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Social Media and Mental Health:

Narcissism's association with well-being is moderated by posting behaviour and received attention in social media

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Narcissism's association with well-being is moderated by posting behaviour and received

attention in social media

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Abstract

This paper had the purpose of investigating how narcissistic individuals' well-being is affected in social networking settings. Thus, the current paper explored narcissists' self-esteem and life satisfaction in social networking sites with possible moderation effects of posting behaviour and attention received online. A sample of 136 mostly German (76% female) young adults completed an online survey for this purpose. Results of the moderated moderation analysis show that higher posting behaviour is related to lower levels of self-esteem for individuals higher on narcissism and higher received attention is related to higher levels of self-esteem for individuals higher on narcissism. Furthermore, results of the current study indicate that high posting behaviour of individuals high on narcissism is negatively related to such individuals' life satisfaction. The findings of the present study contribute to the understanding of narcissistic individuals' higher and lower levels of self-esteem and life satisfaction in social networking site settings.

One relatively new phenomenon of communication is the rise of Social Networking Sites (SNSs) such as Facebook and Instagram. The app development for smartphones of these SNSs makes them even more accessible and thus also more usable on the way. Mobile phone internet users increased from 48.8% in the year 2014 to 63.4% in the year 2019 (eMarketer, 2015). Nowadays, its most common user groups are people ranging from the age of 18 to 30, which are people commonly known as young adults (Duggan & Brenner, 2013; Pelling & White, 2009). Platforms like these enable people not only to chat with others but furthermore to share their private information, pictures of themselves and locations with other members of these platforms (Kuss & Griffiths, 2011). Therefore, SNSs are used in many different ways and for many different purposes and motives by people.

Motives of SNS use can be observed through peoples' posting behaviour. Posting behaviour can be defined as the sharing of any kind of picture, status update, photo, video, comment, one's location and other functions of SNSs which lets other users publicly see into the shared topic (Kim, Lee, Sung, & Choi, 2016). As Kim, Lee, Sung and Choi (2016) found, the primary underlying motive of such behaviour is impression management, where individuals on SNSs tend to show off and share a more positive and socially desirable self of themselves. Additionally, motivations and reasons for a high level of posting selfies online were found to be attention-seeking, communication, archiving, and entertainment (Sung, Lee, Kim, & Choi, 2016).

The personality of an individual plays a major role in their posting and other forms of behaviour on SNSs. Among many other personality traits relevant to an active social media behaviour, e.g. extraversion, neuroticism and openness (Correa, Hinsley, & de Zúñiga, 2010), this study will focus on another important personality trait which is narcissism. A narcissistic person can be described as having an arrogant style, fantasising about having a high status and with a self-image of being entitled to admiration (Ashton, 2013). Additionally, narcissistic personality is a trait which describes individuals with a lack of empathy, an inflated view of themselves, with the belief of being special and the aspiration of special treatment (Bergman, Fearrington, Davenport & Bergman, 2011). Narcissism in the context of SNSs is especially interesting because such individuals find themselves a controlled environment in which they have full power over their self-presentation (Sheldon & Bryant, 2016).

Research on the relationship between personality and the use of SNSs have identified narcissism as one of the personality traits which correlate with higher use of SNSs (Buffardi & Campbell, 2008). Ryan and Xenos (2011) found that people who use Facebook have a higher level of narcissism and that the platform is appealing for those individuals because it satisfies the need for self-promotion. Furthermore, a study that included the platform Instagram found that users who showed high levels in narcissism were often posting selfies of themselves, with an overall higher time spent on the platform and more frequent updates of their profile pictures (Moon, Lee, Lee, Choi, & Sung, 2016).

Furthermore, Weiser (2015) investigated narcissism according to its three facets of Leadership/Authority, Grandiose Exhibitionism and Entitlement/Exploitativeness. In the study, Leadership/Authority is explained as the self-perception of the person's leadership, dominance and agency capacity. Grandiose Exhibitionism is mentioned to reflect the exhibitionistic, vanity and self-absorption qualities of a person which makes such individuals' want to show off and self-present themselves more. Finally, Entitlement/Exploitativeness stands for individuals who believe that they deserve what they wish and will take advantage of others in order to achieve their goals. Weiser (2015) found a significant association between two out of the three of them with selfie-posting frequency, which were Leadership/ Authority and Grandiose Exhibitionism.

Based on these studies, among SNS users, individuals high on trait narcissism seem to be more active on SNSs and display more frequent posting behaviour, as this may be one way to meet their motives of seeking attention and self-promotion. As Bergman et al. (2011) found, narcissists generally desire social contact because this is the source where they get their admiration and attention from.

Narcissism and Well-Being

Traditionally, the relationship between narcissism and psychological well-being has been seen as being of maladaptive nature (Raskin & Terry, 1988). Psychological well-being can be defined as the ability to maintain autonomy, self-esteem, purpose in life, personal growth and self-acceptance in one's life (Brugha, 2015). The current study focuses on two key aspects of mental well-being: self-esteem and life satisfaction (Ryff, 1989; Akin, 2008; Brugha, 2015).

In the psychological context, self-esteem can be defined as an overall self-evaluation that an individual has about one's own worth (Mehdizadeh, 2010). Furthermore, Blascovich and Tomaka (1991) also define the concept of self-esteem in the context of social sciences and state that it is an overall evaluation of one's own worth, value or importance and can be measured through attitudes towards one's self. Previous research that investigated the relationship between narcissism and self-esteem found that these two were positively related to each other with a moderately strong relationship (Barry, Grafeman, Adler, & Pickard, 2007). Furthermore, in another study individuals high on narcissism were related to high levels of self-esteem (Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004). Moreover, the findings in the study of Schwartz (2010) also support the positive relationship between narcissism and self-esteem. Thus, considering the previous findings about narcissism and self-esteem, research shows a consistent existing relationship between these factors with a positive direction.

Life satisfaction is defined as the global evaluation of the quality of an individuals' life while being an aspect of overall subjective well-being (Singh & Jha, 2008). More specifically, life satisfaction can be evaluated by an individual with their life as a whole or within domains of life such as their environment, family or friends (Suldo, Riley, & Shaffer, 2006). The study of Giacomin and Jordan (2016) investigated the relation between trait grandiose narcissism and life satisfaction. Here, grandiose narcissism is defined as being arrogant, extraverted, and exploitative as a person. They found that trait grandiose narcissism was positively related to the individuals' life satisfaction. Additionally, the study of Rose (2002) distinguished between overt and covert narcissists and their life satisfaction. This study describes overt narcissists as experiencing a grandiose sense of the self with the demand of others' attention, whereas covert narcissists tend to feel inferior to others because of their hypersensitivity towards others' evaluations. It has been found that overt type narcissists were more satisfied with their lives than covert type narcissists (Rose, 2002). This means that narcissists with a grandiose sense of the self and the demand of others attention have higher satisfaction with their life.

Narcissists SNS Use and Well-Being

With young adults being the biggest user group on SNSs in terms of demographics, it is important to know whether frequent SNS use and attention received on SNSs have any effects on the psychological well-being of narcissists in this stage of their life. The study of

Mehdizadeh (2010) found out that narcissistic individuals with an overall higher duration of use of SNSs and a greater amount of daily logins were related to lower levels of self-esteem. This finding also matches with another study which found out that high investment in SNSs is related to lower levels of self-esteem and an increased depressed mood (Blomfield Neira & Barber, 2013). Additionally, the study of Schwartz (2010) also found that narcissists' SNS use was negatively correlated with self-esteem, while the study of Zywica and Danowski (2008) also supports this relationship with findings indicating that individuals with lower self-esteem tend to be more intense in SNS usage than individuals with higher self-esteem. These findings of previous research could indicate towards the hope of compensating low levels of self-esteem by higher usage of SNSs of individuals high on narcissism. Also, the previous findings could mean that high SNS use of narcissists is explained by a high need for self-presentation, which therefore is shown by lower levels of self-esteem.

Regarding the satisfaction with life of individuals higher on narcissism, previous research identified that SNS use played an important role in this relationship between narcissism and life satisfaction. A study found out that SNS use affected life satisfaction positively in light of the factor of positive feedback which mediated this effect and was found to be of significant importance for the adolescents of the study sample (Lian, Sun, Yang, & Zhou, 2018). Therefore, individuals who use SNSs actively judge their lives more positively based on the positive feedback they get (Lian et al., 2018).

Regarding the effects of attention and feedback in SNSs on individuals' well-being, a study found that for individuals who are high on trait narcissism and those who actively use Facebook, many likes and frequent posting of new pictures were positively linked to their level of life satisfaction (Brailovskaia & Margraf, 2019). Moreover, the same study for individuals higher on narcissism states that having many online friends and getting others attention by comments on the own pictures was associated with a lower level of depressive symptoms, because a higher friend count meant a higher probability of positive feedback. In contrast, another study found that posting content on SNSs was associated with an increase in life satisfaction but the positivity of the feedback was found to have no association with life satisfaction itself (Wenninger, Krasnova, & Buxmann, 2014). Considering these previous findings about narcissism and attention received on SNSs regarding well-being, research shows different findings which go in contrary directions between these factors. This conflict

shows that the factor of received attention in SNS contexts is not yet in a clear light with its relationship to well-being and thus is suitable for further investigation.

The Current Study, Hypotheses and Research Model

With the currently ongoing increase of social networking site usage and its biggest user group of young adults, it is relevant to investigate implications that this usage comes with. This study will combine several different constructs and therefore extend on previous studies with the aim to investigate and understand the relationship between narcissism and well-being in the context of SNSs with possible moderation effects which might influence this relationship. Specifically, with regard to young adults, it investigates the moderating role of posting behaviour in SNSs and the attention received on SNSs with narcissistic SNS users' self-esteem and life satisfaction.

With a better understanding of cognitive processes, societal benefits on individuals' well-being can be drawn which can result in an improvement of well-being. On this basis, narcissists specific SNS behaviour and attention received online represent two important aspects in investigating narcissisms effect on well-being in an online context. Challenging individual weaknesses with the contributed knowledge should result in less negative affect on narcissistic users' well-being. Out of these research aims, several hypotheses can be derived for the study.

Hypothesis 1: Individuals who are higher on narcissism are expected to have higher posting behaviour in SNSs.

Hypothesis 2a: Individuals higher on narcissism are expected to correlate positively with self-esteem.

Hypothesis 2b: Individuals higher on narcissism are expected to correlate positively with life satisfaction.

Hypothesis 3a: Posting behaviour and the factor of received attention on SNSs will have a moderating effect on the relationship between narcissism and life satisfaction.

Hypothesis 3b: Posting behaviour and the factor of received attention on SNSs will have a moderating effect on the relationship between narcissism and self-esteem.

Specifically, in hypothesis 3a and 3b it is expected that high (vs. low) narcissistic SNS users who have high (vs. low) level of posting behaviour and a low (vs. high) level of received

attention on SNSs, will show lower (vs. higher) levels of self-esteem and life satisfaction. These hypotheses and the moderated influences are visualised and modeled in Figure 1.
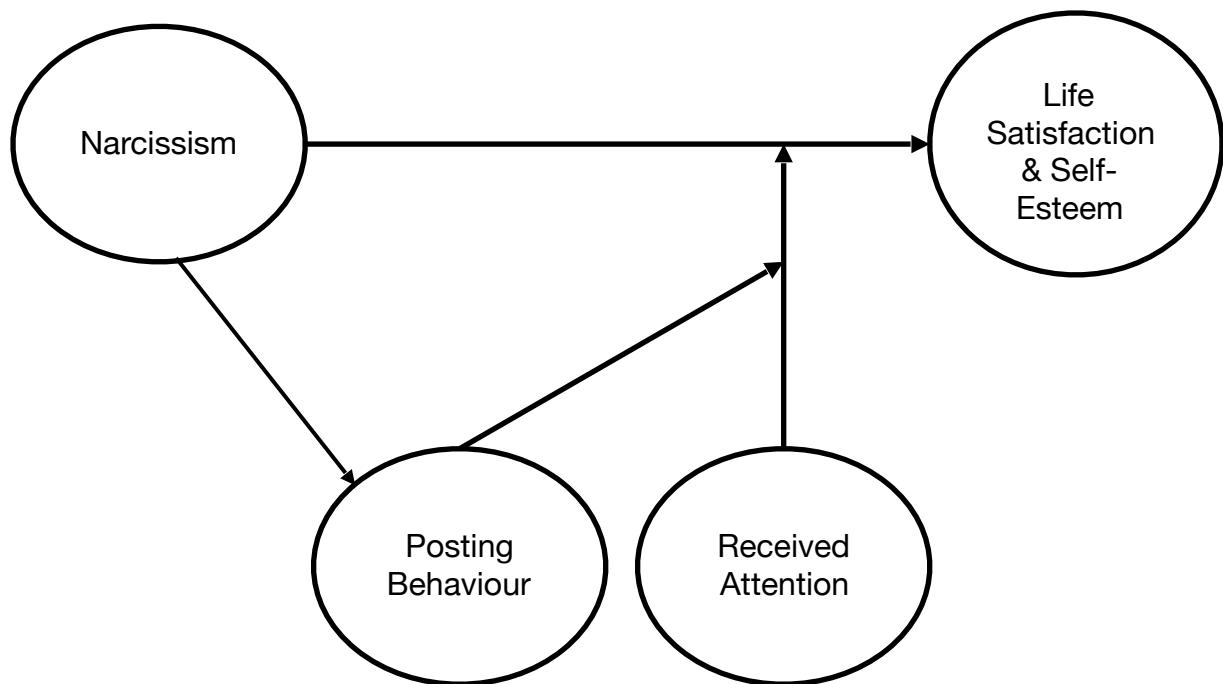

Figure 1. The research model with the proposed hypotheses.

Methods

Participants

A power analysis conducted in GPower yielded a total required sample size of 128 for a power of .80 and alpha of .05 to detect a medium effect size of d = 0.50 for an ANOVA test, assuming the moderation analysis can be done by three continuous variables median-split into two levels (high vs. low narcissism, high vs. low SNS use, high vs. low received attention). The current study involved a sample of 136 young adults in the age range of 18 to 31 years (M = 20.78 years, SD = 2.63). This sample size emerged after cleaning the original sample (N = 163) based on the inclusion criteria.

In order to be included in the sample, respondents had to fulfil the necessary criteria of agreeing to the consent form, being between the age of 18 and 30, giving the correct answers on the two attention check items in the survey and completing the questionnaire. Respondents that did not fulfil all of these mentioned inclusion criteria were excluded from the final sample. This study was accepted by the BMS Ethics Committee of the University of Twente

(UT). Participants were a convenience sample who were recruited through the online participant pool platform of the Department of Psychology, Health and Technology (SONA), or social media (Facebook, Instagram, etc.). SONA participants were awarded with course credit in return for their participation, whereas participants from the social media did not receive any compensation. The full list of demographics is provided in Table 1 below.

Table 1

Demographic Characteristics of the Respondents (N= 136)

Variables	Frequency	%
Gender		
Male	29	21.32
Female	104	76.47
Other	3	2.21
Nationality		
German	95	69.85
Dutch	21	15.44
Other	20	14.71
SNS Profiles		
Facebook	114	83.82
Instagram	115	84.56
Twitter	45	33.09
Snapchat	99	72.79
WhatsApp	135	99.2
Other	33	24.2

Design and Procedure

This cross-sectional study employed an online questionnaire designed in Qualtrics. Data collection occurred from 29th October to 22nd November 2019. The estimated duration of the online survey was 10-15 minutes for the participants. When participants accessed the questionnaire, they first landed on the consent page. To proceed to the study, respondents had

to agree to the consent form. After the consent page, participants completed demographic questions (age, gender, nationality and the SNS accounts held). Then they completed the measures assessing their level of narcissism, the frequency of posting behaviour, frequency of received attention, life satisfaction and self-esteem. The full scales and items are presented in the Appendix.

The measures were presented in two separate groups in which the first group always appeared before the second and their order was randomised within the groups. The first group consisted of the measures of narcissism, self-esteem and life-satisfaction, which were presented in a random order. The second grouping consisted of the measures of posting behaviour and received attention, which were also presented in a random order. Finally, the respondents were presented a debriefing form in which they got thanked for their participation and the real purpose of the study got explained.

Materials

Narcissism. The personality trait of narcissism was measured with the Narcissistic Personality Inventory (NPI-16) (Ames, Rose, & Anderson, 2006) which is a short form measure of the NPI-40 by Raskin and Terry's (1988). It consists of 16 two-statement pairs, in which the participant has to choose one statement from each pair that describes the participant better. The scale consists of statements such as "I really like to be the centre of attention", "I think I am a special person" and "I am more capable than other people". The score is made by computing the proportion of responses consistent with narcissism, the higher the score the higher the narcissism level is. The NPI-16 displayed an acceptable internal consistency with Cronbach's alpha being .69. This was in line with the presented Cronbach's alpha coefficients ranging from .65 to .78 by Ames et al. (2006), which described the scale as having a satisfactory internal consistency.

Self-esteem. Participants' self-esteem was measured with the 10-item Self-Esteem Scale by Rosenberg (1965). Ratings were done on a 7 point scale (e.g., "I feel that I have a number of good qualities"; 1 = strongly disagree to 7 = strongly agree). Items were averaged to create a composite score. Higher scores indicate higher self-esteem. In the current study, the Rosenberg Self-Esteem Scale showed high internal consistency with Cronbach's alpha being .86. This was in line with the presented Cronbach's alpha coefficients ranging from .72

to .87 by Rosenberg (1965), which described the scale as having a fairly high internal consistency.

Life Satisfaction. For the measurement of the subjective life satisfaction of the participants, the Riverside Life Satisfaction Scale (RLSS) was used. The RLSS by Margolis, Schwitzgebel, Ozer and Lyubomirsky (2018) is an improved measure of the Satisfaction With Life Scale by Diener, Emmons, Larsen and Griffin (1985) which has been the dominant measure when it comes to life satisfaction. It consisted of six items in the form of statements which had to be agreed or disagreed, on a 7-point Likert-scale from "Strongly disagree" to "Strongly agree". It includes statements like "If I could live my life over, I would change many things" (reverse-coded) and "I am satisfied with where I am in life right now". Internal consistency of the RLSS in the current study had a Cronbach's alpha of .79, compared to the original article which computed Omega with a value of .92 (Margolis et al., 2018).

SNS Posting Behaviour. The frequency of posting behaviour was measured through the Active Social Networking Site Use Scale by Frison and Eggermont (2015). The scale consists of seven items which are asked as frequency questions such as "How often do you post a message on your own social networking site timeline ?", which the respondent has to answer with the options from "Never" to "A great amount" on a 7-point Likert-scale. The internal consistency of this scale had a Cronbach's alpha of .76 in the current study, which is below the reported internal consistency of Cronbach's alpha being .84 by Frison and Eggermont (2015).

Received Attention at SNS. To measure the amount of received attention individuals got online, five items were developed in form of questions by the author of this thesis due to a lack of scales regarding received attention on SNSs. This included questions like "How often do you receive positive feedback or response when you post a photo on social networking sites?" and "How often do you receive positive feedback or response when you update your profile photo on social networking sites?". The answer options were given on a 7-point Likert-scale ranging from "Never" to "A great amount". Furthermore, this scale demonstrated a relatively high internal consistency with Cronbach's alpha being .81.

Data analysis

The data of this study was analysed with the program of IBM SPSS Statistics 25. First, the collected data was cleaned by excluding data that did not fulfil the inclusion criteria

described earlier. Second, a reliability analysis was done for each specific scale of the questionnaire to test its internal consistency by calculating Cronbach's alpha. Furthermore, a factor analysis was done on the scale of received attention in order to establish its preliminary construct validity. This was done due to the fact that the items of this scale were self-developed.

In order to test the first hypothesis, the Pearson correlation between narcissism and posting behaviour was calculated. Likewise, the Pearson correlation was once more calculated between narcissism with self-esteem and life satisfaction in order to test hypothesis 2a and 2b. For the current study, a correlation is significant when its p-value is lower than .05 and marginally significant with its p-value being between .05 and .10 and an effect size is large if $r > .50$, medium if r is between .30 and .50 and low if r ranges between .10 and .30 (Cohen, 1988).

To test hypothesis 3a and 3b, two moderated moderation models were estimated (PROCESS, Model 3; Hayes, 2017), one for each dependent variable (life satisfaction and self-esteem). PROCESS calculates the conditional indirect effects (based on the bootstrapping technique), that is, estimating the effect of an independent variable (narcissism) on a dependent variable (life satisfaction or self-esteem), at different levels of posting behaviour (the first moderator) and at different levels of received attention (second moderator). The conditional indirect effects were calculated using 5,000 bootstrapping samples, generating bias-corrected confidence intervals. A conditional indirect effect is considered significant if the confidence interval (CI at 95%) does not include the value 0. Additionally, the two predictors were centred which is aimed to prevent potential problematic high multicollinearity (Aiken & West, 1991). A moderation effect is significant with $p < .05$ or with being between .05 and .10 to be considered marginally significant.

Results

Factor analysis on the received attention scale

First, a factor analysis with the extraction method of maximum likelihood was conducted for the received attention scale, in order to establish its preliminary construct validity regarding the Kaiser-Meyer-Olkin criterion. To meet this criterion, an item has to score above .5 in order to be significant and to show good construct validity (Hill, 2011). All

items loaded under a single factor with loadings above the score of .5 (see Table 2).
Therefore, the received attention scale provided a good construct validity.

Table 2

Factor Matrix

	Factor
	1
How often do you receive positive feedback or response when you post a photo on social networking sites?	.76
How often do you receive positive feedback or response when you update your profile photo on social networking sites?	.73
How often do you receive positive feedback or response when you update your status on social networking sites?	.72
How often do you receive positive feedback or response when you post a video on social networking sites?	.66
How often do you receive positive feedback or response when you post an opinion or a comment on social networking sites?	.54

Extraction Method: Maximum Likelihood.

Descriptive statistics

Descriptive statistics and their means, standard deviations, skewness and kurtosis values for the variables of narcissism, posting behaviour, received attention, self-esteem and life satisfaction were also calculated. These values provide a good insight into the normality in data distribution. The skewness and kurtosis values indicate a normal distribution of the sample since these scores did not exceed the cut off points of -1 and 1 (see Table 3).

Table 3

Descriptive statistics

	M	SD	Skewness		Kurtosis	
			Statistic	S.E.	Statistic	S.E.

N	1.28	.18	.56	.21	-.43	.41
SE	4,88	.93	-.34	.21	-.25	.41
LS	4.70	1.00	-.51	.21	.12	.41
PB	4.15	.92	.10	.21	-.14	.41
RA	3.98	1.10	-.56	.21	.16	.41

Note. N = Narcissism, SE = Self-esteem, LS = Life satisfaction, PB = Posting behaviour, RA = Received attention; M = Mean, SD = Standard deviation, S.E. = Standard error; *N* = 136.

Correlational analysis

Since all variables are normally distributed, the Pearson correlation was used for the correlational analyses. To test the first hypothesis whether individuals who are high in narcissism show higher posting behaviour (H1), the Pearson correlation was computed between these two variables. Hypothesis 1 was supported although the relationship between the two variables did not reach the conventional value of statistical significance ($r = .15$, $p = .07$). Moreover, the second hypothesis stating that individuals who are higher on narcissism are expected to have higher self-esteem (H2a) and life satisfaction (H2b), was also tested by computing the Pearson correlation. Here, narcissism and self-esteem showed to be positively related to each other so that higher narcissism is linked with higher self-esteem ($r = .29$, $p < .001$), whereas narcissism and life satisfaction did not have a significant relationship and therefore have no effect on each other when their state changes ($r = .07$, $p = .39$). Thus, the second hypothesis was supported only with regard to self-esteem (H2a). A full overview of all correlation coefficients and *p*-values is given in Table 4.

Table 4

Pearson Correlations and p-values

	1	2	3	4	5
1. Narcissism	-				
2. Self-esteem	.29***	-			
p-value	< .001				

3. Life satisfaction	.07	**.60***	-		
p-value	.396	**< .001**			
4. Posting behaviour	.15	.15	.11	-	
p-value	.072	.077	.200		
5. Received attention	.15	**.17***	.05	**.51***	-
p-value	.080	**.037**	.519	**< .001**	

*p-value significant at .05 margin, ** p-value significant at .01 margin, *** p-value significant at .001 margin.

Moderation analysis

To answer the hypotheses that posting behaviour and attention received on SNSs will influence the effect narcissism has on life satisfaction (H3a) and on self-esteem (H3b), a conceptual model with two moderators was tested. This three-way moderation model was analysed using Hayes PROCESS macro and included posting behaviour as the primary moderator (W) and received attention as the secondary moderator (Z) (Figure 1, Model 3; Hayes 2017).

The first moderated moderation analysis was conducted with life satisfaction (Y) as the outcome variable and the model was significant, $F(7, 128) = 2.45, p = .022, R^2 = .12$. The narcissism x posting behaviour x received attention interaction was not significant, $b = -.42, t(127) = -.75, p = .454$. However, the two-way interactions were significant. The interaction between narcissism and posting behaviour was of significance for the respondents' life satisfaction, $b = -2.17, t(127) = -3.44, p = .001$. Additionally, the interaction between narcissism and received attention was of significance for the respondents' life satisfaction, $b = 1.03, t(127) = 2.2, p = .03$.

Additionally, there are conditional effects of narcissism on life satisfaction. For individuals with high narcissism, low levels of posting behaviour and moderate levels of received attention contributed to an increase in life satisfaction ($b = 2.51, p = .001$). Furthermore, another significant constellation which contributed to an increase in life satisfaction for individuals with high narcissism was having moderate levels of posting behaviour and a high level of received attention ($b = 1.65, p = .026$). The constellation which contributed strongest to an increase in life satisfaction however was for individuals with high

narcissism, low levels of posting behaviour and high levels of received attention ($b = 4.08$, p = .001). The values of the moderation analysis with life satisfaction as the outcome variable are shown in Table 5 and visualised in Figure 2. Also, the conditional effects of narcissism on life satisfaction are shown in Table 6.

Table 5

Moderation analysis, outcome variable: Life satisfaction

	Coefficient	Std. Error	t	p
Narcissism	.51	.49	1.03	.304
Posting behaviour	.20	.11	1.83	.069
Narcissism x Posting behaviour	-2.17	.63	-3.44	**.001***
Received attention	-.01	.09	-.08	.939
Narcissism x Received attention	1.03	.47	2.20	**.030***
Posting behaviour x Received attention	.07	.09	.80	.427
Narcissism x Posting behaviour x Received attention	-.42	.56	-.75	.454

*p-value significant at .05 margin, ** p-value significant at .01 margin, ***p-value significant at .001 margin.
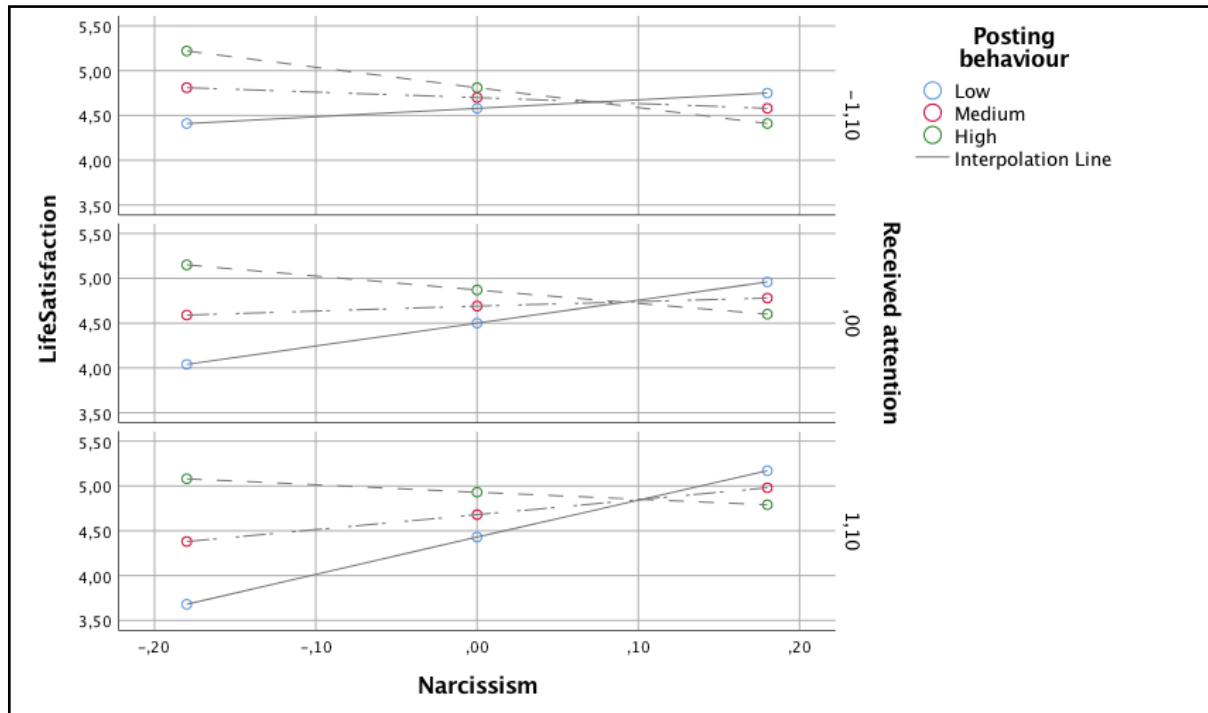
Figure 2. Graphical illustration of the moderation effects with life satisfaction as the
dependent variable.

Table 6

Conditional effects of narcissism on life satisfaction

Posting behaviour	Received attention	Coefficient	Std. Error	t	p
-.92	-1.104	.93	.88	1.06	.291
-.92	.00	2.50	.74	3.35	**.001*****
-.92	1.104	4.07	1.19	3.42	**.001*****
.00	-1.104	-.63	.69	-.91	.364
.00	.00	.50	.49	1.03	.304
.00	1.104	1.64	.73	2.25	**.026***
.92	-1.104	-2.21	1.30	-1.68	.094
.92	.00	-1.49	.77	-1.93	.055
.92	1.104	-.78	.88	-.88	.375

*p-value significant at .05 margin, ** *p-value significant at .01 margin, ***p-value significant
at .001 margin.

The second moderated moderation analysis was conducted with self-esteem (Y) as the outcome variable of the model and showed to be significant, $F(7, 128) = 3.83$, $p = .001$, $R^2 = .17$. In this model, the three-way interaction narcissism x posting behaviour x received attention was of no significance for the respondents' self-esteem, $b = .15$, $t(127) = .29$, $p = .772$. However, the interaction between narcissism and posting behaviour was significant for respondents' self-esteem, $b = -1.64$, $t(127) = -2.88$, $p = .005$, whereas narcissism alone was also of significance for respondents' self-esteem, $b = 1.36$, $t(127) = 3.09$, $p = .002$. The interaction between narcissism and received attention was not significant, $b = .44$, $t(127) = 1.05$, $p = .296$.

Additionally, there are conditional effects of narcissism on self-esteem. For individuals with high narcissism, moderate levels of posting behaviour and moderate levels of received attention contributed to an increase in self-esteem ($b = 1.36$, $p = .002$). Individuals high in narcissism with low levels of posting behaviour and low levels of received attention also showed an increase in their self-esteem ($b = 2.53$, $p = .002$). Furthermore, for individuals with high narcissism, moderate levels of posting behaviour and high levels of received attention contributed to an increase in their self-esteem ($b = 1.85$, $p = .006$). A stronger increase in self-esteem resulted for individuals high in narcissism with low levels of posting behaviour and moderate levels of received attention ($b = 2.87$, $p < .000$). The strongest increase for individuals' self-esteem occurred for individuals of high narcissism, low levels of posting behaviour and high levels of received attention ($b = 3.21$, $p = .003$). The values of the moderation analysis with self-esteem as the outcome variable are shown in Table 7 and visualised in Figure 3. Also, the conditional effects of narcissism on self-esteem are shown in Table 8.

Table 7

Moderation analysis, outcome variable: Self-esteem

	Coefficient	Std. Error	t	p
Narcissism	1.36	.44	3.09	**.002****
Posting behaviour	.09	.10	.95	.346

Narcissism x Posting behaviour	-1.64	.57	-2.88	**.005****
Received attention	.08	.08	.95	.342
Narcissism x Received attention	.44	.42	1.05	.296
Posting behaviour x Received attention	.11	.08	1.50	.136
Narcissism x Posting behaviour x Received attention	.15	.50	.29	.772

*p-value significant at .05 margin, ** p-value significant at .01 margin.
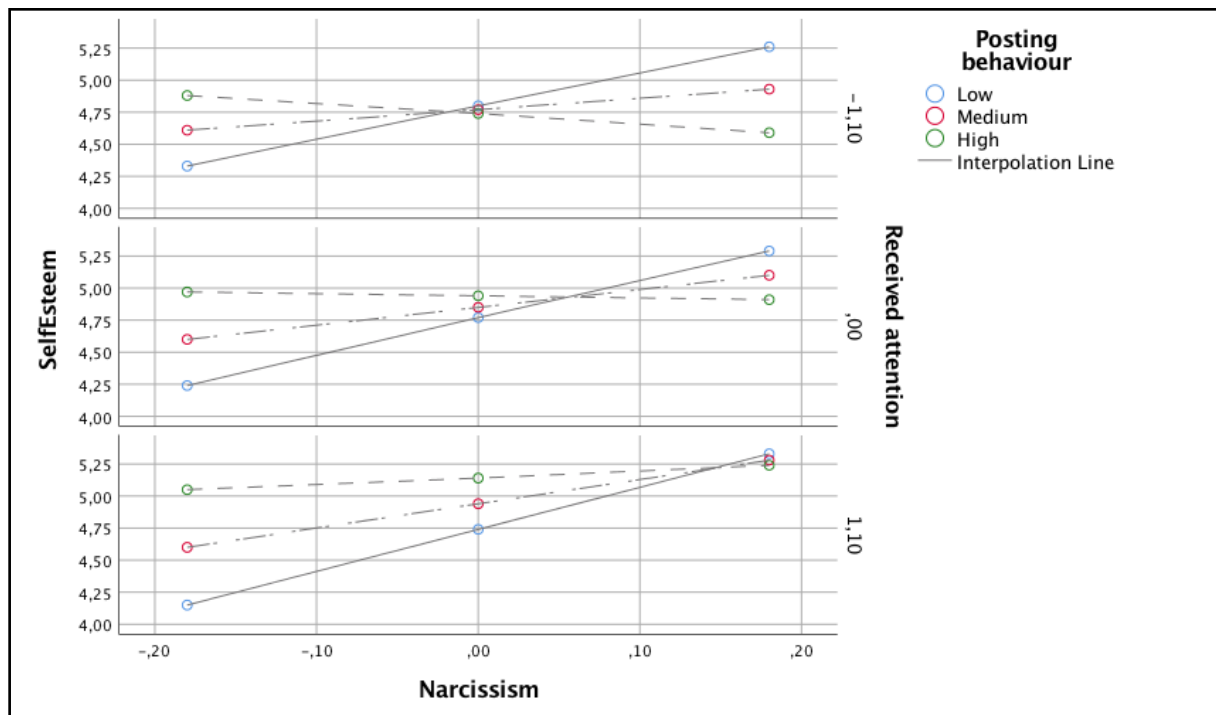

Figure 3. Graphical illustration of the moderation effects with self-esteem as the dependent variable.

Table 8

Conditional effects of narcissism on self-esteem

Posting behaviour	Received attention	Coefficient	Std. Error	t	p
-.92	-1.104	2.52	.79	3.17	**.002****
-.92	.00	2.86	.67	4.27	**< .001*****
-.92	1.104	3.21	1.07	2.99	**.003****
.00	-1.104	.87	.62	1.39	.167
.00	.00	1.36	.44	3.09	**.002****
.00	1.104	1.85	.65	2.82	**.006****
.92	-1.104	-.78	1.17	-.66	.508
.92	.00	-.14	.69	-.20	.838
.92	1.104	.49	.79	.62	.532

*p-value significant at .05 margin, ** p-value significant at .01 margin, ***p-value significant at .001 margin.

Concluding, the results show that the first hypothesis was supported, the second hypothesis was supported only with regard to self-esteem (H2a) due to narcissism being positively related to self-esteem, but not to life satisfaction (H2b). The third hypothesis was supported (H3a) with posting behaviour and received attention separately having a moderating effect on the relationship between narcissism and life satisfaction. However, hypothesis 3b was only supported with regard to posting behaviour, which acted separately from received attention as a moderator for self-esteem, whereas received attention did not act as a moderator.

Discussion

The current study investigated the relationship between narcissism and posting behaviour and the relationship between narcissism and self-esteem and life satisfaction. Additionally, the study investigated the relationship between narcissism and well-being (self-esteem and life satisfaction) with the two moderators of posting behaviour and received attention on SNSs influencing this relationship. The results found by the present study indicate that narcissists do engage in more posting behaviour and do have elevated levels of

self-esteem. Moreover, the relationship of individuals high on narcissism and their well-being (self-esteem and life satisfaction) is indeed influenced separately by received attention and posting behaviour. This has several different meanings for the self-esteem and life satisfaction of narcissistic individuals.

With the first hypothesis about the relation of narcissism and posting behaviour being supported, results of this positive relationship support previous research with similar findings, such as the study of Moon et al. (2016) which also reported high levels in narcissism being related to frequent posting on SNSs. Additionally, Weiser (2015) also found an association between narcissism and posting behaviour, especially for narcissists of high dominance, agency and a strong need for self-presentation. This result can be interpreted so that in line with previous research results, individuals high on narcissism which do engage in frequent posting use the medium of posting content in SNSs to assure that their level of self-presentation stays high enough. Moreover, by this narcissists could also show dominance over others on SNSs with them frequently being on others' timeline and cover page.

Moreover, the results about narcissism having a positive relationship with self-esteem but not with life satisfaction support that individuals high on narcissism have a positive attitude towards themselves and think about them as having more worth and importance compared to others. Furthermore, this finding about narcissism and self-esteem is in line with Barry et al. (2007) who also reported a positive relationship between narcissism and self-esteem. Furthermore, findings of Sedikides et al. (2004) and Schwartz (2010) also support the findings of the current study with similar findings. Also, the results of narcissism not being correlated to life satisfaction in the current study were surprising. This is in contrast to findings of previous research which reported a positive relationship between the two variables of narcissism and life satisfaction (Giacomin & Jordan, 2016; Rose, 2002).

The results of the moderated moderation analysis showed that both factors of received attention and posting behaviour separately influenced the individuals' life satisfaction, so that a person who posted much on SNSs and got moderate and high levels of attention for their profile and their posted content was more satisfied with life than a narcissistic person that did not post much and got less attention. This is in line with findings of Rose (2002) who found about overt type of narcissists, which seek others attention, that they were happier than other narcissist types. Moreover, previous findings of Lian et al. (2018) also match with the results

of the present study regarding high engagement in SNSs, combined with the factor of receiving positive attention and feedback, positively affecting individuals' life satisfaction. Finally, Brailovskaia and Margraf (2019) also reported similar findings, saying that active SNS use, showing a high level of posting behaviour and receiving much attention on SNSs had a positive influence on individuals' life satisfaction.

Furthermore, the fact that only the interaction of narcissism with posting behaviour and not narcissism with received attention influenced self-esteem (negatively) shows that narcissistic individuals that are posting much on their SNS profiles tend to have a lower level of self-esteem than individuals that post less. This finding is in line with previous research findings of Mehdizadeh (2010) and Blomfield Neira and Barber (2013), which found that an increased engagement and investment of narcissistic individuals in SNSs is related to lower levels of self-esteem. This is a surprising finding due to possible contrary expectations of SNSs serving narcissists to increase their self-esteem by providing a forum to receive attention that they need to feel confident with themselves.

The aspect of attention received on SNSs not being a moderator in the relationship between narcissism and self-esteem can also be interpreted. On the one hand, it shows that individuals high on narcissism who are not posting much and therefore have a high level of self-esteem are not dependent on others attention anymore in order to sustain their level of self-esteem. On the other hand, it shows that individuals high on narcissism that do post often and have a low level of self-esteem cannot compensate for this low level with the factor of receiving attention and neither can they impair their self-esteem by not receiving attention. This means that whether or not they receive attention on their posted content will not change the fact of them having a low level of self-esteem. This stands in contrast to previous findings, in which narcissists were described as individuals which engage in attention-seeking behaviour in order to push their self-esteem because of their inability to regulate their self-esteem by themselves (Bergman et al., 2011).

Limitations and Recommendations for Future Research

There were several limitations in the present study that are also to bear in mind and that should be addressed by future studies. First, the study showed to have an uneven sample with regard to gender, with females being overrepresented and being the majority of the sample (76%). This affects the generalisability and the representativeness of the study towards

the population of young adults. Furthermore, the study of Grijalva et al. (2015) about gender differences in narcissism found that men score higher than women on the trait narcissism. So, in the current study with a female majority, more males could result in a change of findings, such as results about narcissism that are more significant and go stronger and more clearly in a positive or negative direction. To ensure a better generalisation of the findings, future research should aim to achieve a better balanced sample of the target population.

Second, a limitation to consider is that the data collected for posting behaviour, received attention, self-esteem and life satisfaction in this study is purely self-reported. Even though the measures of this study were chosen based on reliability, validity and high internal consistency, reporting of respondents could have been biased due to possible influence of social desirability. To address this, future research should aim on collecting data more objectively, for instance through observational or experimental study designs e.g. by giving participants pre-created SNS profiles which they have to engage with. These profiles could be controlled by the researcher in how much attention each profile gets and participants' posting behaviour could be monitored much more objectively. Moreover, an other method could also be analysing already existing user profiles and evaluating these.

Third, this study only had one measurement point, therefore this cross-sectional design does not allow causation inferences to be drawn. Thus, future research should consider a longitudinal design with many measurement points in order to track causal effects. These could include effects about SNS use causing an increase in individuals' level of narcissism or better well-being causing individuals' posting behaviour on SNSs to shrink. Specifically, longitudinal designs help to determine patterns over time more efficiently, which helps researchers to make clearer connections. With the use of many measurement points, changes over time could be detected in terms of the development of individuals. Due to the target group being young adults, these changes in development would be especially interesting to investigate because of individuals in this period of life undergoing a big change in their life regarding their personality development (Roberts, Caspi, & Moffitt, 2003). Thus, time periods could be identified in which young adults are possibly more vulnerable than in other times regarding their well-being.

Finally, the self-developed nature of the scale for received attention can also be considered as a limitation of this study. Due to a lack of scales for attention that individuals

receive in online settings such as SNSs, the items for this scale were self-developed and the scale was not formally tested for validity. Although reliable, self-developing a scale can lead to items being designed ambiguously and difficult to answer (Morgado, Meireles, Neves, Amaral, & Ferreira, 2017). Furthermore, the scale had five items which can be considered relatively short for a scale. Therefore, scales with many items usually are more reliable and have higher alpha values (DeVellis 2016).

Conclusion

Despite some limitations, the present study contributes to the overall knowledge and understanding about narcissistic individuals' self-esteem and life satisfaction in SNS settings. It is now clear that SNSs can leave individuals high in narcissism vulnerable but also stronger with regard to their well-being, with regard to their posting behaviour and received attention online. Moreover, persuasive health-tech apps can benefit from findings that identify which online behaviours contribute to better and to worse well-being. By matching specific user profiles with specific interventions that are aimed to improve well-being, this could be used to either improve self-esteem, life satisfaction or if needed both.

Additionally, the improvement of self-esteem and life satisfaction could be realised through identifying SNS weaknesses e.g. in its design, interface, functions or usability. With regard to self-esteem e.g. SNSs could adjust their design and functions so that in order to have higher self-esteem, users are not dependent on the amount and the positivity of the feedback they get online. These results could be used to design SNSs accordingly, so that findings are implemented in SNSs which improve the well-being of users, while findings which display how users' well-being decreases in SNSs are implemented for redesigning e.g. interfaces, usability or functionality.

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Appendix

NPI-16 Scale

      Instructions. Read each pair of statements below and choose the one that comes closest to describing your feelings and beliefs about yourself. You may feel that neither statement describes you well, but pick the one that comes closest. Please complete all pairs. (Bold statements represent answer options that resemble narcissism)

1.

It makes me uncomfortable to be the center of attention.

I really like to be the centre of attention.

2.

I think I am a special person.

I am no better or nor worse than most people.

3.

Sometimes I tell good stories.

Everybody likes to hear my stories.

4.

I insist upon getting the respect that is due me.

I usually get the respect that I deserve.

5.

I don't mind following orders.

I like having authority over people.

6.

I hope I am going to be successful.

I am going to be a great person.

7.

I can make anybody believe anything I want them to.

People sometimes believe what I tell them.

8.

I like to do things for other people.

I expect a great deal from other people.

9.

I prefer to blend in with the crowd.

I like to be the center of attention.

10.

I am an extraordinary person.

I am much like everybody else.

11.

Sometimes I am not sure of what I am doing.

I always know what I am doing.

12.

I find it easy to manipulate people.

I don't like it when I find myself manipulating people.

13.

Being an authority doesn't mean that much to me.

People always seem to recognise my authority.

14.

When people compliment me I sometimes get embarrassed.

I know that I am good because everybody keeps telling me so.

15.

I am apt to show off if I get the chance.

I try not to be a show off.

16.

There is a lot that I can learn from other people.

I am more capable than other people.

Rosenberg Self-Esteem Scale

      Instructions. Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.
(7-Point Likert Scale: 1 = Strongly disagree, 2 = Disagree, 3 = Somewhat disagree, 4 = Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree)

1. On the whole, I am satisfied with myself.

2. At times I think I am no good at all. (R)

3. I feel that I have a number of good qualities.

4. I am able to do things as well as most other people.

5. I feel I do not have much to be proud of. (R)

6. I certainly feel useless at times. (R)

7. I feel that I'm a person of worth, at least on an equal plane with others.

8. I wish I could have more respect for myself. (R)

9. All in all, I am inclined to feel that I am a failure. (R)

10. I take a positive attitude toward myself.

Riverside Life Satisfaction Scale

      Instructions. Below is a list of statements dealing with your life and satisfaction. Please indicate how strongly you agree or disagree with each statement.

(7-Point Likert Scale: 1 = Strongly disagree, 2 = Disagree, 3 = Somewhat disagree, 4 = Neither agree nor disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree)

1. I like how my life is going.

2. If I could live my life over, I would change many things. (R)

3. I am content with my life.

4. Those around me seem to be living better lives than my own. (R)

5. I am satisfied with where I am in life right now.

6. I want to change the path my life is on. (R)

Active Social Networking Site Use Scale

 Instructions. Below is a list of questions dealing with your use of social networking sites. Please indicate for each question which frequency fits you the best. Think of the social networking site which you most frequently use when answering the below questions.

(7-Point Likert Scale: 1 = Never, 2 = Almost never, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = A lot, 7 = A great amount)

1. How often do you post a message on your own social networking site timeline?

2. How often do you post a photo on your own social networking site timeline?

3. How often do you post a picture on your own social networking site timeline?

4. How often do you send someone a personal message on social networking sites?

5. How often do you chat with someone on social networking sites?

6. How often do you visit a profile of a social networking site friend?

7. How often do you visit a profile of someone that does not belong to your friends list?

SNS Received Attention Scale

 Instructions. Below is a list of questions dealing with the feedback you get online. Please indicate for each question which frequency fits you the best. Think of the social networking site which you most frequently use when answering the below questions.

(7-Point Likert Scale: 1 = Never, 2 = Almost never, 3 = Occasionally, 4 = Sometimes, 5 = Often, 6 = A lot, 7 = A great amount)

1. How often do you receive positive feedback or response when you update status on social networking sites?

2. How often do you receive positive feedback or response when you update your profile photo on social networking sites

3. How often do you receive positive feedback or response when you post a photo on social networking sites?

4. How often do you receive positive feedback or response when you post an opinion or a comment on social networking sites?

5. How often do you receive positive feedback or response when you post a video on social networking sites?