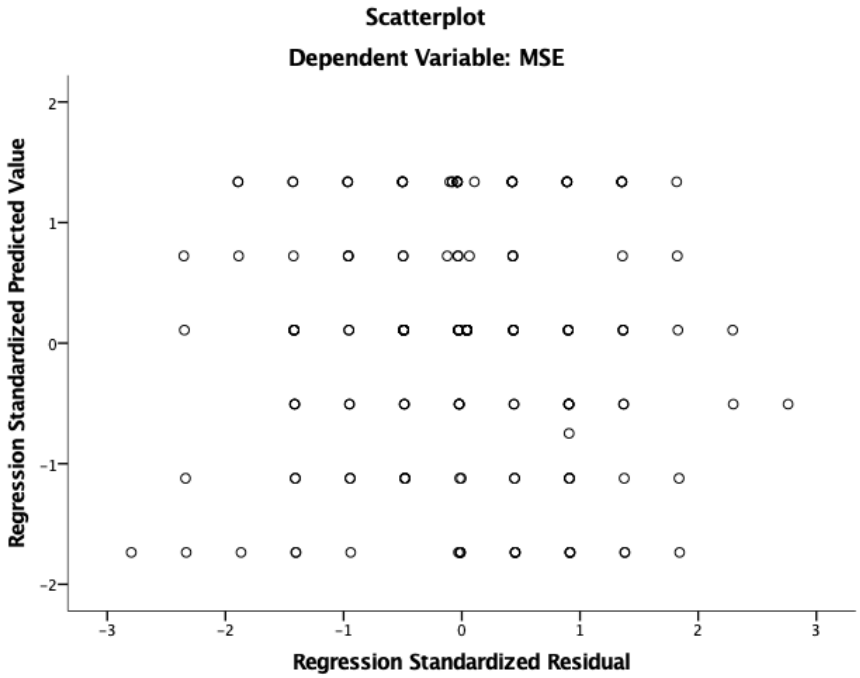


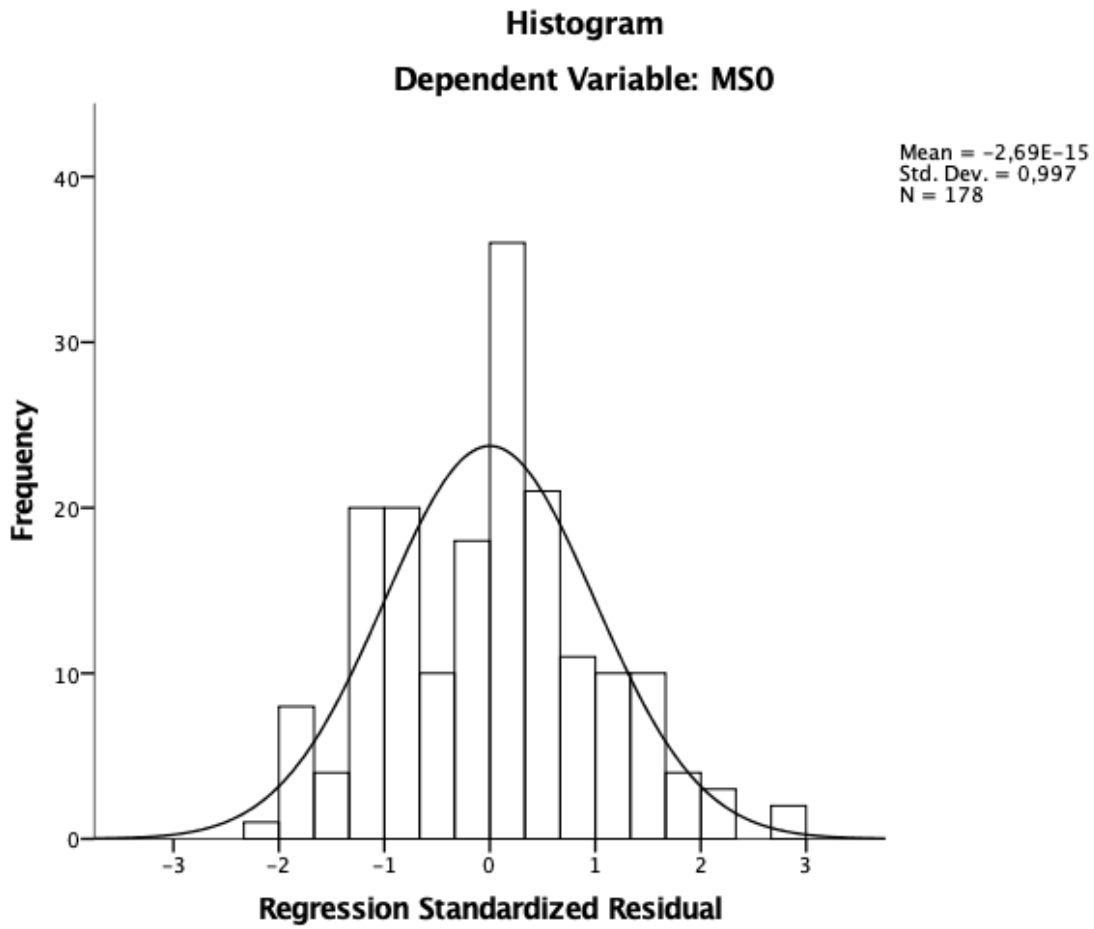

Scatterplot
Dependent Variable: YWB
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3
-4
-2
0
2

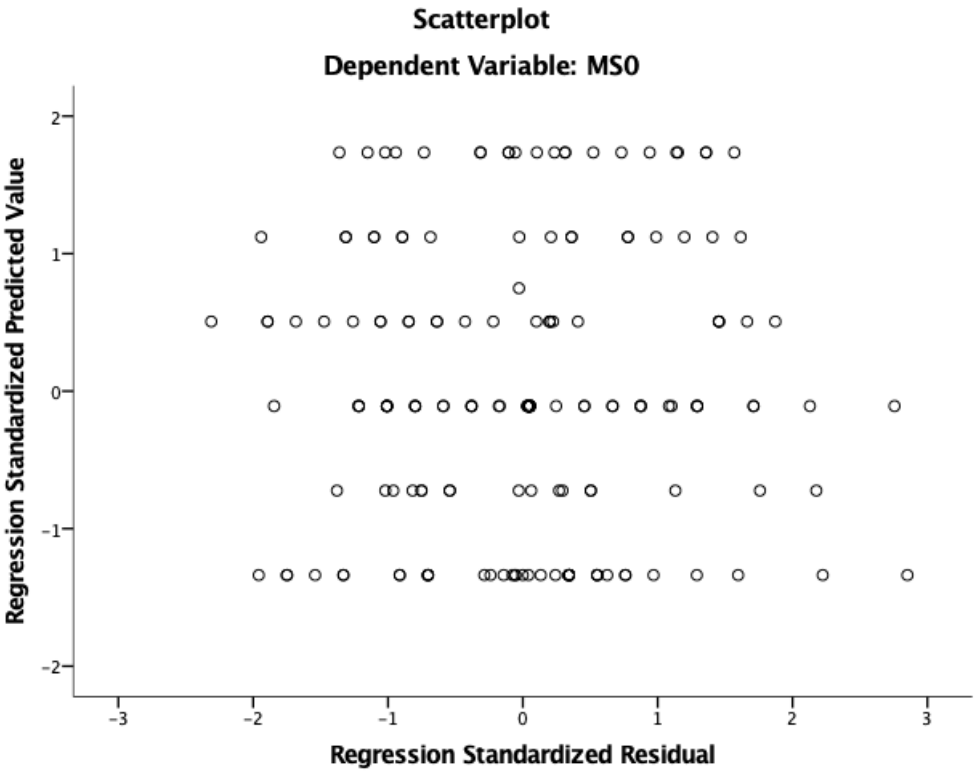

Histogram
Dependent Variable: YWB
Mean = 2,95E-17
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
50
40
30
20
10
0
-3
-2
-1
0
1
2

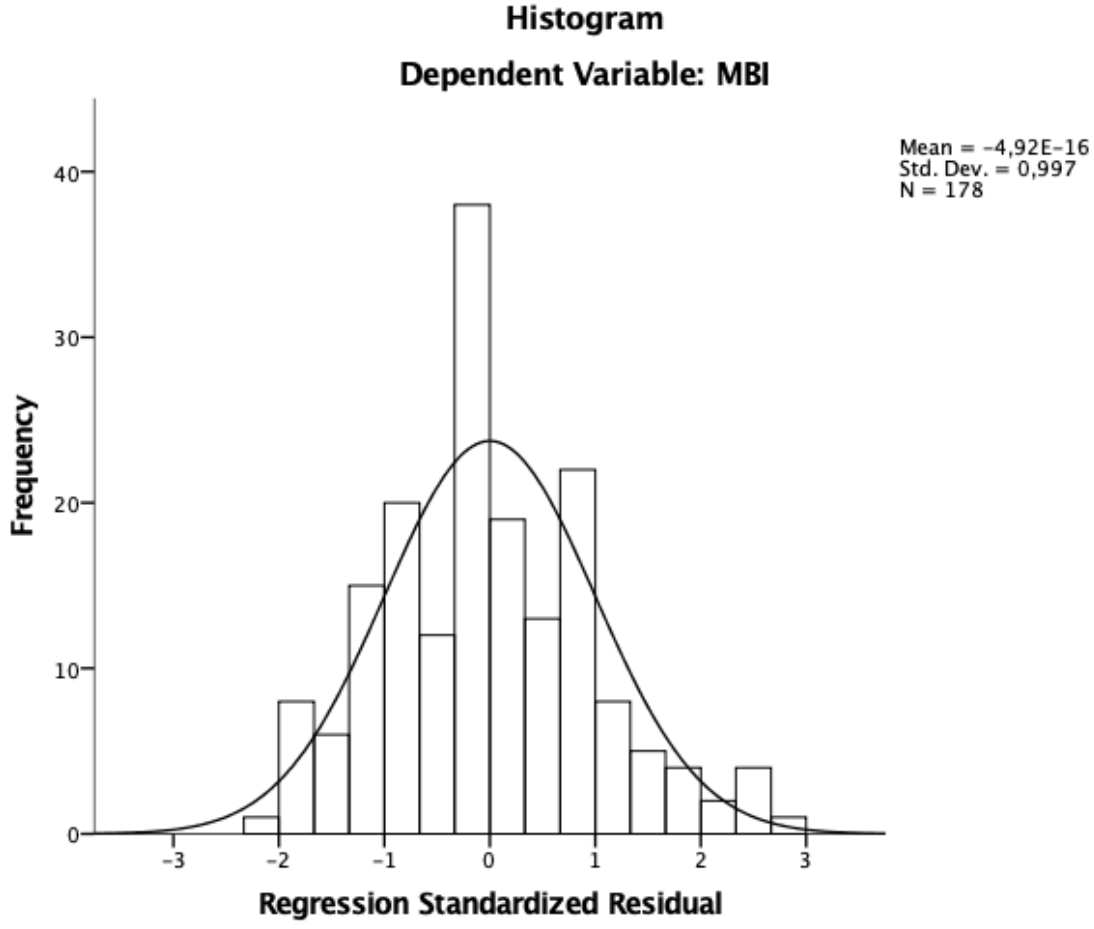

Scatterplot
Dependent Variable: YWB
Regression Standardized Predicted Value
Regression Standardized Residual
2
1
0
-1
-2
-3
-2
-1
0
1
2

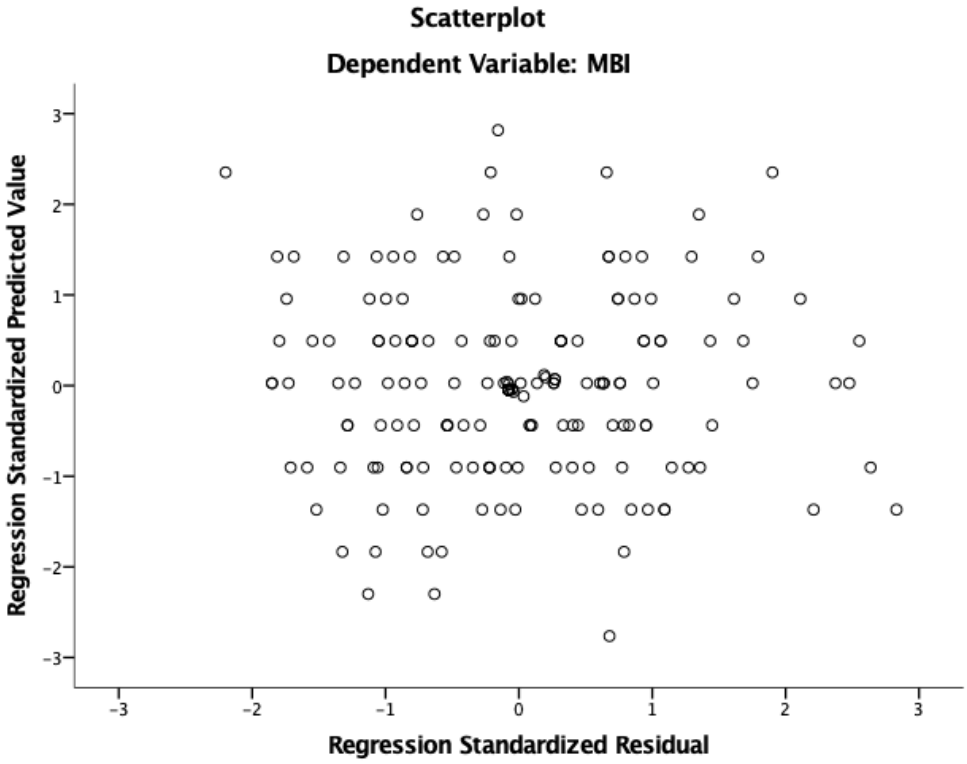

Histogram
Dependent Variable: MSE
Mean = 1,81E-15
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
40
30
20
10
0
-3
-2
-1
0
1
2
3

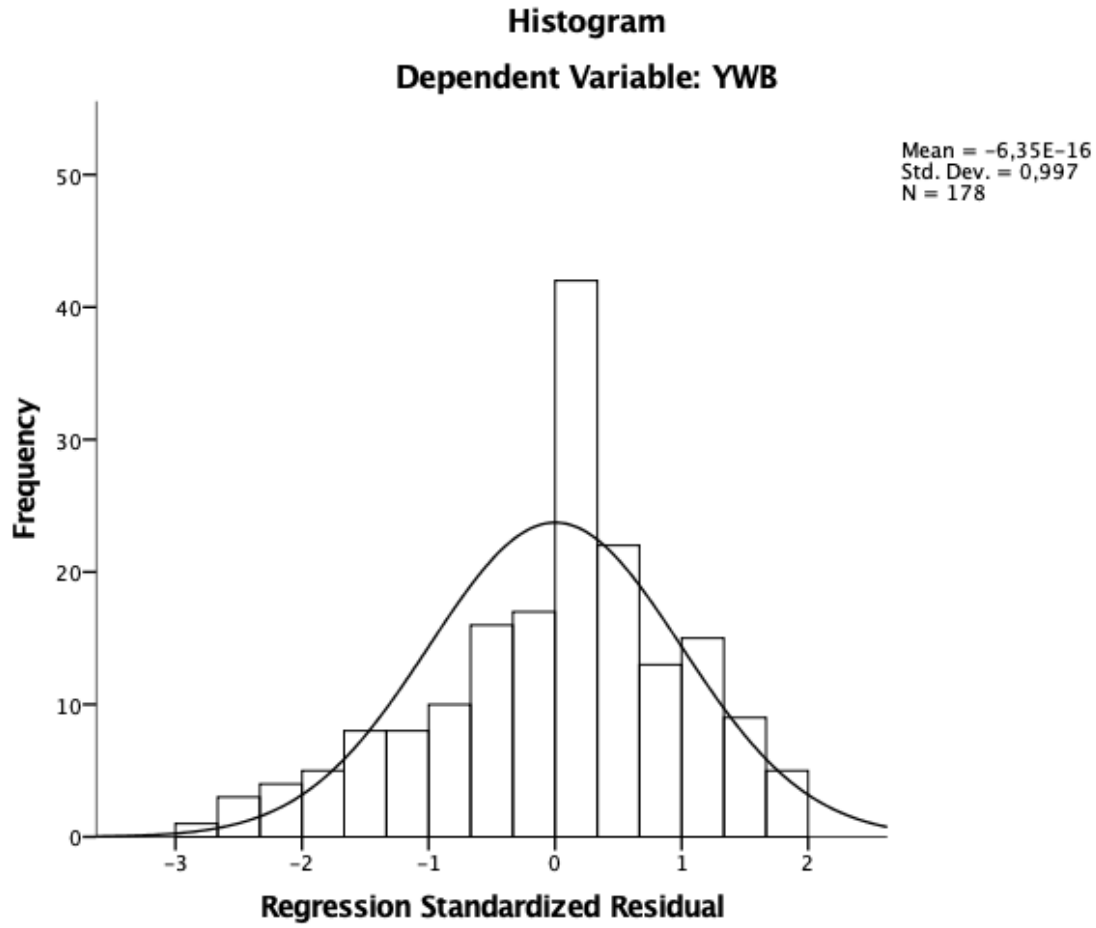

Scatterplot
Dependent Variable: MSE
Regression Standardized Predicted Value
Regression Standardized Residual
2
1
0
-1
-2
-3
-2
-1
0
1
2
3

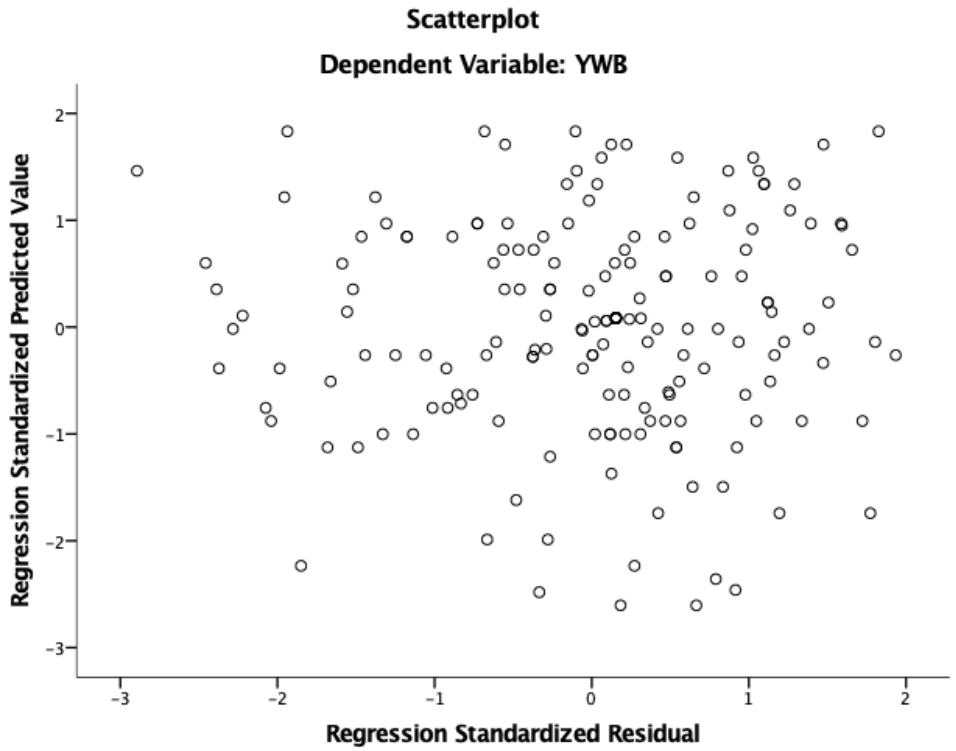

Histogram
Dependent Variable: MS0
Mean = -2,69E-15
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
40
30
20
10
0
-3
-2
-1
0
1
2
3

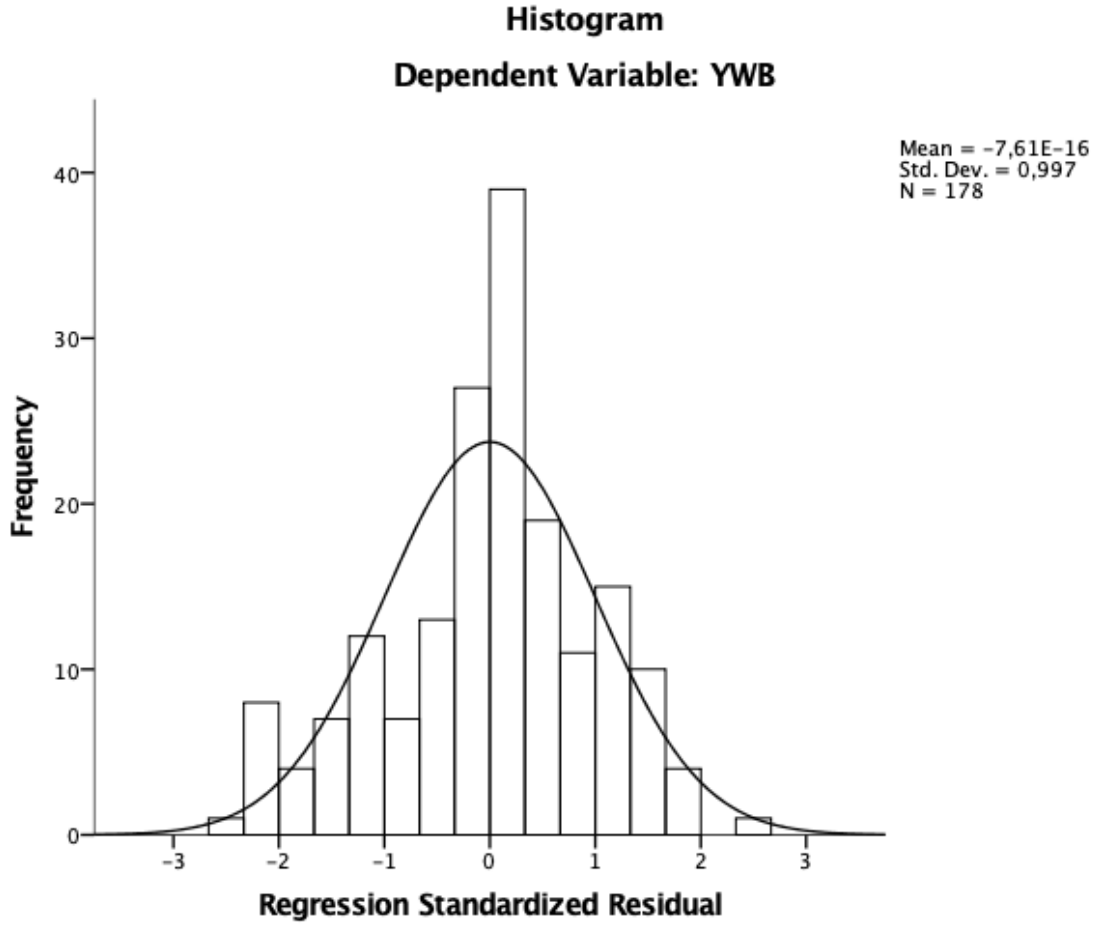

Scatterplot
Dependent Variable: MS0
Regression Standardized Predicted Value
Regression Standardized Residual
2
1
0
-1
-2
-3
-2
-1
0
1
2
3

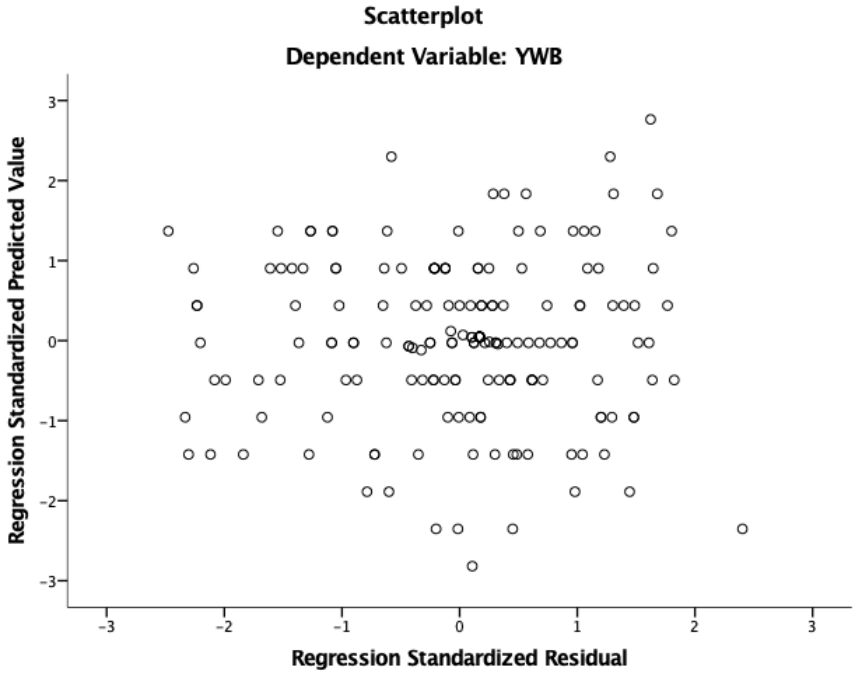

Histogram
Dependent Variable: MBI
Mean = -4,92E-16
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
40
30
20
10
0
-3
-2
-1
0
1
2
3

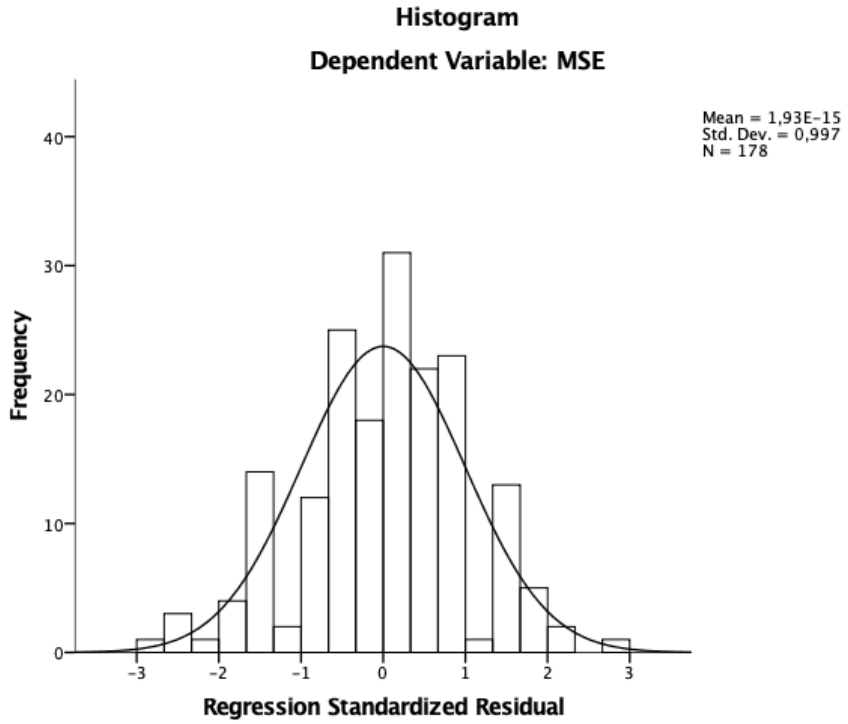

Scatterplot
Dependent Variable: MBI
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2
3

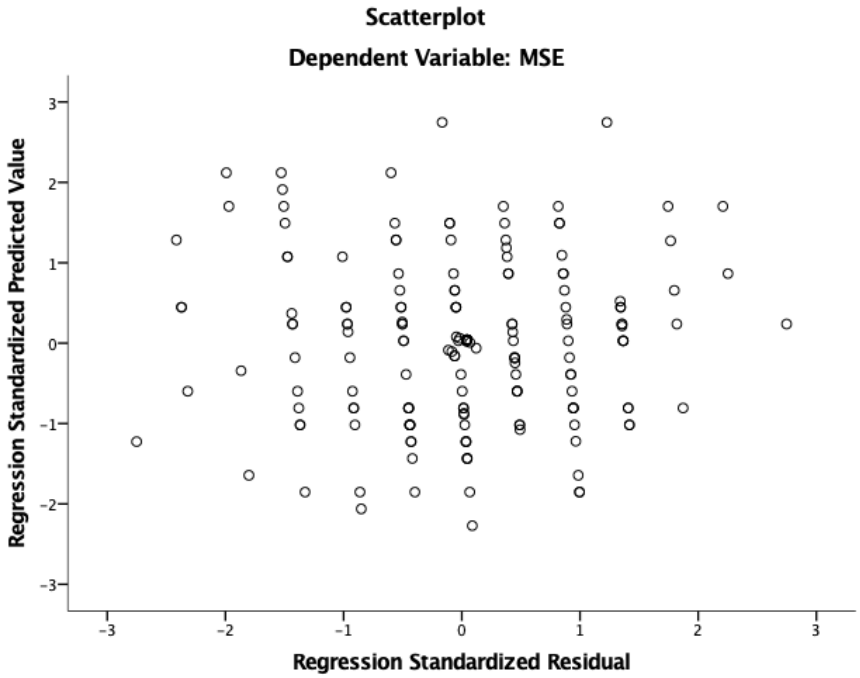

Histogram
Dependent Variable: YWB
Mean = -6,35E-16
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
50
40
30
20
10
0
-3
-2
-1
0
1
2

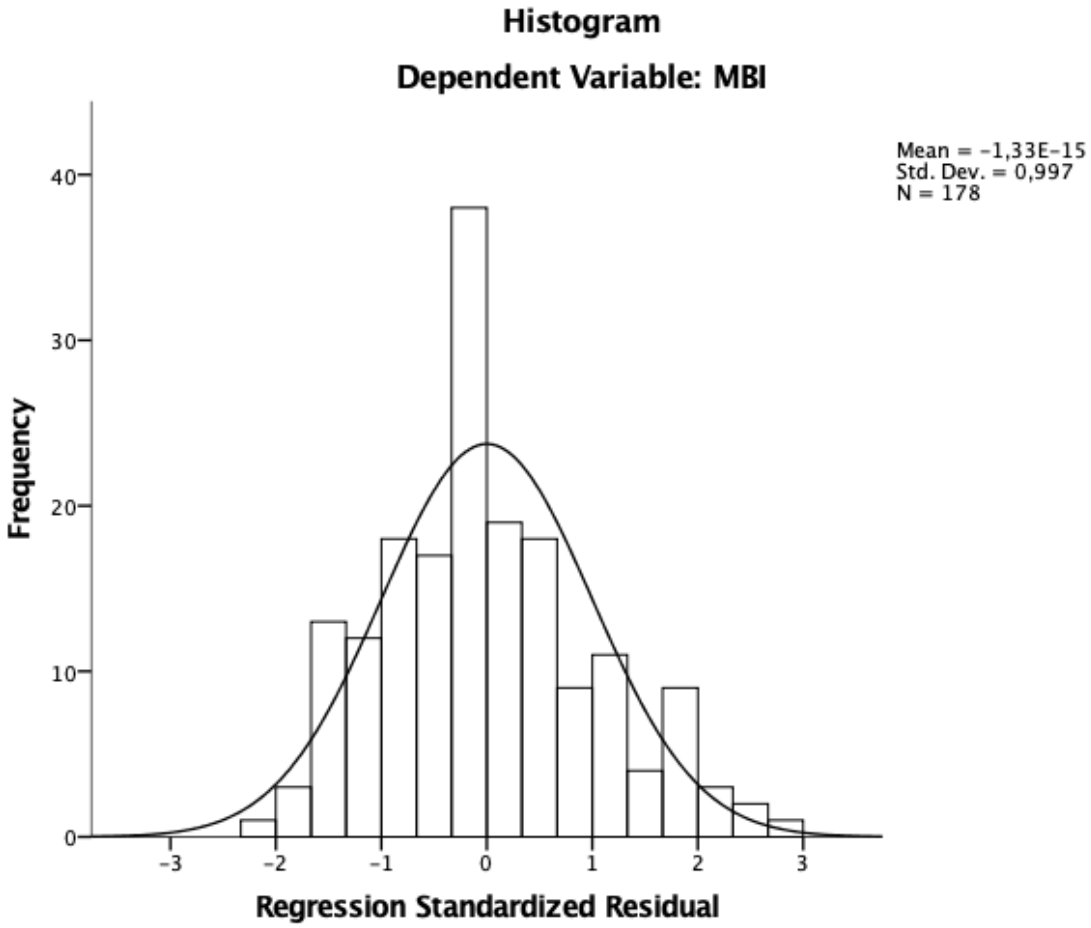

Scatterplot
Dependent Variable: YWB
Regression Standardized Predicted Value
Regression Standardized Residual
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2

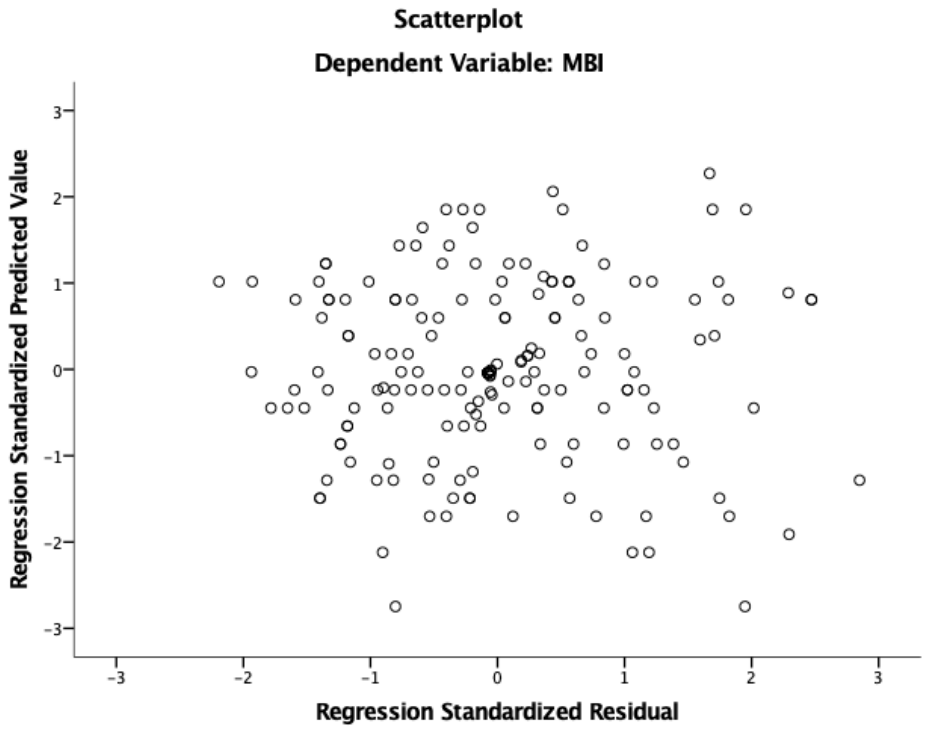

Histogram
Dependent Variable: YWB
Mean = -7,61E-16
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
40
30
20
10
0
-3
-2
-1
0
1
2
3

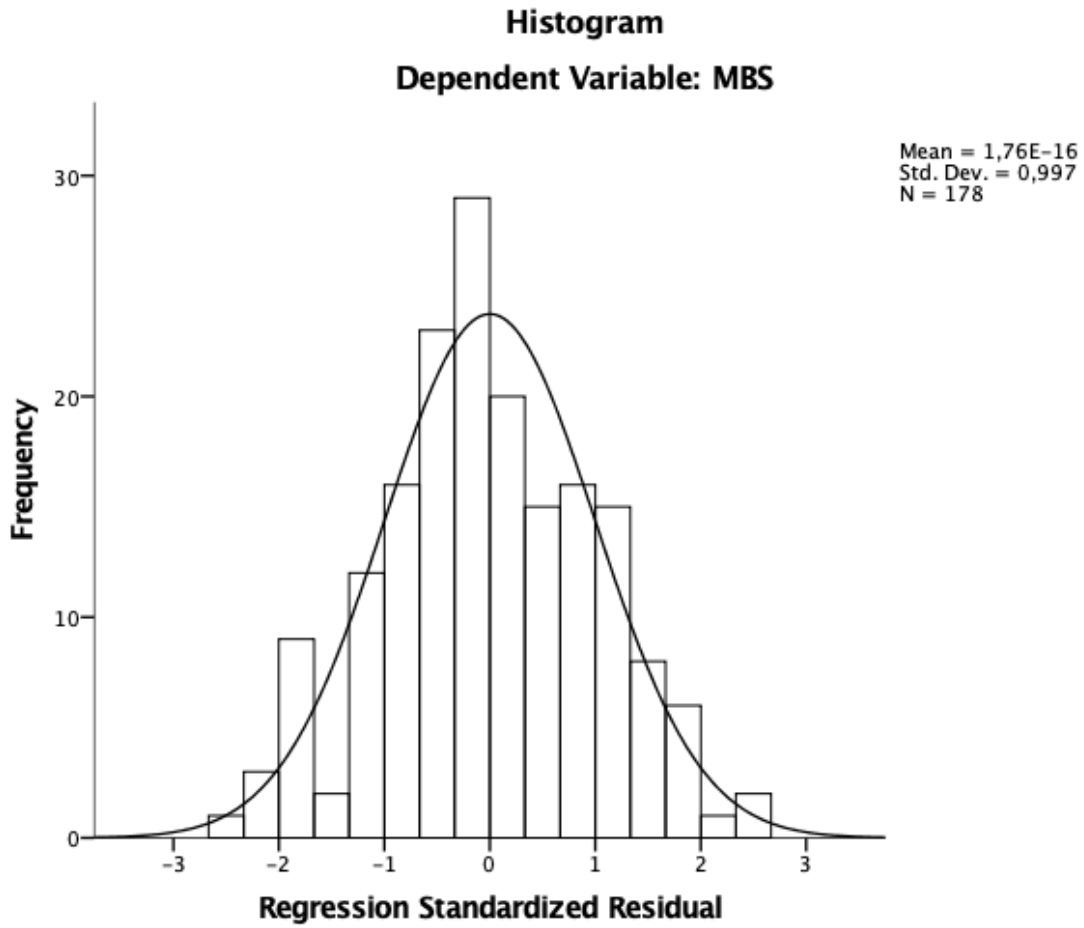

Scatterplot
Dependent Variable: YWB
Regression Standardized Predicted Value
Regression Standardized Residual


Histogram
Dependent Variable: MSE
Mean = 1,93E-15
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual


Scatterplot
Dependent Variable: MSE
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3


Histogram
Dependent Variable: MBI
Mean = -1,33E-15
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
40
30
20
10
0
-3
-2
-1
0
1
2
3


Scatterplot
Dependent Variable: MBI
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3


Histogram
Dependent Variable: MBS
Mean = 1,76E-16
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual
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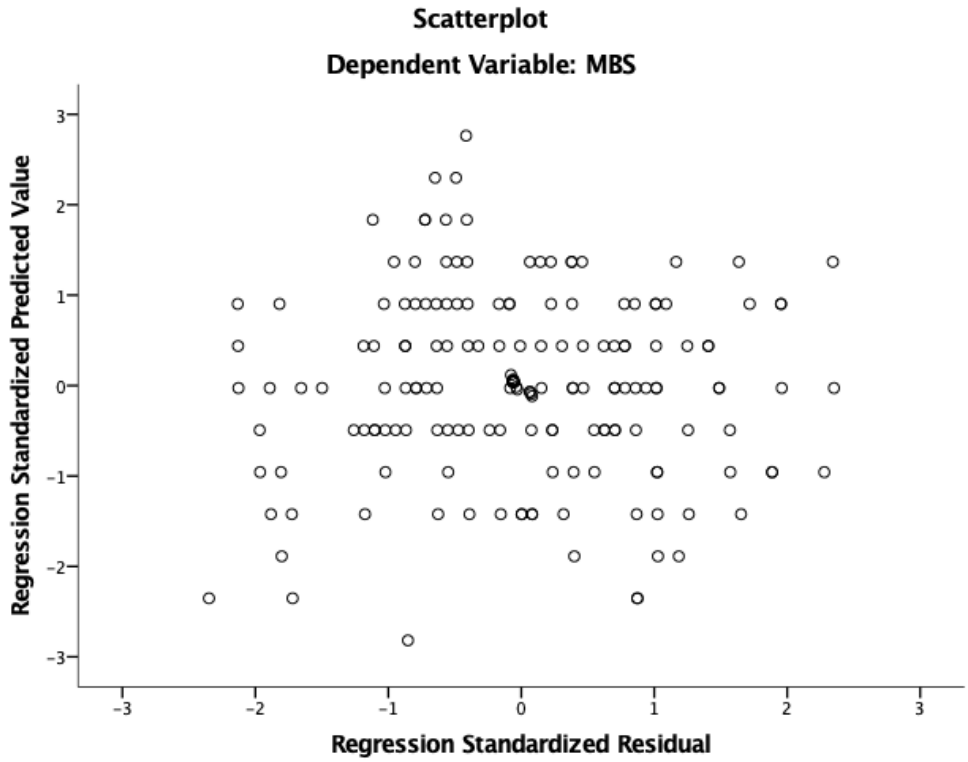
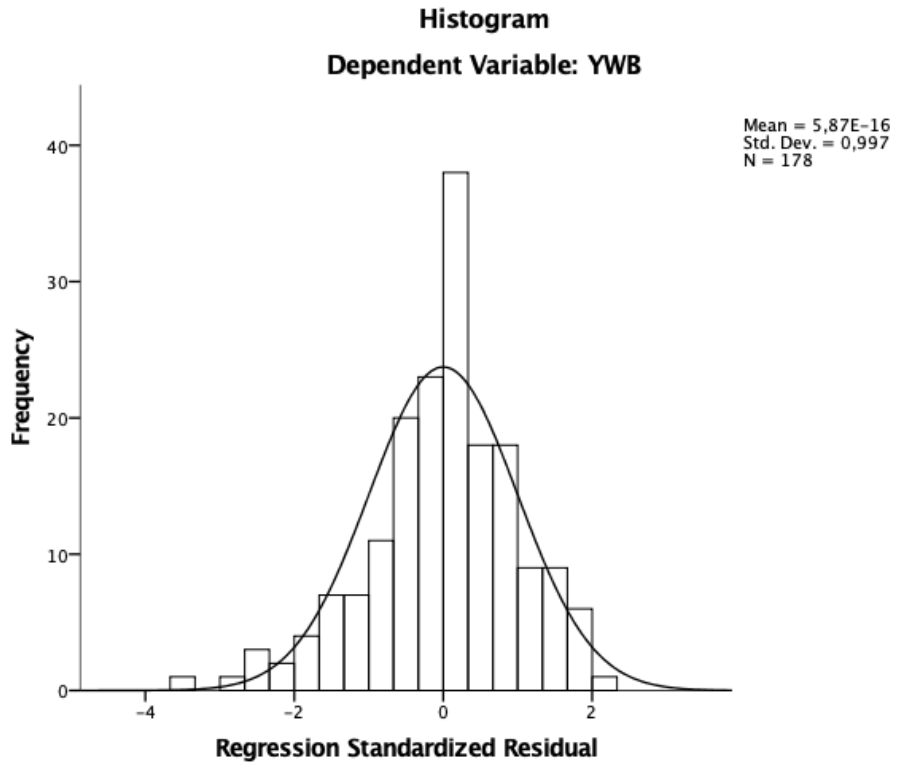
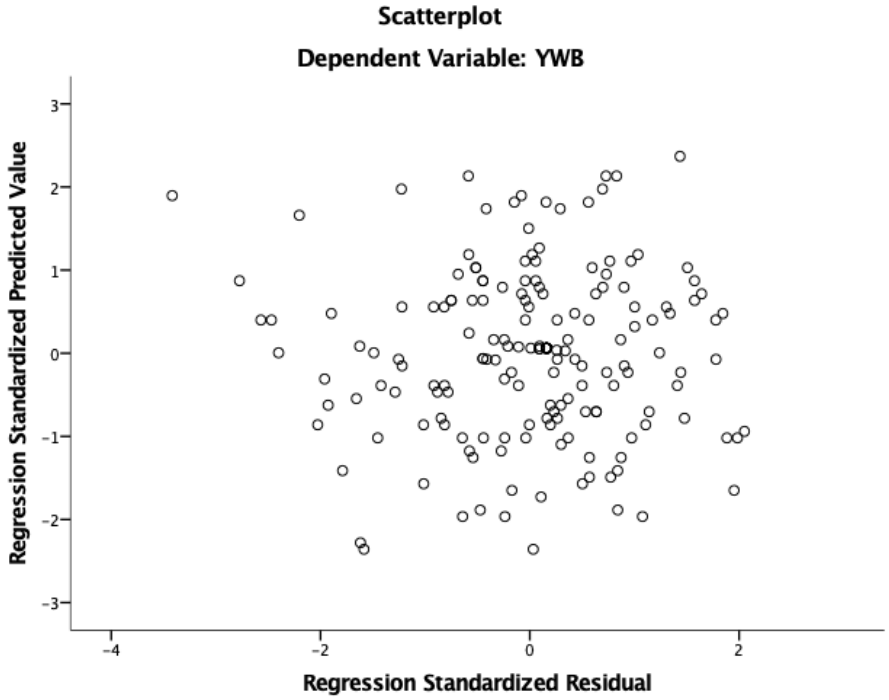
20
10
0
-3
-2
-1
0
1
2
3


Scatterplot
Dependent Variable: MBS
Regression Standardized Predicted Value
Regression Standardized Residual
3
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2
3


Histogram
Dependent Variable: YWB
Mean = 5,87E-16
Std. Dev. = 0,997
N = 178
Frequency
Regression Standardized Residual


Scatterplot
Dependent Variable: YWB
Regression Standardized Predicted Value
Regression Standardized Residual