Facebook users’ loneliness based on different types of interpersonal relationships
Links to grandiosity and envy

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Abstract

Purpose – The purpose of this paper is to investigate: first, the effects of a user’s grandiosity on the loneliness of another user on Facebook who detected it in terms of his/her well-being status; second, the mediational role of envy between grandiosity and loneliness; and, third, whether different effects are given on narcissism, envy, and loneliness depending on social or para-social relationships on Facebook.

Design/methodology/approach – This study’s focus is to investigate how observing others’ grandiose behaviors impact on individuals’ feeling of loneliness. The authors propose that this relationship is mediated by the feeling of envy. The authors further postulate that social relationships that participants may have with other Facebook users would play a key role in feeling different types of envy (i.e. malicious vs benign). Therefore, the current study employed a 2 (levels of grandiosity: high vs low) × 2 (social relationship: para-social vs social) between-subjects design.

Findings – The authors found that one’s grandiosity as reflected on Facebook significantly affects other users’ loneliness through malicious envy. However, no moderated mediation via envy (either benign or malicious) was found within the social relationship group.

Originality/value – Social comparison generated by the use of Facebook was found to have an effect on the user’s loneliness through the mediation of envy. In particular, the possibility that such effects could be triggered in para-social relationships was identified.

Keywords Loneliness, Benign envy, Malicious envy, Grandiosity, Para-social relationship

Paper type Research paper

1. Introduction

Prior research has suggested that one’s number of friends and total time spent on Facebook have positive correlations with higher levels of depression (Moreno et al., 2012). It has also been suggested that a certain psychological mechanism, rather than the direct use of Facebook, might decrease psychological well-being (Moreno et al., 2012). For example, self-evaluation while using Facebook or “Facebook surveillance” can increase depressive symptoms (Blease, 2015; Tandoc et al., 2015). This may suggest that it is critical to understand how users’ judgments about others’ Facebook information and the emotions evoked by such information influence their psychological well-being. In the current research, we examined how other users’ Facebook posts reflecting narcissism affect one’s loneliness as a predictor of psychological well-being.

Grandiosity may be the most prevalent form of narcissism on Facebook. Users expressing grandiosity tend to seek respect from others and often exaggerate their intelligence, physical attractiveness, and power, emphasizing a positive self-view (Mehdizadeh, 2010). However, most Facebook users may be unaware of whether grandiose Facebook posts accurately reflect other users’ personalities or “real” lives.
Moreover, those who observe others’ grandiose Facebook posts often use this distorted information as a standard means of social comparison (Festinger, 1954), involving self-evaluation. This exposure to grandiose content on Facebook can generate negative psychological outcomes. For instance, a user exposed to others’ grandiose Facebook content can view themselves as relatively inferior to others due to the maladaptive social comparison (Vogel et al., 2014).

Such self-evaluation may also create detrimental affective consequences in the viewer, because grandiose narcissistic individuals often act with an expectation of others’ envy (Krivan and Johar, 2012). Those who regularly express grandiosity on Facebook tend to believe that viewers will be impressed by their Facebook posts and consider them an important figure. The phenomenon of Facebook envy, induced by the comparison of one’s situation with that of others’, brings despair to the user (Krasnova et al., 2013), suggesting that envy might be a missing link (Krasnova et al., 2013) that influences users’ psychological responses. The current research addresses the psychological responses by investigating the role of envy in Facebook users’ psychological outcomes, specifically, its impact on feelings of loneliness. Because loneliness, defined as feelings of social isolation and dissatisfaction with one’s social interactions, is considered a representative predictor of one’s psychological well-being (Cohen, 2004; Diener et al., 1985; Russell et al., 1980), it is worth investigating how other users’ (grandiose) Facebook posts affect viewers’ loneliness.

Although a large body of the extant research on social media has examined the impact of Facebook usage on psychological well-being (Baek et al., 2013), little attention has been paid to how different types of relationships on Facebook have distinctive effects on Facebook users’ emotional well-being (Tsiotsou, 2015). Because people have different reactions to others’ Facebook posts based on their relationships, it is likely that emotional outcomes are also different after viewing others’ grandiose Facebook content. Therefore, we explored how two types of social relationships on Facebook can affect one’s levels of loneliness differently. The first type is a social relationship, defined as an active and reciprocal relationship (Cohen, 2004). The second type is a para-social relationship, defined as a passive and unilateral relationship in which one party is known but the other party is not (Auer and Palmgreen, 2000; Horton and Wohl, 1956). Although most Facebook research has focused on social relationships in the social network service (SNS), it is largely unknown how people use Facebook differently and experience emotions within para-social relationships, which in turn affect one’s psychological well-being (Munzel and Kunz, 2014). Therefore, we investigated whether grandiose narcissists with inflated selves on Facebook, where content is easy to control, can cause loneliness in viewers of their posts and whether envy mediates this effect. We examined whether the process depends on the relationship type between a grandiose narcissist and another user on Facebook.

2. Theoretical framework

2.1 Grandiosity and loneliness

Facebook might be one of the most popular outlets for expressing narcissism (Hargittai et al., 2012) because users consider it a tool for impression management (Silver and Day, 2012). Moreover, social network webpages are environments with a very high level of control. For instance, a user can selectively show positive aspects or post the most attractive photo with the motivation of self-promotion. Prior work has suggested that narcissists want to talk about themselves and seek confidence through public glory (Wallace and Baumeister, 2002). Facebook provides such a space. In this space, relatively highly controlled relationship formation is possible, and promoting a particular self-image is easy. Therefore, generally, self-presentation is likely to be conducted on an excessive level (Buffardi and Campbell, 2008).
If narcissists engage in excessive impression management on Facebook, it is important to understand how other users, who are exposed to them, respond to this overly controlled information. Users faced with such grandiosity may go through the process of recognizing their own status through social comparison. Ironically, the more online friends users have and the more they check these friends’ updates, if the content is boastful, then the users’ depression will be aggravated to a greater extent (Blease, 2015). In this respect, depression is a signal that a user will stop the social encounter and not respond to the domineering person (Price et al., 1994). As a coping strategy, on Facebook, a viewer may terminate relationships with those who frequently display excessive grandiosity, such as by unfriending. This termination of the relationship may, in the end, trigger loneliness because a viewer’s relationship termination behavior has an avoidance goal that creates negative relational events (Elliot et al., 2006). Furthermore, those who experience loneliness are also more likely to adopt an avoidance coping behavior (Park and Baumeister, 2015). Prior research on coping has suggested that avoidance coping is associated with loneliness, and as a result, avoidance coping increases loneliness and this increased loneliness has a cyclical pattern that increases avoidance coping again (Rubenstein and Shaver, 1982). The cyclical pattern is a vicious circle of loneliness and avoidance coping.

We are suggesting that greater grandiosity induces greater loneliness on Facebook because, due to the grandiosity of the inflated self, superficial relationships are aggrivated. Because the relationships on Facebook are often formless, superficial, and artificial, an inflated self-concept reflecting grandiosity can transfer poorer information than face-to-face communication (Baek et al., 2013; Gentzler et al., 2011). In this case, a user who maintains shallow relationships may have no choice but to feel loneliness because such relationships cannot provide relational sincerity.

Furthermore, it is hard to anticipate a long-term reciprocal relationship with an individual with a high sense of grandiosity. Someone with a grandiose personality tends to seek compliments and trust from others to an excessive degree, but may not be good at maintaining a strong mutual relationship due to a lack of empathic understanding of others (American Psychiatric Association, 2013). To protect his or her inflated self, a narcissist employs exhibitionist and attention-seeking behaviors (Buss and Chiodo, 1991) and exerts domineering and competitive actions in social situations (Raskin and Terry, 1988). A high level of self-enhancement, one of the characteristics of narcissists, is rewarding and productive to human relationships in the short term. However, if self-enhancement is not properly controlled, it causes relationship conflicts in the long term (Paulhus, 1998). Thus, although narcissistic behaviors can produce a positive effect (e.g. agentic behaviors) in the early stages of social relationships, they tend to produce a negative effect (e.g. antagonistic behaviors) as relationships enter a mature phase. Narcissistic behavior that pursues popularity not only decreases respect from others but also increases rivalry with others (Leckelt et al., 2015). Narcissists are not interested in intimacy, warmth, or other positive long-term relational outcomes from interpersonal relationships, and they initiate and use relationships for a short period to look popular, successful, and high in status (Davenport et al., 2014). To satisfy their narcissistic esteem, narcissists use relationships to self-construct (Morf and Rhodewalt, 2001). These narcissistic characteristics in turn prohibit further interactions and lead to the severance of social relationships. Consequently, other people may experience loneliness when interacting with narcissists because they cannot take part in reciprocal relationships.

Additionally, a particular characteristic of narcissists may undermine the quality of their social relationships. Specifically, the aggressive characteristic of narcissism may destroy interpersonal relationships. The more aggressive narcissists are, the more psychologically controlling and game playing they are, with higher levels of infidelity (Buffardi and Campbell, 2008). Narcissists are thought of as more aggressive because of the excessiveness
of their self-enhancement. Others may see such people as threatening, which in turn leads them to avoid further social interactions. By avoiding, rather than competing against aggressive people, people become more isolated.

Last, because narcissists are self-centered, they are not willing to make much of a commitment to interpersonal relationships. According to Campbell et al. (2002), narcissists show a low level of commitment in romantic relationships because they look for a “better deal” than their current relationship, so they often play mind games with their current partners. As a result, a narcissist’s current partner becomes less resilient to the narcissistic partner’s low relationship commitment.

In a similar vein, Facebook users may avoid relationships with narcissists after recognizing the superficial nature of their relationship, experiencing conflict, and feeling aggression and low commitment from the narcissists. Consequently, users do not have meaningful relationships with those who have narcissistic grandiosity. Avoiding such relationships leads users to experience loneliness. In summary, the following hypothesis was established based on this theoretical background:

\[ H1. \] The higher a post’s grandiosity, the lonelier a viewer feels.

2.2 Envy as a mediator of the link between grandiosity and loneliness

If Facebook users inflate their images to look better than their real selves, users who observe these inflated images may naturally compare themselves with these narcissistic users. This might be a typical social comparison situation occurring on Facebook. Notably, Tandoc et al. (2015) suggested that people feel depression when using Facebook for surveillance purposes because they feel envy toward other users (e.g. looking at their friends’ Facebook posts showing travel photos of places they have never been). This result might be extended to loneliness, which is the focus of our research, if we consider depression to be one example of individuals’ lowered psychological well-being driven by envious feelings (Appel et al., 2016).

To understand the impact of Facebook users’ grandiosity on viewers’ psychological well-being, we need to understand how grandiosity triggers upward comparison and makes others feel envy. Though a viewer tends not to acknowledge feeling envy toward someone on Facebook, previous research has reported that the use of Facebook often correlates with feelings of envy (Krasnova et al., 2013). Moreover, envy caused by grandiosity may have common characteristics reflecting the offensiveness of grandiosity (Sayers, 1949), but it is likely that the same grandiose content on Facebook stimulates two different types of envy: benign and malicious. A recent study (Van de Ven et al., 2009) demonstrated that benign envy causes a leveling up of the self to reach the superior other’s status, while malicious envy produces the opposite effect. Thus, people who feel malicious envy tend to denigrate superior others’ status.

In this study, we assumed that responses will be different depending on the types of envy triggered by grandiosity for the following reasons. First, when people observe others expressing grandiosity by posting their possessions or achievements on Facebook, they may judge whether these grandiose others deserve such possessions or achievements. It is also likely that they evaluate whether such possessions or achievements have been fairly obtained. Malicious envy can be evoked when one feels that things are unfair or that others who show grandiosity do not deserve their possessions or achievements, and subjective injustice creates the hostility of envy (Feather, 1994; Smith et al., 1994; Smith, 2004). Conversely, when people think that superior others’ possessions or achievements are fairly obtained or deserved, they may feel benign envy (Van de Ven et al., 2009). Benign envy is productive and contributes to raising one’s own position, but malicious envy contributes to reducing others’ social standing (Van de Ven et al., 2009). The tendency to inflate the self intentionally (Gabriel et al., 1994) and the tendency to emphasize confidence related to one’s
position directly and in a competitive manner (Krizan and Bushman, 2011), which are shown in narcissistic aggression (Hotchkiss, 2003) and interpersonal relationships of grandiosity, produce envy (Pincus and Lukowitsky, 2010). For example, self-centered and narcissistic individuals seeking self-promotion tend to ignore others’ needs and frustrate their followers. Therefore, followers may experience destructive, malicious envy toward such individuals (Braun et al., 2016).

It is expected that those viewing others’ grandiosity may experience malicious envy, motivating them to avoid and distance themselves from those who post grandiose Facebook content. In contrast, benign envy, which makes people aspire to approach the subject earnestly and to be in the same group or to have the same status, will decrease as levels of grandiosity increase.

Second, the type of pride expressed by an envied person (i.e. authentic vs hubristic) may determine the type of envy generated. If people feeling envy perceive the envied person’s posted outcomes (achievements, possessions, etc.) as authentic pride based on accomplishments and confidence, a socially desirable affective status, they may experience benign envy as likability increases. Conversely, if people feeling envy believe that the envied person shows hubristic pride through high levels of grandiosity and arrogance, they may experience malicious envy and a desire to destroy the envied person’s superior status because they see the envied person as dominating and controlling (Lange and Crusius, 2015b).

Last, Facebook has the detrimental effect of making people feel that others are better off than they are. Prior research has suggested that people are more likely to experience negative emotions and to lower their positive self-view when there is an increase in upward comparison information (Vogel et al., 2014). Moreover, grandiose information on Facebook that may deplete one’s positive self-view can be perceived as unfair or undeserved. Therefore, those who view the grandiosity of narcissistic Facebook users are likely to experience either malicious or benign envy depending on whether they perceive the narcissists’ superiority to be fairly earned. More importantly, it is likely that these two types of envy produce different outcomes on Facebook users’ psychological well-being. Based on this presumption, we hypothesized as follows:

\[ H2a. \] The higher a post’s grandiosity, the stronger malicious envy a viewer feels.

\[ H2b. \] The higher a post’s grandiosity, the weaker benign envy a viewer feels.

2.2.1 Envy and loneliness. Previous literature on the relationship between envy and goal pursuit has demonstrated that benign envy is closely related to hope for success while malicious envy is linked to fear of failure (Lange and Crusius, 2015a). In a similar vein, people use emotions when they need to approach or avoid others (i.e. social affiliation and social distancing) (Fischer and Manstead, 2008). For instance, one can intentionally distance oneself from others or groups by expressing anger or contempt to protect one’s self-concepts (Fischer and Manstead, 2008). Specifically, when Facebook users perceive other users’ peculiar behavior on Facebook as narcissistic grandiosity, they may have either an approach or an avoidance goal for their current relationships with those expressing grandiosity. Because benign envy is inherently connected to an approach motivation, it is possible that benign envy evoked by other users’ grandiose Facebook posts activates an approach goal. Thus, those who feel benign envy would view grandiose information in a positive way and might want to keep interacting with the superior others or pursuing companionship with them (Gable, 2006). In contrast, malicious envy would tend to activate an avoidance goal in a social setting. People who see other Facebook users’ grandiose posts view such information negatively, and thus, they may want to discontinue further social interactions with them on Facebook (Gable, 2006).
Once an avoidance goal is activated, the behavioral consequences on Facebook might be unfriending those showing high levels of grandiosity. Moreover, seeing others’ Facebook pages full of grandiosity, people might feel that they are losers and such thoughts might get stronger (Blease, 2015). Users resort to unfriending to protect themselves from “aggressive” behaviors, such as overemotional messages and bragging, among other threatening actions by narcissists (Rusbult et al., 1991). Indeed, recent research supports this postulation. Peña and Brody (2014) proposed that the hiding and unfriending process is stimulated when Facebook users are exposed to information from others that overemphasizes social and physical attraction. Additionally, people who feel malicious envy do not want to be in the company of others. They do not wish to be with others who make them feel negative emotions, so they are likely to distance themselves from the dissociative reference group (White and Dahl, 2007). The persistence of a negative relationship due to envy triggers dissatisfaction with the group or withdrawal from relationships, and it can stimulate loneliness (Smith and Kim, 2007).

In sum, if people perceive grandiosity from other Facebook users’ excessive narcissism and feel malicious envy, they will use an avoidance strategy (e.g. unfriending or distancing). This might further isolate them from social relationships and, thus, increase the likelihood of experiencing loneliness. Conversely, people experiencing benign envy will not necessarily perceive other Facebook users’ grandiosity as negatively as those who feel malicious envy. Thus, they will not disconnect from those users but remain Facebook friends, which might not influence their feelings of loneliness. In other words, our theoretical examination suggests that grandiosity will increase malicious envy and decrease benign envy. Therefore, when the social functions of each envy type are considered, the causal relationship with loneliness will be established as follows:

\[ H2c. \] The stronger malicious envy a viewer feels, the lonelier a viewer feels.

\[ H2d. \] The weaker benign envy a viewer feels, the lonelier a viewer feels.

2.3 Para-social and social relationships as contextual moderators

A para-social relationship refers to a relationship forged with a media character, news anchor, show host, or celebrity. This type of relationship can be reinforced by shared experiences or interactions with these public figures (Horton and Wohl, 1956). The basic characteristics of a para-social relationship are a lack of intimacy and non-mutual, one-sided, and non-dialectical communication (Tsay and Bodine, 2012). Because direct social interactions are becoming scarce nowadays (Cohen and Metzger, 1998), the proportion of para-social relationships is increasing to the point of their substituting for reciprocal social relationships. This is because people still want to feel a sense of belonging through para-social relationships. Furthermore, they are able to maintain a positive social identity although these relationships are fake and superficial (Derrick et al., 2008). Another advantage of para-social relationships is that they are safe relationships in the sense that people can reduce the cost of friendship (Derrick et al., 2008). However, researchers also view these types of relationships as pathological and maladaptive (Tsay and Bodine, 2012) because they are image-based or “quasi” relationships (Giles, 2002). We believe that the point of maladaptation is triggered in the process of social comparison that people experience in para-social relationships.

It is important to note that the target of social comparison that can stimulate envy has changed as information technologies such as social media have allowed us to have a large number of para-social relationships. In social comparison studies, it has been presumed that the comparison subjects are similar to their own selves (Gastorf and Suls, 1978). People tend to believe that people with the same abilities should achieve the same levels of success. It is not
expected that people with different characteristics will accomplish the same level of success; therefore, comparisons are not made between dissimilar people (Williams, 2006). However, nowadays, people constantly compare themselves with the models they see in advertisements, window displays, and websites. Targets of comparison are now not only well-known celebrities; they include a range of people, from those who are similar to us and well known to those who are anonymous and not well known (Belk, 2008). From a traditional perspective, SNS has transformed the para-social relationship with mass media figures into fake, counterfeit, unilateral “SNS friendships” (Baek et al., 2013, p. 513). Such shallow relationships can be easily formed on Facebook without a direct “offline” interaction. When para-social relationships have similar interactions to face-to-face relationships, individuals use the same or very similar cognitive processes for them (Bargh, 1988). Now, the question is not simply whether the comparison subject is close and similar to oneself. Taking into account these two polarizations – whether an individual is in a reciprocal or para-social relationship with others – the differences in where the relationship with the comparative subject has been formed should be considered. Due to differences between para-social and reciprocal relationships, Facebook users’ emotional responses to other users’ narcissistic grandiosity might vary depending on which relationship is present, and thus, each one’s impact on loneliness might also vary. Specifically, we believe that people may experience either benign or malicious envy depending on the nature of their social relationships.

To understand how Facebook users’ para-social relationships influence their emotional responses and behaviors, it is important to consider the conditions under which passive following (Krasnova et al., 2013) on Facebook is strengthened. Passive following is a dominant activity on Facebook and arises when users scroll through newsfeeds, follow their friends’ communications, or check others’ profiles (Wise et al., 2010). Compared with a social relationship, a para-social relationship is a passive following situation and induces circumstances that can trigger envy (Krasnova et al., 2013). Importantly, previous research has suggested that envy is more strongly evoked when one’s resources for coping with self-threat are limited (Crusius and Mussweiler, 2012). In a para-social relationship, a viewer does not have enough social information collected from an active and reciprocal relationship with other users. This may inhibit a viewer from making an appropriate judgment on whether other users’ grandiose possessions or achievements are fairly obtained. More importantly, such judgment may determine a viewer’s emotional response to grandiose Facebook posts. In other words, when a viewer has limited relational information on SNS, his or her negative emotional responses are evoked by grandiose Facebook posts only, suggesting that a viewer is likely to feel malicious envy. Moreover, because reciprocal relational information on others is limited due to passive use, malicious envy is likely to be strongly experienced from the same level of grandiosity reflected on other users’ Facebook posts. On the contrary, it is not likely that a viewer with enough relational information experiences the same type of envy. Based on this point of view, we propose that one’s emotional response (i.e. either benign or malicious envy) can be largely determined by the nature of social relationships. Therefore, in the current study, we postulate that the mediation effect of envy between grandiosity and loneliness will be stronger when it takes place in a para-social relationship. Under the “illusion of a face-to-face relationship” (Horton and Wohl, 1956, p. 125) and fake friendships (Merton et al., 1946) on Facebook, it is hard to forge a true relationship because no reciprocity and authenticity exists between the audience and the performer. Consequently, unsatisfactory aspects of life such as loneliness and alienation are likely to be produced from these relationships (Baek et al., 2013). Based on this theoretical discussion, we hypothesized the following:

**H3.** The type of social relationship will moderate the relationship between grandiosity and loneliness via envy. Specifically, the mediation effect of envy (both benign and malicious) will be stronger in para-social relationships than in social relationships.
Figure 1 summarizes our hypotheses. We first hypothesized that the effect of grandiosity via each type of envy (i.e. benign vs malicious envy). We then tested a moderating role of social relationships (i.e. para-social vs social relationship) and the effect of grandiosity on loneliness via different types of envy.

3. Methods

3.1 Participants and procedures

The main objective of the current study was to investigate how observing others’ grandiose behaviors on Facebook influences individuals’ feelings of loneliness. We proposed that this relationship is mediated by the feeling of envy. We further postulated that the social relationships that participants have with other Facebook users play a key role in their feeling either malicious or benign envy. Therefore, the current study employed a 2 (levels of grandiosity: high vs low) × 2 (social relationship: para-social vs social) between-subjects design. Upon agreeing to participate in the study, the participants were informed that they would be asked to provide information about their personal experiences on Facebook. After completing the study, they were appropriately compensated for their participation. No conflicts of interest were reported. An *a priori* power analysis using G-Power software showed that the study needed at least 251 participants to have 95 percent power to detect a medium effect (partial $\eta^2 = 0.06$). Thus, 255 participants recruited from Amazon Mechanical Turk completed the survey ($M_{age} = 31.14$, SD = 9.502; 42 percent female).

3.2 Manipulations

To test our hypotheses, we manipulated both levels of grandiosity (high vs low) and types of relationship (para-social vs social) through a short writing task. Across all conditions, we provided a short scenario and asked participants to imagine a described situation as vividly as possible. We manipulated the levels of perceived grandiosity by describing a person who posted about his or her possessions or experiences in two different ways. In the high grandiosity condition, we described a user whose possessions or experiences were exaggerated in their Facebook posts. Also, we portrayed him or her as a person who tended to show off his or her possessions or experiences (see Appendix 1 for details). In contrast, for the low grandiosity condition, we described a user as a person whose Facebook posts reflected his or her “real life” and personality. Furthermore, we described this person as someone who did not show off possessions or experiences on Facebook.

![Figure 1. Theoretical model](image)
Next, we manipulated the types of relationships between the participants (observers) and the other users (i.e. narcissistic grandiose users) by giving them information about a para-social (vs social) relationship on Facebook. Specifically, we asked participants to imagine a person with whom they did not (vs did) have a direct social interaction. After reading the scenario, the participants were asked to describe a similar situation including what they felt and how they reacted to the experience. Once they finished the manipulation task, they were asked to complete a survey containing several questionnaires.

3.3 Measurements
As a manipulation check, we used the narcissistic grandiosity scales from the Pathological Narcissism Inventory (PNI) to measure levels of grandiosity (Lukowitsky and Pincus, 2013). The original PNI includes 52 items, but we selected seven items related to the construct of narcissistic grandiosity because we believed these items could capture how a Facebook user perceives the grandiose characteristics used in the present study (see Appendix 2 for details). Specifically, the participants were asked to rate each statement on a seven-point scale (1 = strongly disagree, 7 = strongly agree) (e.g. “X often fantasizes about being recognized for X’s accomplishments” and “X often fantasizes about being rewarded for his or her efforts”). The summed items showed good reliability (Cronbach’s α = 0.924). To measure the social relationship between the participants and the person they imagined, we asked them to rate how much they agreed with six statements adopted from previous research (Baek et al., 2013; Ballantine and Martin, 2005; Giles, 2002) that describe the quality of social relationships (e.g. “X and I have a relationship with each other through the exchange of news on Facebook”; 1 = strongly disagree, 7 = strongly agree). We summed the participants’ responses to the six items (Cronbach’s α = 0.724). These two summed scores were used for the manipulation check.

Five items were used to measure the participants’ levels of loneliness (Baek et al., 2013). We selected these items because all five directly tap into participants’ feelings of loneliness while using Facebook. Participants were asked to rate how often they felt the way described in each statement (e.g. “When using Facebook, I feel isolated from others” and “Facebook friends are not ‘with’ me”). Responses ranged from 1 (not often at all) to 7 (very often) and were summed (Cronbach’s α = 0.839). We then assessed the two types of envy (i.e. malicious and benign) with ten items that have been prevalent in previous research (Lange and Crusius, 2015a). Malicious envy was measured by asking the participants to rate how much they agreed with five statements (e.g. “I wish that superior X loses their advantage”; 1 = strongly disagree, 7 = strongly agree). Benign envy was also measured with five statements (e.g. “If X has superior qualities, achievements, or possessions, I try to attain them for myself”; 1 = strongly disagree, 7 = strongly agree; see the Appendix 2 for details). These items were summed and showed good reliability (Cronbach’s α = 0.900 for malicious envy; Cronbach’s α = 0.897 for benign envy).

4. Results
4.1 Preliminary analysis
We conducted a series of analyses of variance (ANOVA) on both the levels of grandiosity and the type of relationship. The results confirmed that there was a significant difference in the level of grandiosity based on our manipulation (Mlow grandiosity = 4.226, SD = 1.486; Mhigh grandiosity = 5.502, SD = 1.131; F(1, 251) = 59.774, p < 0.001, η² = 0.192). For the type of relationship, we found a significant difference between the two groups (Mpara-social = 3.048, SD = 1.156; Msocial = 4.464, SD = 1.049; F(1,251) = 106.213, p < 0.001, η² = 0.297). In addition, there was no significant interaction effect between the two factors of both constructs (i.e. the levels of grandiosity (F(1,251) = 0.021, p = 0.884) and the type of
relationship \((F(1, 251) = 0.724, p = 0.396)\). Taken together, these results indicate that our manipulations for each experimental condition were successful (Table I).

Second, to decide what, if any, demographic control variables to include in the model testing, we examined bivariate correlations among the variables of interest with two demographic variables (age and gender). Because there were significant correlations among the tested variables (Table II), we controlled age and gender in all subsequent analyses. Furthermore, as expected, we observed significant correlations among the variables of interest in our data. For instance, the levels of grandiosity and envy were inter-correlated in the predicted direction. The correlation between malicious envy and loneliness was in line with our prediction. However, we found a positive correlation between benign envy and loneliness, which was the opposite of our expectation. Nevertheless, these correlations do not reflect causal relationships, so it is important to carefully verify the causal relationships among the variables (Table III).

<table>
<thead>
<tr>
<th>Grandiosity</th>
<th>Social relationship</th>
<th>Grandiosity M</th>
<th>SD</th>
<th>Relationship M</th>
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<tr>
<td>Low</td>
<td>Para-social ((n = 61))</td>
<td>4.290</td>
<td>1.427</td>
<td>3.087</td>
<td>1.113</td>
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<tr>
<td></td>
<td>Social ((n = 61))</td>
<td>4.162</td>
<td>1.551</td>
<td>4.628</td>
<td>1.089</td>
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<tr>
<td></td>
<td>Overall ((n = 122))</td>
<td>4.226</td>
<td>1.486</td>
<td>3.858</td>
<td>1.342</td>
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<tr>
<td>High</td>
<td>Para-social ((n = 65))</td>
<td>5.543</td>
<td>1.265</td>
<td>3.010</td>
<td>1.202</td>
</tr>
<tr>
<td></td>
<td>Social ((n = 68))</td>
<td>5.462</td>
<td>0.994</td>
<td>4.316</td>
<td>0.997</td>
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<tr>
<td></td>
<td>Overall ((n = 133))</td>
<td>5.502</td>
<td>1.131</td>
<td>3.678</td>
<td>1.278</td>
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<tr>
<td>Total</td>
<td>Para-social ((n = 126))</td>
<td>4.937</td>
<td>1.481</td>
<td>3.048</td>
<td>1.156</td>
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<tr>
<td></td>
<td>Social ((n = 129))</td>
<td>4.847</td>
<td>1.439</td>
<td>4.464</td>
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<tr>
<td></td>
<td>Overall ((n = 255))</td>
<td>4.891</td>
<td>1.457</td>
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Table I. Means and standard deviations for each group

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<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GR</td>
<td>1</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>2. SR</td>
<td>0.011</td>
<td>1</td>
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<td></td>
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<tr>
<td>3. BE</td>
<td>-0.260**</td>
<td>-0.012</td>
<td>1</td>
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<td>4. ME</td>
<td>0.164**</td>
<td>-0.112</td>
<td>0.443**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5. LO</td>
<td>-0.006</td>
<td>-0.083</td>
<td>0.173**</td>
<td>0.377**</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>6. Age</td>
<td>-0.104</td>
<td>0.005</td>
<td>-0.153*</td>
<td>-0.194**</td>
<td>-0.104</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7. Sex</td>
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<td>0.014</td>
<td>-0.024</td>
<td>-0.077</td>
<td>-0.022</td>
<td>0.170**</td>
<td>1</td>
</tr>
</tbody>
</table>

Table II. Correlations among the variables of interest

Notes: GR, grandiosity level \((-1 = \text{low}, 1 = \text{high})\); SR, social relationship type \((-1 = \text{para-social}, 1 = \text{social})\); BE, benign envy; ME, malicious envy; LO, loneliness. *\(p < 0.05\); **\(p < 0.01\)

Table III. Descriptive statistics for the dependent variables
Last, we conducted two-way ANOVAs on malicious envy, benign envy, and loneliness with the levels of grandiosity and the types of social relationships to confirm a main effect of two variables and the interaction effect before submitting the data to a moderated mediation analysis. The results indicated a main effect of grandiosity on benign envy. Specifically, participants' scores on benign envy in the low grandiosity condition were higher than those in the high grandiosity condition ($M_{low} = 3.525$ vs $M_{high} = 2.693; F(1, 249) = 21.709, p < 0.001, \eta^2 = 0.080$). Additionally, as predicted, participants reported higher malicious envy scores in the high grandiosity condition as compared with those in the low grandiosity condition ($M_{low} = 2.077$ vs $M_{high} = 2.555; F(1, 249) = 5.658, p = 0.018, \eta^2 = 0.022$). There was no significant main or interaction effect on loneliness. However, we observed a significant covariate effect of malicious envy on loneliness when we entered both malicious and benign envy as covariates ($F(1, 247) = 31.183, p < 0.001$). This may imply that the effect of grandiosity on participants' levels of loneliness on Facebook is mediated by malicious envy.

4.2 Statistical analysis
We first utilized multiple mediation analyses using the PROCESS macro to test $H1$ and $H2$ (Model 4; Hayes, 2013). This procedure estimates the total direct and indirect effects of a predictor on a dependent variable via a mediator. We quantified the direct effects of grandiosity level on loneliness and the indirect effects mediated by benign or malicious envy. We further examined conditional indirect effects using moderated mediation analysis to see whether there was a moderating role of relationship types in our model (Model 7; Hayes, 2013). Bootstrapping provides an index of moderated mediation for each mediator-mediator relationship. If $0$ is not present in the 95% bias-corrected confidence interval, the index of moderated mediation is considered significant. As recommended, we used 10,000 bootstrapped samples for all analyses (Hayes, 2013). Age and gender were included as covariates in all models to control for the influence of demographic factors on support for the hypotheses[1].

4.3 Testing the mediating role of malicious (vs benign) envy
As expected, grandiosity showed a significant positive effect on malicious envy, indicating that $H2a$ was supported ($b = 0.210, p = 0.020$). However, it had a significant negative effect on benign envy, supporting $H2b$ ($b = -0.446, p < 0.001$). We tested the direct effect of grandiosity on loneliness, but the results indicated no significant direct effect ($b = -0.024, p = 0.719; H1$ rejected). The results revealed that malicious envy positively influences loneliness ($b = 0.393, p < 0.001$), but benign envy does not ($b = -0.020, p = 0.757$). Thus, we could accept $H2c$, but not $H2d$. More importantly, we observed a mediation effect of malicious envy on the effect of grandiosity on loneliness (Indirect effect$^{malicious\ envy} = 0.057, SE_b = 0.026, 95\% CI (0.011, 0.114))$ (Table IV).

4.4 Testing the moderating role of social relationships (para vs social relationships)
We hypothesized that malicious and benign envy would show stronger mediation effects in the para-social relationship condition compared with the social relationship condition ($H3$). To compare the mediating role of malicious and benign envy based on the type of social relationship, we conducted a moderated mediation analysis using the PROCESS macro (Model 7; see Table V). Unfortunately, we could not find any significant interaction effect between the level of grandiosity and the type of relationship on either malicious or benign envy ($b_{malicious\ envy} = -0.032, SE = 0.089, 95\% CI (-0.280, 143); b_{benign\ envy} = 0.184, SE = 0.096, 95\% CI (-0.064, 0.373)). Further, the moderated mediation index confirmed that the type of social relationship did not moderate the proposed mediation model (Mediator$^{malicious\ envy} = -0.025, 95\% CI (-0.166, 0.112); Mediator_{benign\ envy} = -0.007, 95\% CI (-0.076, 0.040)). Therefore, we rejected $H3$.
5. Conclusion

5.1 Discussion

Overall, the results suggest that grandiosity does not directly stimulate loneliness. However, in the present research, we proposed that, after exposure to other Facebook users’ grandiosity, a social comparison process evoking either benign or malicious envy would increase viewers’ feelings of loneliness. Our results show that the mediation effect of malicious envy exists between perceived grandiosity and loneliness. Perceived grandiosity from other Facebook users stimulates the user’s malicious envy, which increases his or her loneliness. Though we postulated that grandiosity may reduce benign envy and thus increase feelings of loneliness, our data only partially supported this argument. That is, we found a significant negative effect of grandiosity on benign envy, but this decreased envy did not affect participants’ loneliness. In summary, it seems that a Facebook user’s narcissistic grandiosity can cause other users’ loneliness. This is because malicious envy increases, evoked by another user’s grandiosity.

Our data did not qualify the proposed moderated mediation effect based on type of social relationship. Therefore, it was impossible to directly compare the path from grandiosity to loneliness via either malicious or benign envy as a function of the type of social relationship involved. There are a few possible reasons why we could not find a significant moderating effect of the type of social relationship. Though Facebook users may recognize a difference between para-social and social relationships, they may not distinguish this in their responses to other users’ Facebook posts. When we compared the moderated mediation to the mediation analysis, from a statistical point of view, the mediation effect of malicious envy, but not the interaction effect, was still valid in two analyses. This might have occurred because of the relatively small sample size in each group, which was too small to detect different effects based on type of social relationship. We believe it might be worth increasing the sample size to interpret the null findings in this study more clearly.

5.2 Implications

Social comparison generated by the use of Facebook was found to have an effect on users’ loneliness through malicious envy. Although a body of research on social media has proposed that Facebook usage positively contributes to psychological well-being via social support, the present research shows that, if social comparison interrupts that process, degradation in well-being is possible. In this process, malicious envy plays a key role. If such phenomena occur on Facebook, which has become a part of our daily lives, they could
### Table V. Index of moderated mediation and summary of moderated mediation model

<table>
<thead>
<tr>
<th>Moderator</th>
<th>Predictors</th>
<th>Outcomes</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Malicious envy</td>
<td>Index</td>
<td>b</td>
<td>SE</td>
<td>CI</td>
<td>Benign envy</td>
<td>Index</td>
<td>b</td>
</tr>
<tr>
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<td>0.212*</td>
<td>0.089</td>
<td>0.036, 0.388</td>
<td>-0.007</td>
<td>-0.446***</td>
<td>0.096</td>
<td>-0.634, -0.256</td>
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<td>SR type</td>
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<td>0.089</td>
<td>-0.037, 0.012</td>
<td>-0.014</td>
<td>0.095</td>
<td>-0.201, 0.174</td>
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<td></td>
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<tr>
<td></td>
<td>Grandiosity×SR type</td>
<td>-0.032</td>
<td>0.089</td>
<td>-0.280, 0.143</td>
<td>0.184</td>
<td>0.096</td>
<td>-0.004, 0.373</td>
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<td></td>
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<tr>
<td>Age</td>
<td></td>
<td>-0.026**</td>
<td>0.001</td>
<td>-0.045, -0.007</td>
<td>-0.031**</td>
<td>0.01</td>
<td>-0.051, -0.010</td>
<td>-0.006</td>
<td>0.009</td>
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<td>Sex</td>
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<td>-0.484, 0.238</td>
<td>0.014</td>
<td>0.197</td>
<td>-0.374, 0.402</td>
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<td>Benign envy</td>
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<td>-0.02</td>
<td>0.065</td>
<td>-0.147, 0.107</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malicious envy</td>
<td></td>
<td>0.392***</td>
<td>0.069</td>
<td>0.256, 0.529</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Notes:** SR, social relationship; Index, bootstrapped index of moderated mediation; b, unstandardized coefficient; SE, standard error. *p < 0.05; **p < 0.01; ***p < 0.001
develop into social relationship issues such as loneliness when the effects are accumulated, even if they act as mild negative factors individually.

This study clearly demonstrated that one can feel (malicious) envy toward narcissistic users showing excessive grandiosity on Facebook and showed that this negative emotion in turn increases loneliness. Though existing studies have examined theories of Facebook usage, social comparison, and malicious envy (Lin and Utz, 2015), this research newly identified in more detail that the process of social comparison induces malicious envy which leads to loneliness and triggering of an avoidance coping strategy. Notably, this “self-selected” avoidance coping mechanism was positively associated with the users’ feelings of loneliness. Additionally, this research was able to clearly find that simply using Facebook did not generate negative results such as depression and loneliness, but such negative results were triggered by the social comparison process.

We believe the present research has several practical implications. First, using an SNS to dispel feelings of loneliness is dangerous, so users must be conscious and pay attention when using Facebook. Specifically, a user should be aware that narcissistic users on Facebook possibly influence his or her emotional well-being via negative emotion evoked by their grandiose Facebook posts. Therefore, to appropriately regulate emotions and protect their positive self-concept (i.e. social selves), Facebook users may need to stay away from narcissistic users’ grandiose information and reduce their frequency of contact with those users.

5.3 Limitations and future study
Though the present research expands our knowledge of how social media contributes to users’ psychological well-being, a few issues require future research. First, how users practically distinguish their social relationships (i.e. para-social vs social) on Facebook should be investigated. For instance, para-social relationships may vary in degree. In this research, a para-social relationship was defined as a unilateral relationship, which was manipulated through experimental scenarios. However, even in a para-social relationship, bidirectional communication might be available. For instance, the quality of the relationship between a celebrity and a layperson is not equal. Nevertheless, for some celebrities, although they are para-social subjects, their psychological distance from users may be reduced because they have more reciprocal interactivity. Hence, a para-social relationship in this case can have an escalated sense of similarity to a social relationship, and such relationships must be contemplated in a more detailed way (Baek et al., 2013).

Second, individual differences, which could determine the effect of social comparison, must be considered. Depending on a user’s self-esteem, social comparison effects may occur differently (Appel et al., 2015). For example, people with low self-esteem may have relatively low self-evaluations when exposed to people conducting high-level social activity. Individuals exposed to those with a stronger upward comparison have shown relatively poorer self-esteem (Vogel et al., 2014). Furthermore, while people with low self-esteem may recognize an SNS as a safe environment in which to express themselves, they might experience aggravated, negative social comparison when exposed to information from others that causes upward comparison. This could result in a vicious cycle in which users’ self-esteem is undermined (Vogel et al., 2014). Therefore, it is worth exploring whether levels of self-esteem determine the direction of social comparison (i.e. upward or downward). In addition, we believe future research could investigate whether self-esteem can determine the intensity and type of envy that people experience by comparing themselves with others on Facebook. Similarly, future work needs to examine whether people with a high (vs low) level of self-esteem feel happier when they see the same group of happy (vs unhappy) people as a consequence of upward (vs downward) social comparison on Facebook.
Lastly, our results may need to be interpreted with caution. Though we used an experimental scenario to induce participants’ envy based on their actual experiences on Facebook, as well as to secure consistency in our research (Robinson and Clore, 2001), future research needs to employ different research methods to further validate our results, such as using a real-world sample or non-scenario methods.

Note
1. When age and gender are not included as covariates, the result of the mediational analysis was not changed from the primary analysis with covariates. For example, the direct effect of grandiosity on loneliness was insignificant ($b = -0.008, p = 0.929$) and the mediation effect of malicious envy on the effect of grandiosity on loneliness was significant (Indirect effect_{malicious envy} = 0.095, 95% CI (0.027, 0.180)); and the result of the moderated mediational analysis was also not changed from the primary analysis. For example, the moderated mediation index confirmed that the type of social relationship did not moderate the proposed mediation model (Mediator_{malicious envy} = -0.020, 95% CI (-0.160, 0.129); Mediator_{benign envy} = -0.006, 95% CI (-0.070, 0.047)).

References
American Psychiatric Association (2013), Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association, Arlington, VA.


Appendix 1. Experimental materials

Instruction: please read the scenario below and imagine a similar situation as vividly as possible.

While using Facebook, you find that someone (1. Social condition type) posted his/her possessions, experiences, and/or achievements (2. Level of grandiosity).

In the box below, please describe a similar situation that YOU might have experienced on Facebook. Specifically, please describe what you felt and how you reacted to the experience.

Note that we will refer to the person who you mention in this task as “X” on the next few screens:

(1) Social relationship types:
- Para-social relationship condition: who you do not have a direct interaction (e.g. you know the person BUT s/he does not know you; non-mutual friends).
- Social relationship condition: who you do have a direct interaction (e.g. you know the person AND s/he knows you; mutual friends).

(2) Levels of grandiosity:
- High grandiosity condition: however, you feel that his/her Facebook posts, such as a photo or text on their wall, are quite inflated. You think s/he tends to overly show off his/her possessions, experiences, or achievements.
- Low grandiosity condition: you feel that his/her Facebook posts, such as a photo or text on their wall, reflect his/her “real” life and personality. You do not think s/he tends to show off his/her possessions, experiences, or achievements.
Appendix 2. Measurements

**SNS loneliness (five items)**
Please indicate the extent to which you agree or disagree with the following statements (1 = strongly disagree; 7 = strongly agree):
- When using Facebook, I feel isolated from others.
- Facebook friends are not “with” me.
- When using Facebook, I feel sometime left out.
- No Facebook friends know the “real” me.
- Facebook relationships are superficial.

**Benign and malicious envy scale (BeMaS; ten items)**
Please indicate the extent to which you agree or disagree with the following statements (1 = strongly disagree; 7 = strongly agree):
- When I envy X, I focus on how I can become equally successful in the future.
- If I notice that X is better than me, I try to improve myself.
- Envying X motivates me to accomplish my goals.
- I strive to reach X’s superior achievements.
- If X has superior qualities, achievements, or possessions, I try to attain them for myself.
- I wish that superior X lose their advantage.
- If X has something that I want for myself, I wish to take it away from him/her.
- I feel ill will toward X I envy.
- Envious feelings cause me to dislike X.
- Seeing X’s achievements make me resent him/her.

**Narcissistic grandiosity measures (seven items)**
Please recall X whom you imagined on the previous screen and provide your honest opinions about the following statements (1 = strongly disagree; 7 = strongly agree):
- X often fantasizes about being recognized for his/her accomplishments.
- X often fantasizes about being rewarded for his/her efforts.
- X often fantasizes about performing heroic deeds.
- X often fantasizes about being admired and respected.
- X often fantasizes about having a huge impact on the world around him/her.
- X often fantasizes about accomplishing things that are probably beyond his/her means.
- X wants to amount to something in the eyes of the world.

**Social relationship (six items)**
Please recall the person who you mentioned earlier again and answer the following questions (1 = strongly disagree; 7 = strongly agree):
- X and I have usual offline relationship.
- X and I have a relationship with each other through the exchange of news on Facebook.
• X and I are friends with each other on Facebook.
• I constantly read news about X via Facebook and X also has news about me via Facebook.
• Usually, I know news about X through Facebook, but X does not know news about me through Facebook.
• I know X, but not vice versa on Facebook.

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