



Social networking sites use and narcissistic traits in adolescents: the roles of attention-seeking and downward social comparison

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Abstract

Nowadays, almost every adolescent uses social networking sites (SNS). At the same time, narcissistic traits have increased among the same age group. Unfortunately, no research has been done among adolescents so far. The aim of this longitudinal study was to explore whether non-clinical narcissistic traits can predict an increase in active SNS use and whether attention-seeking motives can explain this increase. Additionally, this study examined whether narcissistic traits increase downward social comparison tendencies. Lastly, it is studied whether SNS use increases narcissistic traits and whether downward social comparison tendencies can explain this increase. A total of 1419 adolescents (*M* age: 13.3, 55% male) have completed the questionnaire of the Digital Youth Project twice, with an interval of one year. The results of this study only indicate a positive longitudinal effect of narcissistic traits on SNS use. This effect seems to be explained by attention-seeking motives. Since narcissistic traits do also increase downward social comparison tendencies, additional analyses were conducted, showing that downward social comparison also seems to explain the effect of narcissistic traits on SNS use. In conclusion, it seems that adolescents with narcissistic traits make more active use of SNS, because of attention-seeking motives and downward social comparison tendencies.

Keywords: social networking sites, SNS, narcissistic traits, attention-seeking, downward social comparison

Samenvatting

Tegenwoordig maakt bijna elke adolescent gebruik van sociale netwerksites (SNS). Tegelijkertijd zijn narcistische trekken in dezelfde leeftijdsgroep toegenomen. Helaas is tot dusver geen onderzoek gedaan onder adolescenten. Deze longitudinale studie had het doel om uit te zoeken of narcistische trekken een toename in SNS gebruik kunnen voorspellen en of aandachtzoekende motieven deze toename kunnen verklaren. Ook werd onderzocht of narcistische trekken een toename in neerwaartse sociale vergelijking voorspellen. Tenslotte werd bekeken of SNS gebruik narcistische trekken verhoogt en of neerwaartse sociale vergelijking deze toename kan verklaren. 1419 adolescenten (gemiddelde leeftijd: 13,3, 55% man) hebben de vragenlijst van het Digital Youth Project tweemaal ingevuld, met een interval van een jaar. De resultaten wijzen alleen naar een positief longitudinaal effect van narcistische trekken op SNS gebruik. Het lijkt erop dat dit effect deels verklaard kan worden door aandachtzoekende motieven. Aangezien narcistische trekken neerwaartse sociale vergelijking lijken te verhogen, zijn aanvullende analyses uitgevoerd en werd gevonden dat neerwaartse sociale vergelijking het effect van narcistische trekken op het gebruik van SNS ook lijkt te kunnen verklaren. Concluderend lijkt het erop dat adolescenten met narcistische trekken meer actief gebruik maken van SNS, onder andere door aandachtzoekende motieven en door de behoefte aan neerwaartse sociale vergelijking.

Trefwoorden: sociale netwerk sites, SNS, narcistische trekken, aandachtzoekende motieven, neerwaartse sociale vergelijking

Use of social networking sites and narcissistic traits in adolescents: the mediating roles of
attention-seeking and downward social comparison

Several studies have shown that narcissistic personality traits have increased among adolescents over the last generations (McCain & Campbell, 2016; Twenge, Campbell, & Gentile, 2011; Twenge & Foster, 2010). Following the description of Liu and Baumeister (2016) narcissism can be described as “a pervasive pattern of grandiose self-view, need for admiration, and an excessive preoccupation with oneself” (p. 82). At the same time, the use of social networking sites (SNS) has increased as well, towards 96% of the 12 to 18-year-old Dutch adolescents using SNS in 2014 (CBS, 2015). The focus of this study is to explore the relationship between (non-clinical) narcissistic traits and SNS use among adolescents.

A positive relationship between narcissistic traits and SNS use (e.g., Facebook, Instagram, and Twitter) has been demonstrated in multiple reviews (Liu & Baumeister, 2016; McCain & Campbell, 2016). Unfortunately, the reviews showed that findings were mostly correlational and most studies focussed on other age groups than adolescents, with average ages ranging from 19 to 37 years old (Frost & Rickwood, 2017; Liu & Baumeister, 2016; McCain & Campbell, 2016). Longitudinal research testing the relationship between SNS use and narcissistic traits, particularly in adolescents, is lacking. Since adolescents showed the largest increase in SNS use (Statistics Netherlands, 2015) and since many adult problems, such as narcissism, can be traced back to adolescence (Arnett & Hughes, 2012), there is a high demand for longitudinal data to gain more insight into the precise mechanisms that operate in the relationship between non-clinical narcissistic traits and SNS use among adolescents. At this time, it remains unclear whether SNS use predicts narcissistic traits in adolescents, or whether adolescents with already existing narcissistic traits tend to use more SNS. This question is the focus of this study.

The relationship between narcissistic traits and SNS use

Most researchers assume, that personality characteristics are predisposing on behavior (Liu & Baumeister, 2016). According to *the self-selection effect hypothesis* (Halpern et al., 2016), the personality characteristics of individuals with narcissistic traits ensure that they are more likely to use SNS. Narcissistic people have a higher need for attention and admiration (Liu & Baumeister, 2016), and for maintaining their positive self-view (Halpern et al., 2016). These needs can be met easily on SNS. This suggests that attention-seeking behaviors can explain the effect of narcissistic traits on SNS use. This idea is consistent with *the self-enhancement hypothesis*, which stated that social media platforms give opportunities to promote and enhance the self (e.g., post selfies), through which individuals with narcissistic traits can garner the admiration they seek (Buffardi, 2011). This would be the reason why

individuals with narcissistic traits tend to use SNS more often. This notion connects with *the trait hypothesis* (or *trait model*), a hypothesis suggested by McCain and Campbell (2016), stating that some characteristics of narcissism (i.e., extraversion, openness, and attention-seeking) are mechanisms underlying the effect of narcissism on SNS use. Extraversion, openness, and attention-seeking turned out to be related to an increased use of SNS. Since these are characteristic of narcissism, the trait model stated that they can explain the increased use of SNS among narcissistic people (McCain & Campbell, 2016). This corresponds to the thoughts of Dumas, Maxwell-Smith, David, and Katz (2017): “narcissism tends to relate to Instagram use for the purposes of appearing popular and showcasing their creative skills to others” (p. 8).

Besides that attention-seeking motives could underlie the effect of narcissistic traits on SNS use, it seems plausible that adolescents with increased non-clinical narcissistic traits are more inclined to downward social comparison. According to Holmes (2010), people with narcissism tend to devalue and criticize others more to prove and confirm their grandiose self-view. In addition, *the theory of downward social comparison* (Wills, 1981) stated that through comparison with a less fortunate other, people can feel better about themselves and increase their self-image. This indicates that people with narcissistic traits may engage more in downward social comparison.

In contrast to the foregoing assumption, that narcissistic traits influence SNS use, it could also be the case that a higher level of SNS use creates a higher level of non-clinical narcissistic traits. Walters and Horton (2015) highlighted two theories regarding the precise mechanisms by which SNS use can elevate narcissistic traits, namely *the idealized presentation theory* and *the reinforcement theory*. According to the first theory, SNS provide the opportunity to create an idealized identity, which only contains qualities and lacks weaknesses. Through self-perception processes, an individual is slowly internalizing this idealized identity, which facilitates narcissism (Walters & Horton, 2015). According to the reinforcement theory, the positive rewards (e.g., “likes” and positive comments) people receive through SNS “could nurture effectively the beliefs in one’s superiority and entitlement, which are a cognitive cornerstone of the narcissistic system” (Walters & Horton, 2015, p. 327). Possibly, a mechanism that underlies the effect of SNS use on narcissistic traits is the tendency to downward social comparison. In line with the earlier discussed *theory of downward social comparison* (Wills, 1981), downward social comparison can increase the self-image. This tendency may facilitate narcissistic traits since people can easily compare themselves with others on SNS, which makes them actually feel and/or think that they are better (off). One could possibly internalize these superiority beliefs through self-perceptions

processes, which was stated before by Walters and Horton (2015). This indicates that downward social comparison on SNS may facilitate narcissistic traits, and that downward social comparison tendencies on itself can facilitate narcissistic traits as well.

With regard to empiricism, there are two studies that collected longitudinal data about the bidirectional relationship between narcissistic traits and SNS use. This concerns the studies of Halpern, Valenzuela, and Katz (2016) and Walters and Horton (2015). They used data from 314 participants with an age range from 18 to over 65 years old, and from 83 male participants with an age range from 18 to 22 years old respectively. The study of Halpern et al. (2016) consisted of two waves within one year (surveys per e-mail), and the study of Walters and Horton (2015) consisted of eight waves within four days (online surveys). They both found that SNS use was predicted by narcissism. Halpern et al. (2016) found that narcissism influences selfie production, and Walters and Horton (2015) found that “higher levels of narcissism were associated positively with more subsequent Facebook use” (p. 329). Regarding the reverse link, these studies, however, showed conflicting findings. Halpern et al. (2016) did find a positive effect of posting selfies on the level of narcissism, whereas Walters and Horton (2015) did not find an effect of Facebook use on narcissism. All in all, the study of Halpern et al. (2015) supported a bidirectional relationship, whereas the study of Walters and Horton (2015) only supported a unidirectional relationship from narcissistic traits to SNS use. Despite the fact that both studies used older samples and that their findings are somewhat inconsistent, the theoretical notion seems to point towards a bidirectional relationship between narcissistic traits and SNS use.

As discussed earlier, attention-seeking behaviors may explain the effect of narcissistic traits on SNS use. Bergman, Fearington, Davenport, and Bergman (2011), Dumas et al. (2017), and Weiser (2015) all have carried out cross-sectional studies that took attention-seeking behaviors into account in the relationship between narcissism and SNS use. Unfortunately, there is no awareness of any longitudinal studies testing the explanatory role of attention-seeking. Bergman et al. (2011), Dumas et al. (2017), and Weiser (2015) have used samples with mean ages of 21, 25, and 33 years old. All these cross-sectional studies found an association between SNS related attention-seeking behaviors and motives, and narcissistic traits (Bergman et al., 2011; Dumas et al., 2017; Weiser, 2015). This seems to point towards a mediating role of attention-seeking in the effect of narcissistic traits on SNS use.

As stated before, narcissistic people are probably more inclined to downward social comparison, downward social comparison tendencies may facilitate narcissistic traits, and downward social comparison can probably explain the effect of SNS use on narcissistic traits. Empirical research indeed suggests that narcissistic traits and downward social comparison

are positively related. Frost and Rickwood (2016) conducted a review about multiple cross-sectional studies, and they found Facebook use and social comparison were positively associated. In addition, an experimental study by Vogel, Rose, Okdie, Eckles, and Franz (2015) showed that Facebook use was predictive of social comparison among students, and that social comparison predicted less accurate self-perceptions. Unrealistic self-perceptions correspond to a grandiose self-view which is characteristic of narcissistic people (Halpern et al., 2016; Holmes, 2010; Liu & Baumeister, 2016). This suggests that social comparison can increase narcissistic traits. In contrast, an experimental study of Krizan and Bushman (2011) showed that narcissistic traits were predictive of downward social comparison. The authors stated that “narcissists were only somewhat more likely to have an impression that they were “better-off” after making comparisons” (p. 215). Following the results until now, there are indications for an effect of downward social comparison on narcissistic traits and for an effect of narcissistic traits on downward social comparison, suggesting a bidirectional relationship. In addition, it seems to be that SNS use may encourage narcissistic traits through downward social comparison.

In summary, SNS use is expected to increase narcissistic traits and narcissistic traits are expected to increase SNS use (H1). The effect of narcissistic traits on SNS use is expected to be mediated by attention-seeking (H2). In addition, narcissistic traits are hypothesized to increase downward social comparison and vice versa (H3). Lastly, the effect of SNS use on narcissistic traits is expected to be mediated by downward social comparison (H4). This research model is shown in Figure 1.

Present study

The present study aims to gain more insight into the relationship between SNS use and narcissistic traits among adolescents aged 12 to 16. This is relevant, since there is a lack of longitudinal research on this topic. Secondly, it is important because no research has been conducted on the precise mechanisms through which narcissistic traits and SNS use can influence each other among adolescents. This study will provide more insights into these mechanisms. These insights are important, since narcissistic traits are linked to negative outcomes (e.g., low commitment in relationships) and externalizing problems (e.g., aggression; McCain & Campbell, 2016). Therefore, it is valuable to gain insight into mechanisms that underlie narcissistic traits, as a way to help prevent externalizing problem behaviors.

The present study adds to the previous longitudinal studies, because this study tests two mediators simultaneously (attention-seeking and downward social comparison). In addition, the previous longitudinal studies of Halpern et al. (2016), and Walters and Horton (2015) both

focused on older age groups. This is the first study among adolescents aged 12 to 16. The focus of this study on is active SNS use (i.e., creating or posting content), referring to active use of platforms such as Facebook, Instagram, Twitter, and Pinterest. Notice that SnapChat and WhatsApp are not mentioned, because they are instant messengers.

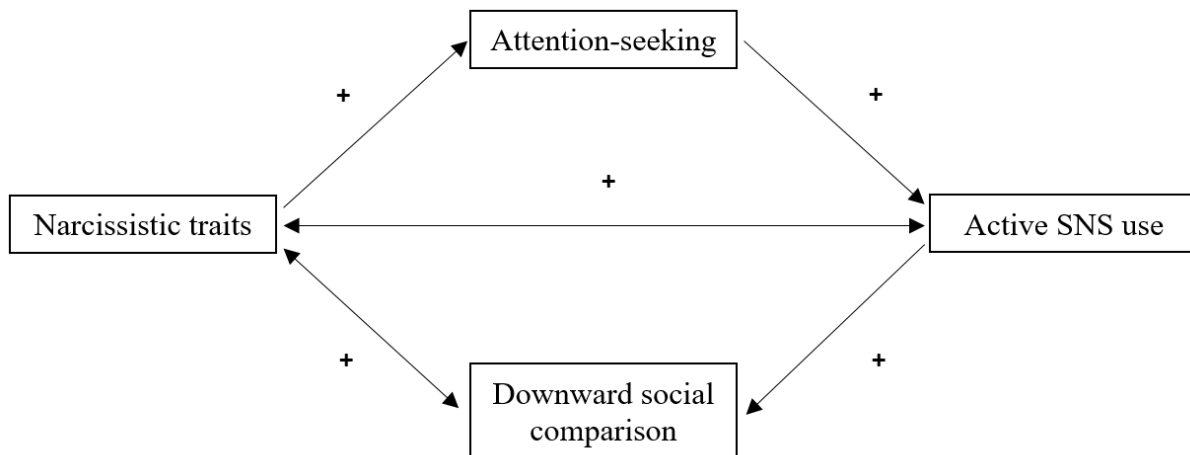


Figure 1. Research model. A positive bidirectional relationship between narcissistic traits and active SNS use, which is positively mediated by attention-seeking (narcissistic traits – active SNS use) and by downward social comparison (active SNS use – narcissistic traits), and with a positive bidirectional relationship between downward social comparison and narcissistic traits.

Method

Procedure

For the current study, data were derived from the Digital Youth Project. This is an ongoing longitudinal study of Utrecht University, among students in the 7th and 8th grade of secondary schools. Data were collected via secured online self-report questionnaires administered in the classroom setting. These questionnaires took about 35 to 45 minutes. During the data collection, research assistants were present to give instructions, answer questions, and to provide help to students who encountered difficulties with the questionnaire. The study procedures were approved by the board of ethics of the Faculty of Social Sciences at Utrecht University (FETC16-076 Eijnden), and were carried out in accordance with the Declaration of Helsinki. All students and their parents were informed about the study and were granted the right to refuse to participate before the study began or at any juncture of the data.

Participants

This longitudinal study included two waves of the Digital Youth Project, namely T2 (2016) and T3 (2017). A total of 1419 adolescents participated in both T2 and T3 (respon-

74%). This group consisted of 781 males (55%) and 638 females (45%), and had a mean age of 13.3. The descriptive statistics showed that 44.8% of the students had a low educational level, 28.8% a middle educational level, and 26.4% a high educational level. Finally, 23.5% of the adolescents had a migration background (i.e., the adolescent was, or one of his/her parents were born outside of the Netherlands). Non-respons was mainly due to drop-out of whole classes, and drop-out of single adolescents because of illness or other reasons for absence during the data collection.

Instruments

Active social media use. Active social media use was measured by 7 items, based on the scale of Hawk, Ter Bogt, Van den Eijnden, and Nelemans (2015). The following items were used among others: “How many times did you post the following on SNS: a post about (1) your thoughts, (2) your feelings, (3) a selfie, (4) a selfie with a sexy appearance”. Answers could be given on a 7 point Likerscale from 1 (*almost never*) to 7 (*more than 40 times*). At T3, the factor analysis indicated two factors with an Eigenvalue higher than 1. Since the Component Matrix showed that all items loaded highest on the same factor, it was decided to keep one factor. With one factor solutions, the explained variance was 45,1% at T2 and 50% at T3. The reliability of the scale was high, with $\alpha = .79$ at T2 and $.83$ at T3.

Narcissistic traits. The *Childhood Narcissism Scale* (Thomaes, Stegge, Bushman, Olthof, & Denissen, 2008) was used to measure non-clinical narcissistic traits. The 10 items could be scored from 1 (*completely incorrect*) to 4 (*completely correct*). Some examples of questions are: “People like me are entitled to something extra” and “I think it’s important to stand out”. The reliability analysis showed $\alpha = .83$ at T2 and $.86$ at T3.

Attention-seeking. The scale to measure attention-seeking is an adapted version of the subscale “exhibitionism” from the Motives for Facebook Use Scale from Hollenbaugh and Ferris (2014). Since items have been merged and added, the final scale consisted of 6 items (e.g., “I post messages/photos and videos, because I like it when I get a lot of reactions at my post”, “I post messages/photos and videos, because I like it when I get a lot of 'likes' at my post”). Answers were given on the basis of a 4 point Likertscale from 1 (*totally disagree*) to 4 (*totally agree*). Factor analyses showed a one factor solution at T2 and T3, with 63,4% and 65,1% explained variance respectively. The reliability was high, with $\alpha = .85$ at T2 and $.86$ at T3.

Downward social comparison. Downward social comparison was measured by 5 items. These items all followed the following question: “How often do you have the following thoughts when you visit the SNS accounts of peers and yourself?” (e.g. “I have more friends than others”, “I’m more popular than others”). Answers were given on a 5 point Likertscale

from 1 (*never*) to 5 (*very often*). The validity and the reliability of this scale was good at T2 and T3, with an explained variance of 76.2% and 77% respectively, and $\alpha = .92$ for both waves.

Control variables. The following demographic variables were examined to see whether they should be included in the statistical analyses: gender, age, migration background, and educational level.

Data analysis

IBM SPSS Statistics 25 was used to conduct all analyses. First of all, the data were cleaned. The data were checked for missing values and answering trends. Since there were several missings through the dataset, “pairwise deletion of missing values” was used. Subsequently, scales were made with help of reliability analyses and/or factoranalyses. The scales were checked for normal distributions and outliers. An answering trend was discovered in one respondent (an outlier), this respondent was excluded from the dataset. Other outliers were not excluded in the analyses since their answers seem realistic (i.e., high scores on the SNS use scale). Concerning the normal distributions, when the raw scale scores weren’t normally distributed, the residuals were. No violations to this assumption were made.

After cleaning the data, Pearson’s r and Spearman’s ρ were used to gain insight into possible influential demographic variables. To be more certain of any results, there was controlled for any demographic variable that correlated with either the dependent or independent variable. Also, there was controlled for every dependent variable on T2.

For both hypotheses concerning a bidirectional relationship (H1 and H3), (longitudinal) linear regression analyses were conducted, with inclusion of control variables in previous steps. For both hypotheses concerning a mediation (H2 and H4), mediation analyses were conducted, using the Baron and Kenny method (1986). Step one, testing the main effect of the independent variable on the dependent variable (c), was already done when testing hypothesis 1 and 4. Step two was to determine whether the independent variable had a significant effect on the mediator (a). In addition, in step three it was checked whether the mediator had a significant effect on the dependent variable (b). Lastly, it was tested whether the effect of the independent variable on the dependent variable was still significant after controlling for the mediator (c’). In addition, Sobel test (1982) was used to determine whether the mediation was significant.

Results

Descriptive statistics

Table 1 shows the descriptive statistics of all research variables. The table is broken down by gender. It can be read that gender is negatively related to SNS use, and positively

related to narcissistic traits, on both T2 and T3. This means that boys (reference category) make less use of SNS, but show more narcissistic traits. In addition, no significant gender differences are found for attention-seeking on T2, but on T3 gender is negatively related to attention-seeking. This suggests that boys seek significantly less attention than girls on T3. Lastly, from Table 1 can be concluded that downward social comparison is positively related to gender on both measurements. This means that boys are more concerned with downward social comparison than girls.

Table 1

Descriptive statistics of the research variables split by gender

	Gender	<i>n</i>	<i>M (SD)</i>	<i>t</i>
1. SNS use T2	Boys	724	1.83 (0.88)	-8.04**
	Girls	601	2.24 (0.97)	
2. SNS use T3	Boys	717	1.73 (0.92)	-6.83**
	Girls	615	2.07 (0.92)	
3. Narcissistic traits T2	Boys	765	2.41 (0.55)	9.24**
	Girls	626	2.14 (0.55)	
4. Narcissistic traits T3	Boys	756	2.32 (0.59)	8.25**
	Girls	628	2.07 (0.54)	
5. Attention-seeking T2	Boys	724	1.84 (0.68)	-1.35
	Girls	600	1.88 (0.62)	
6. Attention-seeking T3	Boys	716	1.71 (0.68)	-2.99**
	Girls	615	1.82 (0.59)	
7. Downward social comparison T2	Boys	723	2.03 (0.95)	3.75**
	Girls	600	1.85 (0.85)	
8. Downward social comparison T3	Boys	716	2.02 (0.99)	4.12**
	Girls	615	1.81 (0.79)	

* $p < 0.05$ ** $p < 0.01$

Correlations

A correlation matrix of all research variables (i.e., SNS use, narcissistic traits, attention-seeking, and downward social comparison) and all demographic variables (i.e., gender, age, migration background, and educational level), is shown in Table 2.

First of all, Table 2 shows a significant positive relationship between SNS use on T2 and narcissistic traits on T3, and the same applies for narcissistic traits on T2 and SNS use on T3. This implies that narcissistic traits promote SNS use on a later occasion, and vice versa (H1). Secondly, Table 2 shows a positive correlation between narcissistic traits on T2 and attention-seeking on T3, and between attention-seeking on T3 and SNS use on T3. This makes it plausible that the assumptions for testing mediation (H2) are being met. Table 2 also shows a

positive correlation between SNS use on T2 and downward social comparison on T3, and between downward social comparison T2 and narcissistic traits on T3. This suggests that downward social comparison is related to more narcissistic traits on a later occasion (H4), and vice versa (H3). Lastly, Table 2 shows that SNS use on T2 is connected to downward social comparison on T3 (H4).

In addition to the correlations between the research variables, Table 2 also shows the correlations with the demographic variables. It can be seen that all demographic variables show several significant correlations with either independent or dependent variables. Whenever a demographic variable is significantly related to one of the variables tested, it was included as a control variable. This means that gender and high educational level (low educational level is the reference category) were included in all analyses, and that age, migration background (no migration background is the reference category) and middle educational level were included only when necessary.

Table 2

Correlation matrix research variables and demographic variables

Research variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. SNS use T2		.49**	.11**	.06*	.42**	.27**	.30**	.19**	.26**	-.01	.02	-.04	-.11**
2. SNS use T3			.09**	.12**	.25**	.35**	.16**	.26**	.27**	-.01	.00	-.03	-.11**
3. Narcissistic traits T2				.50**	.26**	.18**	.47**	.32**	-.24**	.00	.11**	.04	-.12**
4. Narcissistic traits T3					.13**	.24**	.26**	.42**	-.22**	.00	.08**	.06*	-.16**
5. Attention-seeking T2						.41**	.41**	.28**	.05	-.03	-.01	.00	-.13**
6. Attention-seeking T3							.24**	.43**	.10**	-.06*	-.05	.02	-.05
7. Downward social comparison T2								.45**	-.09**	-.01	.04	.01	-.17**
8. Downward social comparison T3									-.08**	-.02	.05*	.02	-.10**
Demographic variables													
9. Gender ^{1,2}										-.09**	.05*	-.01	.10**
10. Age											.05*	-.17**	.00
11. Migration background ^{1,3}												-.01	-.09**
12. Middle educational level ^{1,4}													-.38**
13. High educational level ^{1,4}													

Note. Pearson's r and Spearman's rho: *p<0.05 **p<0.01

¹Conducted with Spearman's rho.

²Reference category gender: "boys"

³Reference category migration background: "no migration background"

⁴Reference category educational level: "low educational level"

The bidirectional relationship between SNS use and narcissistic traits

To determine whether there is a bidirectional relationship between SNS use and narcissistic traits, two separate regression analyses were performed (Table 3.1 and Table 3.2). Table 3.1 shows that, after controlling for the control variables, SNS use on T2 is not a significant predictor of narcissistic traits on T3. In contrast, Table 3.2 shows that, after controlling for the control variables, narcissistic traits on T2 is a significant predictor of SNS use on T3. This is a weak effect. Since there is no significant relationship between SNS use on T2 and narcissistic traits on T3, a bidirectional relationship cannot be fully confirmed (H1).

Table 3.1

Regression analysis between SNS use T2 and Narcissistic traits T3 *N = 1292*

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.267***
	Gender	-.12	.03	-.10	.000***	
	Migration background	.03	.03	.02	.332	
	Middle educational level	.02	.03	.01	.659	
	High educational level	-.11	.04	-.08	.002**	
	Narcissistic traits T2	.47	.03	.46	.000***	
2	SNS use T2	.01	.02	.02	.392	.000

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table 3.2

Regression analysis between Narcissistic traits T2 and SNS use T3 *N = 1276*

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.251***
	Gender	.17	.05	.09	.000***	
	Migration background	-.00	.05	-.00	.937	
	High educational level	-.17	.05	-.08	.001**	
	SNS use T2	.45	.03	.46	.000***	
2	Narcissistic traits T2	.10	.04	.06	.021*	.003*

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Attention-seeking as a mediator between narcissistic traits and SNS use

In order to test whether attention-seeking is a mediator between narcissistic traits and SNS use (H2), the steps of the Baron and Kenny method (1986) were followed. As mentioned earlier, linear regression analysis show a significant main effect of narcissistic traits on SNS use (c). Subsequently, three separate regression analyses were conducted, namely: narcissistic traits on attention-seeking (a; Table 4.1), attention-seeking on SNS use (b; Table 4.2), and the whole model (c’; Table 4.3). Table 4.1 indicates a significant effect of narcissistic traits on attention-seeking, and Table 4.2 also shows a significant effect of attention-seeking on SNS use. This means that all criteria of Baron and Kenny (1986) are met. In addition, Table 4.3 shows the results of the regression analysis of the whole model: attention-seeking as a mediator between narcissistic traits and SNS use. The effect of narcissistic traits on SNS use is no longer significant, after controlling for attention-seeking. This whole model has a medium effect size. The Sobel test (1982) shows that this mediation is significant, $z = 3.68, p < .001$ (a: .123; b: .344, SEa: .031; SEb: .035). Therefore, it can be confirmed that attention-seeking mediates between narcissistic traits and SNS use (H2).

Table 4.1

Regression analysis between Narcissistic traits T2 and Attention-seeking T3 N = 1274

	Model	B	SE	Beta	p	ΔR^2
1	<i>Control variables</i>					.172***
	Gender	.09	.03	.07	.011*	
	Age	-.03	.02	-.04	.173	
	Migration background	-.07	.04	-.04	.098	
	High educational level	-.02	.04	-.01	.669	
	Attention-seeking T2	.40	.03	.40	.000***	
2						.010***
	Narcissistic traits T2	.12	.03	.11	.000***	

Note. *p<0.05 **p<0.01 ***p<0.001.

Table 4.2

Regression analysis between Attention-seeking T3 and SNS use T3

N = 1276

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.251***
	Gender	.17	.05	.09	.000***	
	Age	.00	.03	.00	.885	
	Migration background	-.01	.05	-.00	.930	
	High educational level	-.17	.05	-.08	.001**	
	SNS use T2	.45	.03	.46	.000***	
2						.052***
	Attention-seeking T3	.34	.04	.24	.000***	

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table 4.3

*Regression analysis between Narcissistic traits T2 and SNS use T3,
and Attention-seeking (M)*

N=1275

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.254***
	Gender	.18	.05	.10	.000***	
	Age	.01	.03	.01	.835	
	Migration background	-.00	.05	-.00	.956	
	High educational level	-.16	.05	-.08	.002**	
	SNS use T2	.43	.03	.44	.000***	
	Attention-seeking T2	.08	.04	.06	.037*	
2						.050***
	Attention-seeking T3	.36	.04	.25	.000***	
3						.000
	Narcissistic traits T2	.04	.04	.02	.341	

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

The bidirectional relationship between narcissistic traits and downward social comparison

To determine whether a bidirectional relationship between narcissistic traits and downward social comparison exists, two regression analyses were performed (Table 5.1 and

Table 5.2). Table 5.1 shows that, after controlling for the control variables, downward social comparison on T2 is not a significant predictor of narcissistic traits on T3. In contrast, the results in Table 5.2 confirm that, after controlling for the control variables, narcissistic traits on T2 is a significant predictor of downward social comparison on T3. This is a weak effect. Since there is no significant relationship between downward social comparison on T2 and narcissistic traits on T3, a bidirectional relationship cannot be fully confirmed (H3).

Table 5.1

*Regression analysis between Downward social comparison T2
and Narcissistic traits T3*

N = 1290

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	<i>R</i> ²
1	<i>Control variables</i>					.267***
	Gender	-.12	.03	-.10	.000***	
	Migration background	.03	.03	.02	.332	
	Middle educational level	.02	.03	.01	.659	
	High educational level	-.11	.04	-.08	.002**	
	Narcissistic traits T2	.47	.03	.46	.000***	
2	Downward social comparison T2	.01	.02	.02	.476	.000

Note. **p*<0.05 ***p*<0.01 ****p*<0.001.

Table 5.2

*Regression analysis between Narcissistic traits T2
and Downward social comparison T3*

N = 1273

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	<i>R</i> ²
1	<i>Control variables</i>					.213***
	Gender	-.12	.05	-.07	.009**	
	Migration background	.11	.05	.05	.049*	
	High educational level	-.06	.05	-.03	.222	
	Downward social comparison T2	.44	.03	.44	.000***	
2	Narcissistic traits T2	.20	.05	.13	.000***	.011***

Note. **p*<0.05 ***p*<0.01 ****p*<0.001.

Downward social comparison as a mediator between SNS use and narcissistic traits

In order to test whether downward social comparison is a mediator between SNS use and narcissistic traits (H4), the procedure of the Baron and Kenny method (1986) was followed again. The main effect of SNS use on narcissistic traits has already passed in Table 3.1. Since there is no significant main effect, the criteria of Baron and Kenny (1986) are not met. This means that the mediation effect of downward social comparison cannot be tested. In addition, this hypothesis (H4) cannot be confirmed.

Additional analysis

As discussed earlier, the assumptions for testing the mediation effect of downward social comparison in the effect of SNS use on narcissistic traits were not met. But, there is a significant positive effect of narcissistic traits on SNS use (Table 3.2) and of narcissistic traits on downward social comparison (Table 5.2). In addition, the previous results do only show effects of narcissistic traits, and not that narcissistic traits are stimulated. Therefore, it seems logical to test a possible mediation effect of downward social comparison in the effect of narcissistic traits on SNS use. Regarding the theory this seems plausible too. As mentioned earlier, it could be expected that people with more narcissistic traits, compare themselves more often to others who do worse, to increase their self-image (theory of downward social comparison ; Wills, 1981) and to prove their superiority (Holmes, 2010). This can be done easily on SNS, which could result in an increased active use of SNS. Therefore, additional analyses were performed to test the mediation effect. Table 6.1 indicates a significant effect of downward social comparison on SNS use (b), allowing the whole model to be tested. It can be read that the effect of narcissistic traits on SNS use is no longer significant, after controlling for downward social comparison (c' ; Table 6.2). This whole model has a weak effect. Sobel test (1982) gives a test statistic of $z = 3.79$, $p < .001$ (a: .201; b: .191, SEa: .046; SEb: .025), which means that downward social comparison is a significant mediator in the effect of narcissistic traits on SNS use. This mediation model, with downward social comparison, is even slightly stronger ($z = 3.79$) than the mediation model with attention-seeking ($z = 3.68$).

Table 6.1

*Regression analysis between Downward social comparison T3
and SNS use T3*

N = 1276

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.251***
	Gender	.17	.05	.09	.000***	
	Migration background	-.00	.05	-.00	.937	
	High educational level	-.17	.05	-.08	.001**	
	SNS use T2	-.45	.03	-.46	.000**	
2						.032***
	Downward social comparison T3	.19	.03	.19	.000 ***	

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table 6.2

*Regression analysis between Narcissistic traits T2 and SNS use T3,
and Downward social comparison (M)*

N=1274

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.251***
	Gender	.18	.05	.10	.000***	
	Migration background	-.01	.05	-.00	.904	
	High educational level	-.17	.05	-.08	.002**	
	SNS use T2	.45	.03	.45	.000***	
	Downward social comparison T2	.02	.03	.02	.368	
2						.035***
	Downward social comparison T3	.22	.03	.21	.000***	
3						.001
	Narcissistic traits T2	.06	.05	.04	.215	

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

New model

Summarizing, there are only effects of narcissistic traits on active SNS use, through attention-seeking and downward social comparison. The main effect of narcissistic traits on SNS use, without the mediators, can be found in Table 3.2. The effects of narcissistic traits on

attention-seeking and downward social comparison are indicated in Table 4.1 and Table 5.2 respectively. In addition, Table 7 shows the effects of attention-seeking and downward social comparison on SNS use. The effect of narcissistic traits on SNS use, after controlling for the mediators, are demonstrated in Table 7 as well. All the standardized beta's of these effects are included in the model of Figure 2. Figure 2 shows that the effect of narcissistic traits on active SNS use is significant without controlling for the mediators, but that this effect is not significant after controlling for the mediators.

Table 7

*Regression analysis between Narcissistic traits T2 and SNS use T3,
with Attention-seeking (M) and Downward social comparison (M)*

N=1274

	Model	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>p</i>	ΔR^2
1	<i>Control variables</i>					.254***
	Gender	.18	.05	.10	.000***	
	Age	.01	.03	.01	.835	
	Migration background	-.00	.05	-.00	.956	
	High educational level	-.16	.05	-.08	.002**	
	SNS use T2	.43	.03	.44	.000***	
	Attention-seeking T2	.08	.04	.06	.037*	
	Downward social comparison T2	.01	.03	.01	.789	
2						.062***
	Attention-seeking T3	.29	.04	.20	.000***	
	Downward social comparison T3	.13	.03	.13	.000***	
3						.000
	Narcissistic traits T2	.04	.05	.02	.385	

Note. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

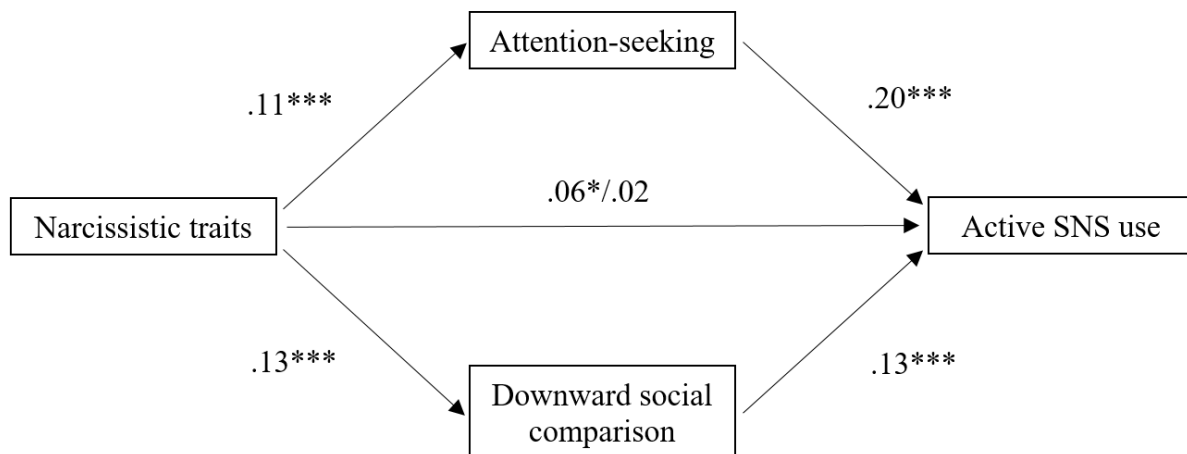


Figure 2. New model. A positive effect of narcissistic traits on active SNS use, which is positively mediated by attention-seeking and by downward social comparison. After controlling for the mediators, there is no significant main effect of narcissistic traits on active SNS use.

Discussion

The aim of this longitudinal study was to gain more insight into the precise mechanisms (i.e., attention-seeking and downward social comparison) that operate in the relationship between non-clinical narcissistic traits and active SNS use among adolescents. The results show that adolescents who report more narcissistic traits, report higher active SNS use one year later, but no evidence for the reverse link was found. Moreover, adolescents who report more narcissistic traits, report more attention-seeking on SNS. The results of this study also indicate that more narcissistic traits are related to more downward social comparison on SNS one year later. Summarizing, narcissistic traits seem to stimulate the active use of SNS among adolescents. This positive effect seems to be explained by both attention-seeking motives and downward social comparison tendencies.

Regarding a bidirectional relationship between narcissistic traits and SNS use (H1), the results show a positive effect of narcissistic traits on SNS use, but not vice versa. This finding is in line with the study of Walters and Horton (2015), which also found support for a unidirectional relationship from narcissistic traits to SNS use. At the same time, this finding is not in line with the study of Halpern et al. (2016), which found support for a bidirectional relationship. This contradiction might be explained by the use of different age groups, since Halpern et al. (2016) used a sample with an age range from 18 to over 65 years old. Possibly, the effect of SNS on narcissistic traits is less visible in adolescents. This can also be due to the different ways in which SNS use is measured. The study of Halpern et al. (2016) only took selfie production into account, while this study used a broader definition of posting content on

SNS. Probably, narcissism is a too stable personality trait to get influenced by social media behaviors. With regard to the existing theories, the confirmation of narcissistic traits predicting SNS use is consistent with the self-enhancement hypothesis (Halpern et al., 2016) and the trait hypothesis (McCain & Campbell, 2016). These theories stated that SNS give opportunities to promote the self, through which individuals can garner the admiration of others (self-enhancement hypothesis; Buffardi, 2011). In addition, the “need for attention from others” is characteristic of narcissism, which also is a personality characteristic related to an increased use of SNS (trait hypothesis). At the same time, finding no support for an effect of SNS use on narcissistic traits is inconsistent with the idealized presentation theory and the reinforcement theory (Walters & Horton, 2015). These theories state that the idealized identity on SNS gets internalized, which facilitates narcissism (idealized presentation theory) and that the “likes” and positive comments on SNS could nurture the beliefs in one’s superiority, which is characteristic of narcissism (reinforcement theory). For now, the results indicate that these theories do not apply to the entire group of adolescents aged 12 to 16. It is possible that those theories do apply to adolescents with certain characteristics or subgroups (for example when they already have a high level of narcissistic traits). Future research should sort this out. Summarizing, narcissistic traits do seem to stimulate SNS use, but SNS use does not seem to stimulate narcissistic traits in return.

In addition, the results show that attention-seeking seems to explain the effect of narcissistic traits on SNS use (H2). This finding is in line with the cross-sectional studies of Bergman et al. (2011), Dumas et al. (2017), and Weiser (2015), which all found an association between attention-seeking, narcissism, and SNS use. As discussed earlier, attention-seeking behaviors are characteristics of narcissism which easily can be facilitated on SNS, and this could be the reason why individuals with narcissistic traits tend to use SNS more often (self-enhancement hypothesis; Buffardi, 2011).

With regard to downward social comparison, in line with the previous results, there only seem to be effects of narcissistic traits. Downward social comparison on SNS does not seem to stimulate narcissistic traits in return (H3 and H4). As mentioned before, an idealized identity does not get internalized directly. The same applies with regard to not finding an effect of downward social comparison on narcissistic traits: the thoughts of feeling “better off than someone else” do not get internalized directly to facilitate narcissistic traits subsequently. Again, it seems that the personality trait narcissism is predisposing on behavior (like SNS use and downward social comparison). In addition, that narcissistic traits can predict downward social comparison is in line with the study of Krizan and Bushman, which found the same results. This is also in line with Holmes (2010) and the theory of downward social comparison

(Wills, 1981). Namely, individuals can increase their self-image through comparison with a less fortunate other (theory of downward social comparison), and people with narcissism do tend to devalue others more to prove their grandiose self-view (Holmes, 2010). Since the need for downward social comparison is so easily facilitated on SNS, these tendencies can possibly explain the effect of narcissistic traits on SNS use. Additional analyses indeed show that downward social comparison tendencies seem to explain the effect of narcissistic traits on active SNS use.

This study has several strengths and weaknesses. With regard to the strengths, it is the first study which completely focussed on adolescents aged 12 to 16, an understudied age group in the relationship between narcissistic traits and SNS use. In addition, this study uses longitudinal data that allow causal relationships to be explored, and allow several characteristics to be controlled for at an earlier measurement (T2). Also, reliability analyses showed that all scales used have a high internal consistency. Besides the strengths, there are some limitations to this study. First of all, two waves of the Digital Youth Project were used. Mediation effects, however, must be measured with three waves at least, so, due to methodological shortcomings, full mediation can not be concluded. Secondly, longitudinal data give no certainty regarding causality. There will always be the risk that other variables affect the variables of interest, since not everything can be controlled for, as is possible with an experimental design. Lastly, since the data were collected using self-reports, there is a chance that some respondents have given socially desirable answers. This may have led to an underreporting of all constructs that have been used, since all constructs are somewhat sensitive to social desirability tendencies. However, any consequences of this are estimated to be small, since the sample is large (1419 respondents).

This study is the first longitudinal study that focussed on adolescents, in the relationship between narcissistic traits and SNS use. This relationship has been studied before, but not with attention-seeking and downward social comparison as mediators taken into account simultaneously. Thanks to this study, there is more insight into the precise mechanisms playing a role in the relationship between narcissistic traits and SNS use in adolescents. The most important conclusion is that personality traits seem to be predisposing on behavior, and that there is no evidence to believe that SNS use or downward social comparison can influence the personality trait narcissism. In other words, individuals show behavior that suits their personality characteristics, like Halpern et al. (2016; i.e., self-enhancement hypothesis) and McCain and Campbell (2016; i.e., trait hypothesis) already stated. A possible explanation may be that narcissism is too stable as a personality trait to get influenced by social media behaviors. In addition to narcissistic traits being a predictor of SNS use among adolescents, it

became visible that both attention-seeking motives and downward social comparison tendencies seem to underlie the influence of narcissistic traits on active SNS use.

Since both SNS use and narcissistic traits have increased among adolescents (CBS, 2015; McCain & Campbell, 2016; Twenge, Campbell, & Gentile, 2011; Twenge & Foster, 2010), the results of this study should be taken seriously. Among adolescents, SNS use does not seem to lead to an increased level of narcissistic traits as suggested by theory (Walters & Horton, 2015) and empiricism (Halpern et al., 2016). In addition, active SNS use does not have such a negative influence as often suspected. Subsequently, when handling narcissistic traits among adolescents, SNS use does not seem to be a facet where prevention or interventions should focus on. To completely exclude a possible effect of SNS use on narcissistic traits, future longitudinal studies should replicate in the same age group with the use of different subgroups with certain characteristics. In addition, to be sure about the mediating roles of attention-seeking and downward social comparison, it is recommended to interesting to conduct a study with data from three measurements.

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