

# **Narcissism and Active Use of Social Networking Sites by Adolescents**

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### **Abstract (English)**

Both narcissism and the use of social networking sites (SNS) seem to have increased in the past decade. The main aim of the current study was to investigate whether there is a bi-directional relationship between narcissism and active SNS use. As longitudinal research on this topic is scarce, the current study contributes to existing knowledge. A longitudinal design with two measurements was used to investigate this bi-directional relationship as well as the roles of downward social comparison regarding the number of likes on SNS and self-esteem within this relationship. The data of the current study were derived from the Digital Youth Project of Utrecht University. There were 1,419 adolescents aged 11 to 16 that participated in two measurements. The results show that a higher level of narcissism predicts more active SNS use over time, and not the other way around. This relationship can be partially explained by making more downward social comparisons regarding the number of likes on SNS. Furthermore, self-esteem does not seem to play a role in the relationship. In conclusion, it seems that narcissistic adolescents use SNS more actively over time rather than adolescents becoming more narcissistic because of their active SNS use.

**Key words:** narcissism – social networking sites – downward social comparison – likes – self-esteem

### **Abstract (Dutch)**

Zowel narcisme als het gebruik van sociale netwerk sites (SNS) lijken gedurende het laatste decennium te zijn toegenomen. Het voornaamste doel van de huidige studie was om te onderzoeken of er een bi-directionele relatie is tussen narcisme en actief SNS gebruik. Gezien longitudinaal onderzoek hierover schaars is, draagt de huidige studie bij aan bestaande kennis. Er is gebruik gemaakt van een longitudinaal design met twee metingen om zowel de bi-directionele relatie te onderzoeken als de rollen van neerwaartse sociale vergelijking met betrekking tot het aantal likes op SNS en zelfvertrouwen binnen deze relatie. De data waarvan gebruik gemaakt is, komen voort uit het Digital Youth Project van Universiteit Utrecht. In totaal hebben 1,419 adolescenten tussen 11 en 16 jaar deelgenomen aan de twee metingen. De resultaten laten zien dat een hogere mate van narcisme meer actief SNS gebruik voorspelt over tijd, en niet andersom. Deze relatie kan gedeeltelijk verklaard worden door het maken van meer neerwaartse sociale vergelijkingen met betrekking tot het aantal likes op SNS. Daarnaast lijkt zelfvertrouwen geen rol te spelen in deze relatie. Concluderend lijkt het erop dat narcistische

adolescenten meer actief SNS gebruiken over tijd dan dat adolescenten narcistischer worden door hun actieve SNS gebruik.

**Trefwoorden:** narcisme – sociale netwerk sites – neerwaartse sociale vergelijking – likes – zelfvertrouwen

## **Introduction**

The use of social networking sites (SNS) (e.g., Facebook, Twitter, Instagram etc.) has been growing the last couple of years in the Netherlands (Centraal Bureau voor de Statistiek [CBS], 2015). The latest numbers show that 81 percent of the population used SNS in 2014 (CBS, 2015). For adolescents between 12 and 18 years old this percentage was even higher, namely 96 percent. This makes adolescents the second largest group of SNS users, right behind young adults (CBS, 2015). Along with the increase in SNS use, there is empirical evidence that the prevalence of the personality trait narcissism is also increasing (Paris, 2014). Narcissism is characterized by grandiosity, lack of empathy and a need for admiration (Walters & Horton, 2015). In the current study, the term narcissism refers to narcissistic tendencies and not to narcissism as a clinical disorder. It has been suggested that narcissism increases the frequency of SNS use (Walters & Horton, 2015). However, it has also been suggested that SNS use may reinforce narcissism (Buffardi & Campbell, 2008). Given that there is evidence for both directions, it is possible that the relationship is bi-directional. Therefore, the aim of the current study is to investigate whether there is a bi-directional relationship between narcissism and SNS use.

Until now, the association between narcissism and SNS use has mainly been investigated among college students and adults (e.g., Panek, Nardis, & Konrath, 2013), but hardly among adolescents. Not only are adolescents the second largest group of SNS users, they are also in a developmental phase in which they are vulnerable to both normal and pathological development of narcissism (Bleiberg, 1994). This makes it particularly relevant to examine the relationship between narcissism and SNS use among adolescents. Furthermore, it is likely that narcissistic individuals engage more in active SNS use (e.g., posting status updates, uploading photos etc.) rather than passive SNS use (e.g., reading status updates, viewing photos etc.). Davenport, Bergman, Bergman, and Fearington (2014) explain this by saying that narcissists have a strong need to maintain their egos and to receive attention from others, for which active SNS use is more useful than passive SNS use. The authors also state that this may explain why previous studies, that did not make a distinction between active and passive SNS use, found weak or nonsignificant relationships between narcissism and SNS use (Davenport et al., 2014). Therefore, the focus of the present study lies on active SNS use.

## **Narcissism and active SNS use**

The relationship between narcissism and active SNS use has been researched extensively. The results of these studies, however, are mixed. Whereas some researchers have demonstrated a

relationship between narcissism and active SNS use (Fox & Rooney, 2015; Kim & Chock, 2017; McCain et al., 2016; Mehdizadeh, 2010; Moon, Lee, Choi, & Sung, 2016; Panek et al., 2013; Scott, Boyle, Czerniawska, & Courtney, 2017; Sung, Lee, Kim, & Choi, 2016; Wang, Jackson, Zhang, & Su, 2012; Weiser, 2015), others have not found such a relationship (Barry, Doucette, Loflin, Rivera-Hudson, & Herrington, 2015; Deters, Mehl, & Eid, 2014; Eşkisü, Hoşoğlu, & Rasmussen, 2017; Wang, 2017). In addition, Bergman, Fearington, Davenport, and Bergman (2011) found that a higher level of narcissism was related to posting self-focused pictures, but not to the frequency of status updates. Furthermore, Sorokowski and colleagues (2015) found that for men, but not for women, selfie-posting behavior was related to narcissism.

Only two studies examined the relationship between narcissism and active SNS use among adolescents. In their cross-sectional research among 275 Singaporean adolescents between 12 and 18 years old, Ong and colleagues (2011) demonstrated that adolescents with a higher level of narcissism updated their Facebook status more often than adolescents with a lower level of narcissism. Moreover, Errasti, Amigo, and Villadangos (2017) demonstrated in their cross-sectional study among 503 Spanish adolescents between 14 and 17 years old that a higher level of narcissism was related to a higher frequency of sending tweets, but not to posting Facebook updates. The latter findings are in line with empirical evidence among both college students and adults, showing that a higher level of narcissism was more strongly related to active Twitter usage than active Facebook usage (Davenport et al., 2014), and to posting something about oneself on Twitter, but not on Facebook (McKinney, Kelly, & Duran, 2012).

The account of the literature presented above makes clear that longitudinal research is crucial. As far as known, there is only one longitudinal study that investigated the relationship between narcissism and active SNS use. Halpern, Valenzuela, and Katz (2016) demonstrated among 1,225 Chilean participants aged 18 to 34 that individuals with a higher level of narcissism took more selfies over time and that this increase in selfies raised subsequent levels of narcissism. These authors thus demonstrated a bi-directional relationship between narcissism and active SNS use. The current study examines whether this bi-directional relationship also exists for adolescents aged 11 to 16. The main research question of the present study therefore is: ‘Is there a bi-directional relationship between narcissism and active SNS use among adolescents aged 11 to 16?’

A theoretical explanation as to why a higher level of narcissism might predict more active SNS use can be found in the media-practice model (Steele & Brown, 1995). In this model it is stated that media do not solely influence adolescents, but also that adolescents actively select and consume media that fit their identity. As mentioned before, narcissists are

characterized by a need for admiration (Walters & Horton, 2015). SNS can provide them with a platform where they can receive attention. If they receive this attention, this may affirm them in their narcissistic self-views, which might predict more active SNS use. A possible explanation as to why more active SNS use might predict a higher level of narcissism can be found in the self-idealization theory (Walters & Horton, 2015). This theory states that SNS provide an opportunity for people to present an ideal image of themselves and if people only post ideal pictures and status updates, they may internalize this ideal self-image and become more narcissistic. This could be true especially for narcissistic individuals as they have a strong need for attention and admiration (Walters & Horton, 2015).

Thus, based on the media-practice model and the self-idealization theory, the relationship between narcissism and active SNS use seems to be bi-directional. This assumption is also supported by the results of the longitudinal study by Halpern and colleagues (2016). It is therefore expected that a higher level of narcissism predicts more active SNS use (hypothesis 1.1) and that more active SNS use predicts a higher level of narcissism (hypothesis 1.2).

### **Downward social comparison regarding the number of likes**

A factor that can play a role in the relationship between narcissism and active SNS use, and which has not yet been studied, is downward social comparison regarding the number of likes received on SNS. Downward social comparison means comparing oneself with a less fortunate other in order to enhance one's own subjective well-being (Wills, 1981). Narcissistic individuals are sensitive to making downward social comparisons (Bogart, Benotsch, & Pavlovic, 2004). Bogart and colleagues (2004) demonstrated among 98 American college students that participants with a higher level of narcissism experienced more positive affect when making downward social comparisons than participants with a lower level of narcissism. In addition, Krizan and Bushman (2011) demonstrated among 190 college students that individuals with a high level of narcissism also tended to make more frequent downward, rather than upward, social comparisons (Krizan & Bushman, 2011). Whether narcissistic individuals also make more downward social comparisons regarding the number of likes they receive on SNS has not been investigated yet. Therefore, the second research question of the present study is: 'Does a higher level of narcissism predict more downward social comparisons regarding the number of likes?'

A possible theoretical explanation as to why individuals with a higher level of narcissism might make more downward social comparisons is given by Krizan and Bushman (2011). The authors explain that narcissists have a strong need for status and admiration and

can achieve this by making downward social comparisons. Narcissistic individuals perceive themselves as superior to others and this perception is fed by comparing themselves to people they perceive as inferior (Krizan & Bushman, 2011). When it comes to likes received on SNS, it seems plausible that when narcissistic individuals compare themselves with others who receive less likes, their need for status, admiration and superiority will be fulfilled. Therefore, it is expected that a higher level of narcissism predicts more downward social comparisons regarding the number of likes (hypothesis 2.1).

In order to investigate the possible mediating effect of downward social comparison regarding the number of likes received on SNS, the third research question is: ‘Does making more downward social comparisons regarding the number of likes predict more active SNS use?’. As far as known, this has not been investigated yet. However, it seems plausible that when individuals compare their number of likes on SNS with those of people who receive less likes, this makes them feel good about themselves. This might lead them to post status updates and photos more often to maintain this feeling. Therefore, it is expected that making more downward social comparisons regarding the number of likes predicts more active SNS use (hypothesis 2.2).

Additionally, a fourth research question has been formulated to test the possible indirect effect of downward social comparison regarding the number of likes: “Does downward social comparison regarding the number of likes mediate the relationship between narcissism and active SNS use?” Based on the aforementioned literature and hypotheses, it is expected that downward social comparison regarding the number of likes mediates the relationship between narcissism and active SNS use (hypothesis 2.3).

### **Self-esteem**

Another factor that may play a role in the relationship between narcissism and active SNS use is self-esteem. The relationship between narcissism and self-esteem seems to depend on the characteristics of the narcissist, as there are different types of normally expressed narcissism. Whereas narcissists that have a grandiose self-view are characterized by a high level of self-esteem, narcissists that have a vulnerable self-view are characterized by a low level of self-esteem (Bosson et al., 2008). Plausibly, the relationship between narcissism and active SNS use differs for narcissists with high and low self-esteem. This leads to the final research question of the present study: ‘Is the relationship between narcissism and active SNS use different for adolescents with high and low self-esteem?’.

There are few cross-sectional studies in which the associations between narcissism, self-esteem and active SNS use have been investigated. These studies have used college and adult samples and their results are mixed. Whereas both Barry and colleagues (2015) and McCain and colleagues (2016) found that narcissists with low self-esteem posted less selfies than narcissists with high self-esteem, Eskisu and colleagues (2016) and Mehdizadeh (2010) found no such relationship. A possible theoretical explanation as to why narcissists with low self-esteem might post less selfies than narcissists with high self-esteem, is that they may be more sensitive to criticism and might try to avoid harm (for example negative responses to photos or updates) more than those who have a high level of self-esteem (Miller & Maples, 2011). This might lead them to use SNS less actively. Therefore, it is expected that the relationship between narcissism and active SNS use is stronger for adolescents with high self-esteem than for adolescents with low self-esteem (hypothesis 3).

### **The present study**

The main aim of the present study is to test whether there is a bi-directional relationship between narcissism and active SNS use among adolescents aged 11 to 16 (see Figure 1). This relationship has mainly been investigated cross-sectionally, and longitudinal studies are scarce. Considering that both the use of SNS and narcissism are increasing, it is useful to investigate whether they predict each other. The focus of this study lies on adolescents as opposed to college students and adults, which are the focus of most studies investigating this relationship. By testing the relationship longitudinally and among a different sample, the present study contributes to existing knowledge. Furthermore, this study aims to test for factors that can play a role in this relationship, namely the possible mediating role of downward social comparison regarding the number of likes and the possible moderating role of self-esteem. Downward social comparison regarding the number of likes has hardly been investigated before and will hopefully provide more insight into the process of how narcissism might predict more active SNS use.



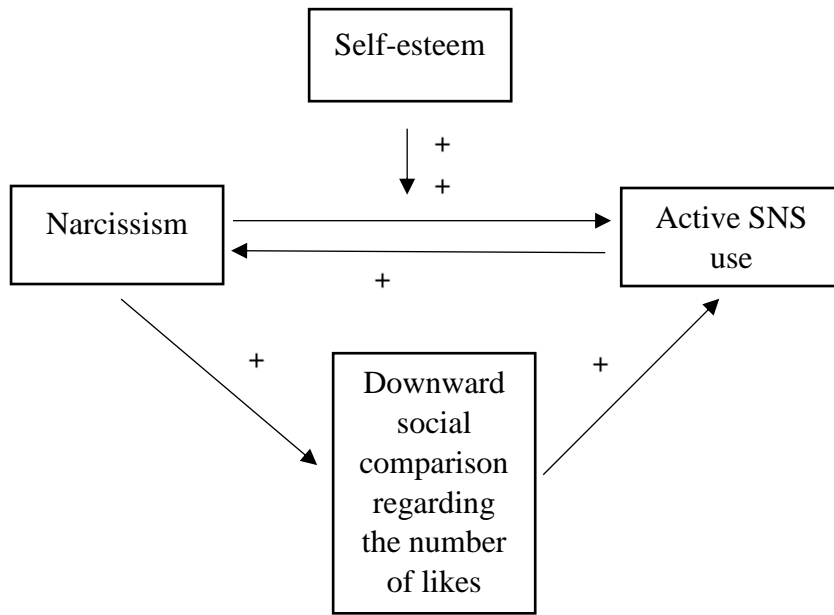


Figure 1. Hypothetical model of the bi-directional relationship between narcissism and active SNS use, the mediating role of downward social comparison regarding the number of likes and the moderating role of self-esteem.

## Method

### Procedure

The data for the current study were derived from the Digital Youth Project, an ongoing longitudinal study at Utrecht University. Data were collected via online self-report questionnaires administered in the classroom setting. The study followed students for two years with annual assessments from February to March of 2015 (T1), 2016 (T2) and 2017 (T3). For the current study, only data from T2 and T3 were used. For these two measurements, students of 7 schools were followed. The study procedures were carried out in accordance with the Declaration of Helsinki, and were approved by the board of ethics of the Faculty of Social Sciences at Utrecht University (FETC16-076 Eijnden). All participants and their parents were fully 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

The final sample consisted of 1,419 adolescents with ages ranging from 11 to 16 years ( $M = 13.28$ ,  $SD = .91$ ) at T2. There were slightly more boys (55.0%) than girls and most adolescents

had a Dutch ethnic background (76.5%). Students were in lower level vocational education (44.8%), moderate level secondary education (28.8%), and high school or pre- university education (26.4%) at T2.

## **Measures**

*Narcissism.* Narcissism was assessed with the Childhood Narcissism Scale (Thomaes, Stegge, Bushman, Olthof, & Denissen, 2008). In this scale, 10 items are measured (e.g., ‘young people like me deserve something extra’ and ‘I serve as an example for other young people’) on a 4-point Likert scale (1 = absolutely not true, 4 = absolutely true). Reliability was good ( $\alpha = .83$  at T2,  $\alpha = .86$  at T3).

*Active SNS use.* The active use of SNS was assessed by asking questions on how often participants disclosed information about themselves on SNS (e.g., ‘How often in the past six months did you post any of the following on your profile on SNS?’) (Hawk, Ter Bogt, Van Den Eijnden, & Nelemans, 2015). Examples of these 7 disclosures are ‘A message on what you are thinking’ and ‘A selfie’. For these items a 7-point Likert scale was used (1 = never, 7 = more than 40 times). Based on factor- and reliability analyses, one item that measured how often participants posted a picture of themselves with a sexy look was excluded, as this item measured risky online behavior, whereas the other six items did not. Reliability of the remaining 6 items was good ( $\alpha = .79$  at T2,  $\alpha = .83$  at T3).

*Downward social comparison regarding the number of likes.* This variable is newly developed and was measured with one item (‘How often do you think: I receive more likes than others’) on a 5-point Likert scale (1 = never, 5 = very often).

*Self-esteem.* Self-esteem was assessed with 5 items (e.g., ‘I am positive towards myself’ and ‘I think I have some very good qualities’) on a 5-point Likert scale (1 = absolutely not true, 5 = absolutely true) (Rosenberg, Schooler, & Schoenbach, 1989). Reliability was good ( $\alpha = .82$  at T2,  $\alpha = .82$  at T3).

## **Data analysis**

Analyses were conducted using IBM SPSS Statistics 24. Data were checked for unusual values and outliers. While there were several outliers, it was decided after closer inspection of the scores to leave these participants in the sample as they did not show irregularities. Next, factor- and reliability analyses were conducted. For active SNS use, one item was deleted based on these analyses because this item measured a sort of risk behavior which is not relevant for the current study. Other than that, the criteria for factor analyses were met and for each of the

variables scales were constructed. The assumption of normality was examined for all variables and, except for active SNS use, distributions were normal. For active SNS use, the standardized residuals were checked which were normally distributed. Next, t-tests were conducted to investigate group differences (e.g., the difference between boys and girls on active SNS use). Furthermore, correlations were examined between all variables. There was no multicollinearity between the independent variables. For the demographic variables categories were made. Gender was categorized as boy (1) and girl (0), ethnicity as Dutch (1) and other (0) and education level as low, middle and high with low education being the reference category. Before conducting the regression analyses, assumptions were checked. Based on the standardized residuals and the leverage values there were 145 outliers and cases with an extreme influence on the predicted values. The regression analyses were conducted both with these cases as well as without these cases. Differences between these analyses are reported in the results section. Other than that, assumptions were met. When conducting the analyses, missing values were deleted pairwise.

The main analyses were conducted using (longitudinal) linear regression. In the first step, control variables were added to the model. In the second step the relationship between narcissism at T2 and active SNS use at T3 was analyzed, with narcissism being the independent variable and active SNS use being the dependent variable. As a third step, self-esteem was added to the regression model and as a fourth step, the interaction term between narcissism and self-esteem was added to the model. The interaction term was created by centering narcissism and self-esteem. The relationship between active SNS use at T2 and narcissism at T3 was analyzed in the same manner. In order to test for mediation, the method of Baron and Kenny (1986) was used. In the first step, the relationship between narcissism at T2 and downward social comparison regarding the number of likes at T3 was examined, while controlling for control variables and downward social comparison regarding the number of likes at T2. In the second step the relationship between downward social comparison regarding the number of likes at T3 and active SNS use at T3 was investigated, while controlling for control variables and active SNS use at T2. As a final step, the relationship between narcissism at T2 and active SNS use at T3 was examined, while controlling for downward social comparison regarding the number of likes at T3 (mediator). Lastly, a Sobel test was conducted to examine whether the indirect effect was significantly different from the direct effect.

## **Results**

### **Descriptive statistics**

Table 1 shows the descriptive statistics for the dependent and independent variables for both T2 and T3. It shows for example that participants had a mean score of 2.14 on active SNS use at T2 on a range from 1 to 7. This means that participants scored rather low on this variable. For narcissism, participants had a mean score of 2.29 at T2 on a range from 1 to 4. This means that participants scored slightly above the midpoint on this variable. Overall, there are slight decreases in mean scores between T2 and T3, except for downward social comparison regarding the number of likes, which remains similar.

Table 1

*Mean Scores and Standard Deviations for the Independent and Dependent Variables at T2 and T3*

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
Active SNS use (T2)	1326	2.14	1.04	1.00	7.00
Active SNS use (T3)	1333	2.00	1.04	1.00	7.00
Narcissism (T2)	1395	2.29	.57	1.00	4.00
Narcissism (T3)	1385	2.21	.58	1.00	4.00
DSC likes (T2)	1324	1.91	1.00	1.00	5.00
DSC likes (T3)	1332	1.91	1.03	1.00	5.00
Self-esteem (T2)	1398	3.90	.74	1.00	5.00
Self-esteem (T3)	1392	3.79	.75	1.00	5.00

*Note.* DSC likes is an abbreviation for downward social comparison regarding the number of likes.

### **Group differences**

In order to investigate whether there are group differences for gender, ethnicity and education level, t-tests have been conducted (see Table 2). It is shown that boys score significantly lower than girls on active SNS use, but higher on narcissism and self-esteem. As for education, both middle and high educated participants score significantly lower than low educated participants on active SNS use. Also, high educated participants score significantly lower than middle and low educated participants on narcissism and downward social comparison regarding the number of likes. Additionally, middle educated participants scored significantly higher than low educated participants on self-esteem. Lastly, participants with a Dutch ethnic background scored significantly lower on narcissism than participants with a different ethnic background.

Table 2

*Mean Group Differences for the Independent and Dependent Variables at T2*

Variable	Gender		Ethnicity		Education		
	Boys ( <i>N</i> ) <i>M</i>	Girls ( <i>N</i> ) <i>M</i>	Dutch ( <i>N</i> ) <i>M</i>	Other ( <i>N</i> ) <i>M</i>	High ( <i>N</i> ) <i>M</i>	Middle ( <i>N</i> ) <i>M</i>	Low ( <i>N</i> ) <i>M</i>
Active SNS use (T2)	(725) 1.92**	(601) 2.42**	(1013) 2.14	(313) 2.17	(345) 1.96**	(385) 2.10**	(596) 2.28**
Narcissism (T2)	(767) 2.41**	(628) 2.14**	(1069) 2.26**	(326) 2.40**	(372) 2.17**	(406) 2.33**	(617) 2.34**
DSC likes (T2)	(724) 1.95	(600) 1.86	(1011) 1.89	(313) 1.98	(344) 1.65**	(385) 1.94**	(595) 2.04**
Self-esteem (T2)	(768) 4.00**	(630) 3.79**	(1072) 3.89	(326) 3.96	(373) 3.89	(406) 3.98**	(619) 3.86**

*Note.* \*\* $p < .01$ .

### Correlations

Table 3 shows the correlations between the independent and dependent variables. The positive correlation between narcissism at T2 and active SNS use at T3 is significant, which means that a higher level of narcissism at T2 is associated with more active SNS use at T3. Active SNS use at T2 is not significantly associated with narcissism at T3. Downward social comparison regarding the number of likes at T2 is positively and significantly associated with both narcissism at T2 as well as active SNS use at T3, which means that making more downward social comparisons regarding the number of likes at T2 is associated with a higher level of narcissism at T2 and more active SNS use at T3. Self-esteem at T2 is positively and significantly related to narcissism at T2 and negatively and significantly correlated with active SNS use at T3, which means that a higher level of self-esteem at T2 is associated with a higher level of narcissism at T2 and with less active SNS use at T3.

Table 2 also shows the correlations between the demographic variables and the independent and dependent variables. Only gender and high education level are significantly related to both active SNS use and narcissism and therefore will be controlled for in the regression analyses. However, for a complete interpretation of education level, middle education level will also be controlled for. As ethnicity is correlated only with narcissism, both analyses with and without ethnicity as a control variable will be conducted and reported.

Table 3

*Correlations between the Independent and Dependent Variables for Both T2 and T3 and Correlations with Demographic Variables at T2*

	1.	2.	3.	4.	5.	6.	7.	8.
1. Active SNS use (T2)	1.00							
2. Active SNS use (T3)	.49**	1.00						
3. Narcissism (T2)	.10**	.08**	1.00					
4. Narcissism (T3)	.04	.12**	.50**	1.00				
5. DSC likes (T2)	.33**	.16**	.37**	.21**	1.00			
6. DSC likes (T3)	.19**	.25**	.25**	.34**	.38**	1.00		
7. Self-esteem (T2)	-.08**	-.07*	.33**	.22**	.04	.01	1.00	
8. Self-esteem (T3)	-.07*	-.08**	.17**	.31**	.03	-.00	.46**	1.00
	<b>Demographic variables</b>							
9. Gender(T2)	-.28**	-.28**	.24**	.22**	.04	.02	.15**	.12**
10. Age(T2)	-.02	-.02	.00	.00	-.02	-.05	-.05	-.03
11. Educ(T2)								
Middle	-.04	-.03	.04	.06*	.02	.01	.06*	.05
High	-.12**	-.11**	-.12**	-.16**	-.16**	-.09**	.00	-.02
12. Ethnic(T2)	-.02	.00	-.11**	-.08**	-.04	-.06*	-.05	-.08**

*Note.* \* $p < .05$ , \*\* $p < .01$ . For the correlations with gender, education and ethnicity, Spearman correlations were used and for all other correlations Pearson was used. Educ is an abbreviation for education level.

### **Narcissism, self-esteem and active SNS use**

In order to investigate whether narcissism and self-esteem predict active SNS use, and whether active SNS use predicts narcissism, (longitudinal) linear regression analyses have been

conducted (see Table 4 and 5). It is shown in Table 4 that a higher level of narcissism at T2 predicts more active SNS use at T3, both before and after controlling for confounding variables. Conducting these analyses without the extreme cases on the one hand, and with ethnicity as a control variable on the other, yields similar results ( $b = .09$ ,  $SE = .04$ ,  $\beta = .06$ ,  $t = 2.20$ ,  $p = .03$  and  $b = .11$ ,  $SE = .05$ ,  $\beta = .06$ ,  $t = 2.34$ ,  $p = .02$ , respectively).

It is also shown in Table 4 that the main effect of self-esteem is not significant and therefore does not predict active SNS use. Consequently, the interaction term between narcissism and self-esteem is not significant either, and therefore self-esteem does not moderate the relationship between narcissism and active SNS use. When conducting the same analyses without the extreme cases on the one hand, and with ethnicity as a control variable on the other, the main effect of self-esteem is also not significant ( $b = -.05$ ,  $SE = .03$ ,  $\beta = -.04$ ,  $t = -1.51$ ,  $p = .13$  and  $b = -.06$ ,  $SE = .04$ ,  $\beta = -.04$ ,  $t = -1.56$ ,  $p = .12$  respectively), and neither is the interaction term ( $b = .03$ ,  $SE = .05$ ,  $\beta = .02$ ,  $t = .61$ ,  $p = .54$  and  $b = .03$ ,  $SE = .05$ ,  $\beta = .01$ ,  $t = .58$ ,  $p = .57$  respectively).

Table 4

*Linear Regression Analyses for Narcissism at T2, Self-esteem at T2 and Active SNS Use at T3 (N = 1276)*

	Active SNS Use (T3)				
	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
<b>Regression without control variables</b>					
Narcissism(T2)	.15	.05	.08	2.95	.00**
<b>Step 1: Control variables</b>					
Gender(T2)	-.21	.05	-.10	-3.94	.00**
Education(T2)					
Middle	-.09	.06	-.04	-1.49	.14
High	-.22	.06	-.09	-3.45	.00**
Active SNS use (T2)	.45	.03	.45	17.92	.00**
<b>Step 2: Research variable</b>					
Narcissism (T2)	.11	.05	.06	2.27	.02*
<b>Step 3: Moderator variable</b>					
Self-esteem (T2)	-.06	.04	-.04	-1.58	.12
<b>Step 4: Interaction variable</b>					
Narcissism(T2)*Self-esteem(T2)	.03	.05	.01	.57	.57

*Note.* \* $p < .05$ , \*\* $p < .01$ .

In order to investigate whether active SNS use predicts narcissism, the same regression analysis has been conducted. It is shown in Table 5 that more active SNS use at T2 does not predict more narcissism at T3. When conducting the same analyses without the extreme cases on the one hand and with ethnicity as a control variable on the other, the results are not significant either ( $b = .01$ ,  $SE = .02$ ,  $\beta = .01$ ,  $t = .45$ ,  $p = .66$  and  $b = .01$ ,  $SE = .01$ ,  $\beta = .02$ ,  $t = .72$ ,  $p = .47$  respectively).

Table 5

*Linear Regression Analysis for Active SNS Use at T2 and Narcissism at T3 (N = 1292)*

	Narcissism (T3)				
	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
<b>Regression without control variables</b>					
Active SNS use(T2)	.03	.02	.04	1.58	.11
<b>Step 1: Control variables</b>					
Gender(T2)	.12	.03	.10	4.01	.00**
Education(T2)					
Middle	.03	.03	.01	.40	.69
High	-.10	.04	-.08	-2.99	.00**
Narcissism(T2)	.48	.03	.46	18.71	.00**
<b>Step 2: Research variable</b>					
Active SNS use(T2)	.01	.01	.02	.69	.49

Note. \*\* $p < .01$ .

### **The mediating role of downward social comparison regarding the number of likes**

In order to investigate whether downward social comparison regarding the number of likes mediates the relationship between narcissism and active SNS use, (longitudinal) linear regression analyses have been conducted (see Table 6, 7 and 8).

In Table 6 it is shown that a higher level of narcissism at T2 predicts more downward social comparison regarding the number of likes at T3. Conducting the same analysis without the extreme cases on the one hand, and with ethnicity as a control variable on the other, yields similar results ( $b = .24$ ,  $SE = .05$ ,  $\beta = .13$ ,  $t = 4.42$ ,  $p = .00$  and  $b = .23$ ,  $SE = .05$ ,  $\beta = .13$ ,  $t = 4.47$ ,  $p = .00$  respectively).



Table 6

*Linear Regression Analysis for Narcissism at T2 and Downward Social Comparison regarding the Number of Likes (DSC Likes) at T3 (N = 1273)*

	DSC Likes (T3)				
	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
<b>Step 1: Control variables</b>					
Gender(T2)	.05	.05	.02	.85	.40
Education(T2)					
Middle	-.02	.06	-.01	-.35	.73
High	-.09	.07	-.04	-1.34	.18
DSC likes(T2)	.38	.03	.38	14.27	.00**
<b>Step2: Mediation variable</b>					
Narcissism(T2)	.24	.05	.13	4.65	.00**

*Note.* \*\* $p < .01$ .

Table 7 shows that making more downward social comparisons regarding the number of likes at T3 predicts more active SNS use at T3. Conducting the same analysis without the extreme cases on the one hand, and with ethnicity as a control variable on the other, generated similar results ( $b = .14$ ,  $SE = .02$ ,  $\beta = .17$ ,  $t = 6.75$ ,  $p = .00$  and  $b = .17$ ,  $SE = .03$ ,  $\beta = .17$ ,  $t = 6.84$ ,  $p = .00$  respectively).

Table 7

*Linear Regression Analysis for Downward Social Comparison regarding the Number of Likes (DSC Likes) at T3 and Active SNS Use at T3 (N = 1275)*

	Active SNS Use (T3)				
	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
<b>Step 1: Control variables</b>					
Gender(T2)	-.21	.05	-.10	-3.94	.00**
Education(T2)					
Middle	-.09	.06	-.04	-1.49	.14
High	-.22	.06	-.09	-3.45	.00**
Active SNS use(T2)	.45	.03	.45	17.91	.00**
<b>Step2: Mediation variable</b>					
DSC Likes(T3)	.17	.03	.17	6.80	.00**

*Note.* \*\* $p < .01$ .

Lastly, after controlling for downward social comparison regarding the number of likes, narcissism at T2 still predicts more active SNS use at T3 (see Table 8). The indirect effect is significantly different from the direct effect ( $S = 4.07, SE = .01, p = .00$ ). Additionally, before controlling for downward social comparison regarding the number of likes, the beta was .06 and after controlling this was .07. This means that downward social comparison regarding the number of likes partially mediates the relationship between narcissism and active SNS use. However, to draw conclusions about mediation effects, measurements for at least three time points are necessary, so the results have to be interpreted with caution.

Conducting the same analysis without the extreme cases on the one hand, and with ethnicity as a control variable on the other, generated similar results ( $b = .09, SE = .04, \beta = .06, t = 2.03, p = .04$  and  $b = .13, SE = .05, \beta = .07, t = 2.51, p = .01$  respectively).

Table 8

*Linear Regression Analysis for Narcissism at T2 and Active SNS Use at T3 (Controlling for DSC Likes at T3) (N = 1307)*

	Active SNS Use (T3)				
	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>
<b>Step 1: Control variables</b>					
Gender(T2)	-.45	.05	-.22	-8.34	.00**
Education(T2)					
Middle	-.14	.06	-.06	-2.18	.03*
High	-.31	.07	-.13	-4.67	.00**
DSC Likes(T3)	.24	.03	.24	9.09	.00**
<b>Step2: Mediation variable</b>					
Narcissism(T2)	.12	.05	.07	2.41	.02*

*Note.* \* $p < .05$ , \*\* $p < .01$ .

## Discussion

The aim of the current study was to investigate the bi-directional relationship between narcissism and active SNS use and the role of downward social comparison regarding the number of likes and self-esteem within this relationship. It was found that a higher level of narcissism predicted more active SNS use over time, and not the other way around. Moreover, it was found that this relationship could be partially explained by making more downward social comparisons regarding the number of likes on SNS and that self-esteem does not seem to play a role in the relationship between narcissism and active SNS use.

### **The uni-directional relationship between narcissism and active SNS use**

In order to investigate the bi-directional relationship between narcissism and active SNS use, two hypotheses were formulated. The first hypothesis (a higher level of narcissism predicts more active SNS use), was supported. However, the second hypothesis (more active SNS use predicts a higher level of narcissism) could not be supported, and therefore the relationship seems to be uni-directional. These findings are in line with the media-practice model (Steele & Brown, 1995), which states that adolescents actively consume and select media that fit their identity. SNS can provide narcissists with an ideal platform for self-promotion where they can receive the admiration they need, and which they can use as often as they want to (Walters & Horton, 2015). These findings are also partially in line with previous studies (e.g., Halpern et al, 2016) that found a bi-directional relationship, as in the current study evidence was found only for a uni-directional relationship between narcissism and active SNS use.

Not finding support for the second hypothesis is contradictory with the self-idealization theory (Walters & Horton, 2015), which states that people who post more ideal status updates might internalize this ideal self-image, which can make them more narcissistic. In the light of the current findings and evidence from similar research areas (e.g., the field of music) this theoretical perspective should be reconsidered. It seems that people select specific media based on their behavioral characteristics, rather than media influencing their behavior. For example, Selfhout, Delsing, Ter Bogt, and Meeus (2008) found that adolescents' problematic behavioral patterns propelled them toward music that reflected those behaviors, and not that music drove them toward behavioral patterns. Applying this to the findings of the current study, it could be that narcissistic adolescents (problematic behavioral pattern) are being propelled toward social networking sites that offer them the opportunity to expose their narcissistic behavior, and not the other way around.

In addition, research among adults has shown that personality traits seem to be stable over a long period of time (Cobb-Clark & Schurer, 2012). If this is also true for adolescents, it is possible that their personality traits are not influenced that easily, by for example SNS use, on such a short period of time. However, as this is speculation, future researchers are encouraged to investigate whether this could be the case.

### **The mediating role of downward social comparison regarding the number of likes**

In order to investigate the mediating role of downward social comparison regarding the number of likes, three hypotheses were formulated. All three of these hypotheses (a higher level of narcissism predicts more downward social comparisons regarding the number of likes, making

more downward social comparisons regarding the number of likes predicts more active SNS use, and downward social comparison regarding the number of likes mediates the relationship between narcissism and active SNS use), were supported. However, as there is still a significant relationship between narcissism and active SNS use after controlling for downward social comparison regarding the number of likes, this mediator can only partially explain the relationship. Plausibly, other factors play a role too, for example the desire that narcissists have to have many friends and followers on SNS (Davenport et al., 2014).

It is possible that narcissistic individuals are fulfilled in their needs for status and admiration when they compare themselves with people who receive less likes online. In turn, this might reinforce them to use SNS more actively as they may want to maintain this feeling of superiority. However, these theories are not validated and little research has been conducted on this topic. As there is evidence that downward social comparison regarding the number of likes partially mediates the relationship between narcissism and active SNS use, this theory should be replicated in other studies.

### **Not finding evidence for the moderating role of self-esteem**

Lastly, the hypothesis that the relationship between narcissism and active SNS use is stronger for adolescents with high self-esteem than for adolescents with low self-esteem (hypothesis 3), could not be supported. No evidence was found for self-esteem as a predictor of active SNS use and, in consequence, no evidence was found for self-esteem to moderate the relationship between narcissism and active SNS use. This finding is partially in line with previous research, as Eskisu and colleagues (2016) and Mehdizadeh (2010) did not find that narcissists with low self-esteem use SNS less actively than narcissists with high self-esteem. However, Barry and colleagues (2015) and McCain and colleagues (2016) did find such a relationship. Along with these latter findings, Miller and Maples (2011) suggest that narcissists with low self-esteem may be more sensitive to criticism and might try to avoid harm (e.g., negative responses) more than those with high self-esteem, which in turn might lead them to use SNS less actively. However, based on the findings of the current study, this perspective could not be supported.

A possible explanation for not finding evidence for a main effect of self-esteem might be that in the current study no distinction has been made in types of self-esteem. For example, social self-esteem is related to active SNS use, but global self-esteem is not (Valkenburg, Koutamanis, & Vossen, 2017). As it was beyond the scope of the current study to distinguish between these types of self-esteem, future researchers are encouraged to do so when examining the relationship between narcissism, self-esteem and active SNS use.

### **Strengths, limitations and future directions**

The current study has several strengths. First of all, the current study is one of the few studies that have investigated the bi-directional relationship between narcissism and active SNS use, longitudinally. When using a longitudinal design, as opposed to using a cross-sectional design, more insight can be provided into causal relationships. Secondly, the current study is also one of the first studies to investigate downward social comparison regarding the number of likes within this relationship. Thirdly, the large school sample size used to analyze the data makes the study more representative than for instance when convenience samples are used.

Besides strengths, the current study also has some limitations. Firstly, only two waves were used to test for the mediator, while three waves are needed to draw conclusions about the mediating role of a certain variable. Future researchers should use at least three waves to test the mediating role of downward social comparison regarding the number of likes. Secondly, downward social comparison regarding the number of likes was measured with one item, which is less reliable than using multiple items. Even though this one item may be a more objective item than items measuring comparison regarding a better or more fun life (as people can see directly whether they receive more or less likes than others), future researchers are encouraged to examine more aspects of downward social comparison, as this one item may be a proxy for downward social comparison in general. Thirdly, even though the current study is longitudinal, causal conclusions cannot be drawn with absolute certainty. It merely provides more insight into causal relationships.

Further limitations, which are usual when conducting questionnaire research, are related to self-report and social desirability. For instance, it is possible that adolescents do not respond to questions of self-esteem honestly, as they may be reluctant to admit that they have low self-esteem.

### **Conclusion and implications**

The current study is one of the few studies that have investigated the bi-directional relationship between narcissism and active SNS use, longitudinally. It was found that a higher level of narcissism predicted more active SNS use over time, and not the other way around. This relationship could be partially explained by making more downward social comparisons regarding the number of likes on SNS. No evidence was found that self-esteem played a role in the relationship between narcissism and active SNS use.

The findings of the current study have several implications for social scientific research. First of all, they contribute to and elaborate on existing knowledge regarding the relationship

between narcissism and active SNS use. Secondly, the current study gives directions for theory on downward social comparison regarding the number of likes as no other theory has been constructed on this topic before.

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