Information Systems Research

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

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To cite this article:
Hanna Krasnova, Thomas Widjaja, Peter Buxmann, Helena Wenninger, Izak Benbasat (2015) Research Note—Why Following Friends Can Hurt You: An Exploratory Investigation of the Effects of Envy on Social Networking Sites among College-Age Users. Information Systems Research 26(3):585-605. https://doi.org/10.1287/isre.2015.0588

Information Systems Research
Vol. 26, No. 3, September 2015, pp. 585–605
ISSN 1047-7047 (print) | ISSN 1526-5536 (online)

http://dx.doi.org/10.1287/isre.2015.0588

Research Note

Why Following Friends Can Hurt You: An Exploratory Investigation of the Effects of Envy on Social Networking Sites among College-Age Users

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Research findings on how participation in social networking sites (SNSs) affects users' subjective well-being are equivocal. Some studies suggest a positive impact of SNSs on users' life satisfaction and mood, whereas others report undesirable consequences such as depressive symptoms and anxiety. However, whereas the factors behind the positive effects have received significant scholarly attention, little is known about the mechanisms that underlie the unfavorable consequences. To fill this gap, this study uses social comparison theory and the responses of 1,193 college-age Facebook users to investigate the role of envy in the SNS context as a potential contributor to those undesirable outcomes. Arising in response to social information consumption, envy is shown to be associated with reduced cognitive and affective well-being as well as increased reactive self-enhancement. These preliminary findings contribute to the growing body of information systems research investigating the dysfunctional consequences of information technology adoption in general and social media participation in particular.

Keywords: envy; self-enhancement; social comparison theory; social media; social networking sites; subjective well-being
History: Radhika Santhanam, Senior Editor; Jason Thatcher, Associate Editor. This paper was received on May 24, 2013, and was with the authors 15 months for 3 revisions.

1. Introduction

Social networking sites (SNSs), such as Facebook (FB) or VKontakte, are common in today's world. With over 1.47 billion members (e.g., eMarketer 2013), they have the potential to transform many aspects of human life.[1] However, research findings on the consequences of SNS participation on users' subjective well-being (SWB)—a universal "measure of the quality of life of an individual and of societies" (Diener et al. 2003, p. 405)—are still equivocal. Some studies suggest a positive association between SNS use and SWB, including improvements in life satisfaction (Valenzuela et al. 2009, Apaolaza et al. 2013) and affect (Lee et al. 2011). Others link SNS participation to undesirable states, such as depression (Pantic et al. 2012), anxiety (Labrague 2014), and narcissistic behaviors (Bergman et al. 2011, Rosen et al. 2013; see Table 1 for a summary).

The mechanisms behind the emergence of positive outcomes have received significant scholarly attention. Particularly active forms of SNS participation, including social interaction and information sharing, have been shown to promote these favorable consequences by triggering social support (Lee et al. 2013), promoting helping behaviors (Wang 2013), and allowing users to self-assert in front of others (Kim and Lee 2011, Tamir and Mitchell 2012). However, despite significant media coverage (e.g., eMarketer 2014, Kramer et al. 2014), the mechanisms behind the unfavorable consequences remain unclear. Yet, understanding their causes is a necessary step on the path to eliminating them.

Several recent reports show that common activity such as following the information shared by others

[1] In this study, we focus on the hedonic type of SNSs designed for private use. Utilitarian platforms, like LinkedIn, are not directly covered by our investigation.

Table 1 Association Between SNS Participation and Users' SWB: Overview of Selected Findings

Effect	Study	Measured SNS activity	SWB-related variables[a] (Relationship)
Favorable association with SWB	Apaolaza et al. (2013)	Usage (time)	Satisfaction with life (+)[b] | Loneliness (−)[b]
	Burke et al. (2010)	Directed communication	Loneliness (−)
	Gonzales and Hancock (2011)	Editing own profile | Viewing self-only profile	Self-esteem (+)
	Kim et al. (2014)	Self-disclosure	Subjective well-being (on an SNS) (+)
	Kim and Lee (2011)	Positive self-presentation	Subjective happiness (+)
		Honest self-presentation	Subjective happiness (+)[c]
	Lee et al. (2011)	Amount of self-disclosure	Affective balance (+) | Satisfaction with life (+) | Affective balance + Satisfaction with life (+)
	Lee et al. (2013)	Self-disclosure	Satisfaction with life (+)[d]
	Lee et al. (2014)	Information sharing	Experiential value (+)
	Locatelli et al. (2012)	Positive status frequency	Rumination (−)
			Depression (−)[e] | Physical symptoms (−)[e] | Satisfaction with life (+)[e]
	Lou et al. (2012)	Intensity of use	Loneliness (−)
	Oh et al. (2014)	Supportive interaction | History of use	Positive affect (+)
	Reinecke and Trepte (2014)	Authentic self-presentation	Positive affect (+) | Negative affect (−) | Satisfaction with life (+)
	Valenzuela et al. (2009)	Intensity of use	Satisfaction with life (+)
	Valkenburg et al. (2006)	Use of site	Satisfaction with life (+)[f]
	Wang (2013)	Sharing	Satisfaction with life (+)
	Wenninger et al. (2014)	Posting | Chatting	Satisfaction with life (+)
Unfavorable association with SWB	Burke et al. (2010)	Content consumption	Loneliness (+)
	Davila et al. (2012)	Time using | Time interacting	Corumination (+)
	Feinstein et al. (2013)	SNS social comparison	Rumination (+) | Depressive symptoms (+)[g]
	Haferkamp and Kraemer (2011)	Exposure to attractive profile pictures	Positive affect (−) | Satisfaction with one's own body (−) | Real–ideal discrepancy (+)
	Kross et al. (2013)	Use (time)	Affective well-being (−) | Satisfaction with life (−)
	Labrague (2014)	Time spent	Anxiety (+) | Depression (+)
	Lee (2014)	Social comparison frequency	Frequency of having a negative feeling from comparison on an SNS (+)
	Locatelli et al. (2012)	Negative status frequency	Depression (+) | Physical symptoms (+) | Satisfaction with life (−) | Rumination (+)
	Pantic et al. (2012)	Time spent	Depression (+)
	Rosen et al. (2013)	General use	Bipolar mania (+) | Narcissism (+) | Antisocial (+) | Compulsive (+) | Histrionic personality disorder (+)
		Impression management	Bipolar mania (+) | Narcissism (+) | Histrionic personality disorder (+)
	Wenninger et al. (2014)	Social information consumption	Satisfaction with life (−)

[a]When applicable, reporting is based on the actual construct operationalization.
[b]Tested as follows: Usage → Socializing (+) → Self-esteem (+) \| Loneliness (−) → Satisfaction with life (+).
[c]Tested as follows: Honest self-presentation → Perceived social support (+) → Subjective happiness (+).
[d]Tested as follows: Self-disclosure → Social support (+) → Satisfaction with life (+).
[e]Tested as follows: Positive status frequency → Rumination (−) → Depression (−) \| Physical symptoms (−) \| Satisfaction with life (+).
[f]Tested as follows: Use of site → Frequency of reactions (+) → Tone of reactions (+) → Social self-esteem (+) → Satisfaction with life (+).
[g]Tested as follows: SNS social comparison → Rumination (+) → Depressive symptoms (+).

may contribute to the proliferation of upward social comparisons (in the sense of Festinger's 1954 social comparison theory) among SNS members and, under certain conditions, feelings of envy (Chou and Edge 2012, Krasnova et al. 2013, Lee 2014). Defined as "an unpleasant and often painful blend of feelings [...] caused by a comparison with a person or group of persons who possess something we desire" (Smith and Kim 2007, p. 49), envy may indeed be present among SNS users as they can easily benchmark themselves in self-relevant domains by following information about each other. Linked to an array of harmful outcomes in terms of SWB in off-line settings (Smith and Kim 2007), envy can therefore be a possible missing link explaining the undesirable impact of SNS use on users' SWB observed in previous research. In addition, envy may contribute to the widespread narcissistic character of information shared on SNSs (Bergman et al. 2011), with self-enhancement working as an envy-coping strategy (Brown and Gallagher 1992, Salovey and Rodin 1988, Yoshimura 2010).

Building on this background, this study focuses on investigating the role of envy as a mediator between use of SNSs and the associated unfavorable outcomes, such as reduced SWB and narcissistic self-enhancement. This study thereby contributes to the growing body of information systems (IS) research that investigates the emotional and cognitive consequences of information technology (IT) adoption (e.g., Beaudry and Pinsonneault 2010, Zhang 2013). More specifically, this study falls within and extends the research domain that addresses the dysfunctional outcomes of IS usage from a sociopsychological perspective (e.g., Koch et al. 2012, Maier et al. 2014, Tsai and Bagozzi 2014). Indeed, in addition to the characteristics of technology that have been shown to cause individual stress in the context of utilitarian workplace IS (e.g., Ayyagari et al. 2011), SNSs have introduced another level of social complexity, as they involve the sharing and consumption of social information among interconnected users as their central artifact (Sundararajan et al. 2013). Referred to as "information about others" (Ramirez et al. 2002, p. 214), social information may contribute to users' SWB-related outcomes due to its unique properties and its ubiquity, which calls for further investigations of the underlying sociopsychological processes.

On the practical side, our study has relevance not only for users but also for SNS providers, as they may want to understand the possible undesirable outcomes for their members as well as the mechanisms behind such outcomes (e.g., Kramer et al. 2014). Indeed, negative experiences may cause users to discontinue their usage (Venkatesh et al. 2011), which threatens platform sustainability—a pivotal issue for any platform provider (Enders et al. 2008).

This paper is structured as follows. In §§2 and 3, we build on Festinger's (1954) social comparison theory to develop a theoretical basis and a model for conceptualizing envy, its antecedents, and its effects in the context of SNSs. In §4, we begin by presenting Study 1, which uses the analysis of qualitative data to demonstrate the prevalence of SNS-induced envy and the objects for which it is particularly pronounced, including specific differences with the traditional off-line context. The findings of Study 1 in turn justify Study 2, in which our theoretical model is tested using the quantitative analysis of survey responses drawn from a sample of college-age SNS users. Together, both studies provide a number of theoretical and practical implications. These, along with limitations of this investigation and scope for future research, are discussed in §5.

We chose college-age SNS users as our study sample for several reasons. First, they represent the largest share of participants on these platforms: for example, 26.2% of FB users in the United States are between 18 and 24 years old (Statista 2015). Second, these young adults may be more vulnerable to envy, especially in the SNS context, considering their developing identities, the importance they attach to social relationships, the uncertainties they face about the future, and the academic stress they are under (Subrahmanyam et al. 2008). Moreover, the "always online" habit widespread among young adults may further exacerbate the unfavorable influences of social media applications (e.g., Ahn 2011, Davies 2012, Turel and Serenko 2012).

2. Theoretical Background: Envy in the SNS Context

2.1. Conceptualization and Theory of Envy

Referred to as a painful emotion promoted by the superiority of privileged others who possess something that one covets (Smith and Kim 2007), envy is an inalienable part of social interactions (Tai et al. 2012). A distinction is often made between three conceptually different types of envy. *Dispositional envy*—a stable individual property—reflects an "individual-difference variable referring to one's general tendency to feel envy" (Cohen-Charash 2009, pp. 2131–2132). By contrast, *episodic envy* takes place as a result of a specific experience between two parties (Cohen-Charash 2009). Taking a broader view, *situational envy* implies an "existing state of multiple unflattering comparisons" originating from a specific environment (Duffy et al. 2012, p. 645) and can be conceptualized as "thinking about one or more other people in relation to the self" (Wood 1996, p. 520). Considering that SNSs represent environments that facilitate online encounters and as a result benchmarking with multiple peers, we adhere to the *situational* conceptualization of envy in our study.

To provide the basis for understanding envy in the context of SNSs, we build on Festinger's (1954) social comparison theory and its extensions. In his seminal work, Festinger (1954, p. 117) posits that "there exists, in the human organism, a drive to evaluate his opinions and his abilities." In its basic form, this motivation can be interpreted as the natural desire to reduce uncertainty (Gibbons and Buunk 1999) and establish one's standing (Brown et al. 2007). Although in some cases self-evaluation can be based on objective information on one's own performance, most often it is made in relative terms in the process of *social comparison* of oneself to others (Festinger 1954, Gilbert et al. 1995). Social comparisons are defined as "comparative judgments of social stimuli on particular content dimensions" (Kruglanski and Mayseless 1990, p. 196). They are a ubiquitous phenomenon, can be both conscious and unconscious, and often arise as a sponta-

neous reaction to social information about the performance of others (Gilbert et al. 1995). Importantly, the social environment may play both a passive and an active role in social comparison processes: whereas in the former case individuals choose the comparisons to engage in, in the latter, social information embedded in the social environment actively imposes social comparisons and thereby can shape individual self-evaluations (Marsh et al. 1985, Wood 1989).

In essence, social comparison implies juxtaposition. Here, research differentiates between upward and downward comparisons (Wills 1981). A downward comparison involves a better performance of oneself relative to the other. At the same time an upward comparison signals superiority of the other party on a particular dimension. Whereas downward comparisons have been shown to be self-enhancing in a variety of situations, upward comparisons are seen as more informative and, hence, more useful (Nosanchuk and Erickson 1985, Wheeler et al. 1969, Wills 1981). Importantly, both downward and upward comparisons may lead to a variety of positive and negative emotional and cognitive outcomes, including SWB, depending on a combination of factors that motivate and underlie a specific comparison (Smith 2000).

Envy is one of the possible negative emotional consequences of an *upward* social comparison. Beyond the overarching condition of target superiority (i.e., upward comparison), state-of-the-art research singles out two additional core conditions necessary to produce envy (Smith and Kim 2007). First, the target of comparison has to be *similar* to oneself, with the degree of similarity influencing the intensity of the arising envy (e.g., Smith and Kim 2007). This is because information on similar others is more diagnostic and, hence, can provide a better benchmark for one's relative standing (Gilbert et al. 1995). In support of this claim, research finds close friends and acquaintances at the top of the most common envy targets (Hill and Buss 2006). Second, the superior performance should be in the domain *relevant* for one's self-definition (Salovey and Rodin 1991); only then can a specific social comparison resonate with one's sense of self-worth and thereby generate the feelings of envy (Tesser 1980, 1988; Smith 2004). The importance of self-relevant domains may be particularly pronounced for young adults, because they are more likely to have already defined those areas, as opposed to, for example, children (Bers and Rodin 1984). In summary, the *superiority* of the referent (upward social comparison), the *similarity* between parties, and the self-definitional *relevance* of the focal domain (object of envy) may determine the presence and intensity of envy perceived by the subject.

As such, envy may be associated with an array of undesirable SWB-related consequences,[2] including depression (e.g., Gold 1996, Smith et al. 1999), feelings of inferiority (e.g., Parrott and Smith 1993, Smith et al. 1999), anxiety (e.g., Cohen-Charash 2009), and reduced happiness (e.g., Smith et al. 1999). Pressured by the unpleasant and painful state of envy, subjects may experience a natural urge to restore balance by adopting an array of *envy-coping strategies*.[3] By and large, these coping strategies have a self-defensive nature, with an envious person trying to overcome or respond to invidious emotions (Elster 1998) by, for example, hurting or degrading the target (e.g., Cohen-Charash 2009, Salovey and Rodin 1984) or by self-enhancement (e.g., Yoshimura 2010). Building on these insights, the unique role of SNSs in promoting envy is discussed in §2.2.

2.2. Sources of Envy on SNSs

Since envy has been linked to a variety of unfavorable outcomes in off-line social settings (Smith and Kim 2007), it may also be an important factor behind the undesirable consequences associated with SNS use reported in past research (e.g., Labrague 2014). Two major closely related yet different types of SNS activities should be distinguished in this regard: *social information sharing* and *social information consumption* (e.g., Burke et al. 2010, Koroleva et al. 2011). Together, these activities revolve around social information on an SNS, which is defined as information about others, including user-related news, facts, and opinions that are typically expressed in the form of status updates, photos, and conversations (Burke et al. 2010, Ramirez et al. 2002). In this context, *social information sharing* reflects an *active* creation of social content by users (about themselves and their environment), involving such activities as content broadcasting and interaction. By contrast, *social information consumption* is *passive* in nature and takes place when users follow updates and interaction of others (e.g., SNS friends), browse through the web of interconnected users, or examine the profiles of others on an SNS.[4] Since

[2] See Table A.1 in Online Appendix A (available as supplemental material at http://dx.doi.org/10.1287/isre.2015.0588) for a summary.

[3] See Table A.2 in Online Appendix A for a summary.

[4] *Social information sharing* has been mainly linked to positive outcomes (Wang 2013, Kim et al. 2014). At the same time, although evidence remains equivocal (Wise et al. 2010, Koroleva et al. 2011), most studies focusing on *social information consumption* find a negative association between this type of use and users' SWB (Burke et al. 2010, Wenninger et al. 2014). Moreover, being the dominant activity on SNSs (Constine 2012), *social information consumption* may also contribute to the unfavorable outcomes associated with the "general participation" on SNSs (often operationalized as the "time spent" on an SNS; e.g., Labrague 2014, Kross et al. 2013), as shown in Table 1.

Table 2 Mapping Envy-inducing Characteristics of Social Information to Functionalities of SNSs

Envy-inducing characteristics of social information shared on SNSs	Examples of enabling functionalities of popular SNSs[a]	Empirical evidence for the presence of the envy-inducing characteristics in social information shared on SNSs
Superiority of the sender	• Asynchronous communication (e.g., via "post," "edit," "hide," "remove," and "untag" features of FB, VKontakte, Sina Weibo) allows for a well-thought-out strategy for profile construction and induces a high level of control over the content (Ellison et al. 2006, Toma and Hancock 2013) (F1, F2) • "One-to-many" communication to a self-selected audience on SNSs (e.g., FB, VKontakte, Sina Weibo) motivates users to "put their best foot forward" (Leary and Kowalski 1990; Toma and Hancock 2013, p. 322) (F2, F3)	• Emphasis is placed on projecting identities that are socially desirable (Zhao et al. 2008) • Majority of posted FB profile pictures are appropriate and posed (Hum et al. 2011) • Narcissistic users share self-promoting content, emphasize attractiveness and sexiness in their appearance on SNSs (Buffardi and Campbell 2008) • Content is posted consciously to portray a specific image, to impress peers (Peluchette and Karl 2009) • FB is not a preferred channel for articulating negative feelings (Leung 2013)
Similarity between the sender and the audience	• Functionality to search (F2) for users from the same school, university, or with similar interests directly or by traversing through contact lists (F4) (e.g., FB, VKontakte, Sina Weibo) • "People You May Know" feature of FB promotes links based on "Mutual Friends" (F3) • The "EdgeRank" functionality of FB ensures that friends' posts will be displayed more often in user's news feed (EdgeRank 2015) (F2, F3)	• Majority of FB friends have some common background with a focal user (Hampton et al. 2011) • Peers are the desired audience on an SNS (West et al. 2009) • Friend requests originate (among others) from close friends, former school friends, and family members on FB (Lewis and West 2009)
Relevance of the information to the audience	• Functionalities to share verbal and visual content (e.g., "about me," "interests," status updates, comments, photos, videos, locations) on most SNSs (e.g., FB, VKontakte, Sina Weibo) (F1) • Audience control features (e.g., "friends," "public," "custom") allow to fine-grain the receiving audience on most SNSs (e.g., FB, VKontakte, Sina Weibo) (F2, F3)	• Content in which friends are interested in is shared on an SNS profile (Livingstone 2008) • Women portray themselves as attractive and affiliative (Manago et al. 2008)—objects of importance for females off-line (DelPriore et al. 2012, Manago et al. 2008) • Men depict themselves as strong and powerful (Manago et al. 2008)—objects of importance for males off-line (DelPriore et al. 2012, Manago et al. 2008)

[a]Kane et al. (2014, p. 280) proposed four core functionalities: digital profile (F1), search and privacy (F2), relational ties (F3), and network transparency (F4).

processing of social information represents a necessary precondition for social comparison and envy feelings (Festinger 1954, Salovey and Rodin 1991), in this study, we specifically focus on the effects of *social information consumption* on envy and, as a consequence, on SWB and the envy-coping strategies of SNS users.

Envy has been found to flourish in groups where a lot of information about other members is available (Duffy and Shaw 2000). Indeed, by engaging with content shared by others, SNS users expose themselves to a social environment that is characterized by high transparency of social contacts and information, which may generate a variety of unflattering upward social comparisons that may in turn produce envy (Festinger 1954, Salovey and Rodin 1991, Wood 1989). We argue that the core functionalities offered by current constantly evolving SNSs (broadly referred to as *social media networks* by Kane et al. 2014)—digital profile (F1), search and privacy (F2), relational ties (F3), and network transparency (F4) (Kane et al. 2014, p. 280)—may promote the proliferation of envy-inducing social information on these sites. Specifically, social information shared on SNSs may exhibit characteristics that comply with the conditions critical for envy to emerge (see §2.1): *superiority* of a *similar* comparison target in a domain that is *relevant* to the self. Table 2 provides some examples of how envy-inducing characteristics of social information can be associated with the core functionalities of these platforms.

Specifically, the presentation of a *superior* picture of the self is promoted by the ability to construct one's profile in an asynchronous mode (F1). These self-constructed profiles are likely to emphasize preselected visual images and thoughts (Ellison et al. 2006), with expressions being "given" rather than "given off" (Goffman 1959, p. 4, Boyd and Ellison 2007). For example, the majority of profile pictures on FB are posed (Hum et al. 2011). Additionally, the plethora of control mechanisms over the shared content (F2) further empowers users in their efforts to project their

desirable identity. These effects may be further reinforced by the fact that sharing on SNSs takes place in front of a large self-selected audience (F2, F3), which promotes subjective self-awareness, motivating users to present their best sides (Leary and Kowalski 1990). Together, these forces may lead to the perceptions of superiority of the sender. Particularly young adults have been observed to engage strongly in self-presentation on social media, signaling the establishment of these communication patterns as norms in their subculture (Bergman et al. 2011).

Likewise, the condition of *similarity* between senders and recipients of social information on SNSs is promoted by offering users facilitated approaches to identify and articulate a set of others with whom they share a relational connection (F3; e.g., by using friending mechanisms such as the "People You May Know" feature). Additionally, the search algorithms integrated on SNSs (F2) and the ability provided to traverse existing connections (F4) facilitate the discovery of similar others. For example, Hampton et al. (2011) reveal that 22% of contacts in an average FB friend list attended the same high school, and 9% are college friends. These effects may be especially pronounced among young adults, because they attach significant importance to their circle of friends (Subrahmanyam et al. 2008).

Finally, the creation of social information that is *relevant* to the receiving audience is supported by the ability to create a unique user profile (F1) that is visible to the ecosystem of preselected similar "friends" (F3), and can be further strengthened by the mechanisms of audience control that allow users to further refine who gets access to the shared content (F2). This is because the self-concept of the sender and values of the receiving audience are defining for impression management activities (Leary and Kowalski 1990), and hence will be reflected in the profile construction activities and sharing of the sender on an SNS. Indeed, since similar people are likely to have a comparable view of what defines a desirable self-concept, shared content is likely to be relevant for both the sender and the self-selected audience. At the same time, the importance attached to the values of this audience implies that a sender will aim to ensure value-compatible relevance for the recipients when sharing on an SNS. For example, young adults were shown to share content on their social and romantic relationships, special occasions, and unique locations (Strano 2008)—all objects of interest and relevance to this age group at this stage of their development (Feather and Sherman 2002, Hill et al. 2011).

As supported by the empirical evidence summarized in Table 2, these special characteristics of social information shared on SNSs (i.e., the *superiority* of a *similar* target in a *relevant* domain) appear to hold significant envy-inducing potential. Building on this foundation, a theoretical model is proposed in §3, positioning envy as a focal construct in the relationship between social information consumption and SWB as well as between social information consumption and self-enhancement as an envy-coping strategy.

3. Hypotheses Development

3.1. The Role of Social Information Consumption in Producing Envy on an SNS

The social environment, and hence the social information that is elicited as a user interacts with it, has been shown to actively trigger social comparisons, including ones with a negative impact on individual self-evaluation (Wood 1989). This is especially relevant for younger users, who form their identity based on a process of observation and imitation in social contexts (e.g., Thompson 2013) and therefore are "involved in a culture of incessant social comparison, self-evaluation and perpetual enhancement of projected identity messages" (Doster 2013, p. 277). Supporting this claim, Marsh and Parker (1984) find that children in better schools had lower self-esteem than those from weaker schools. Apparently, the social environment in privileged schools was imposing higher reference levels, leading to less satisfaction with oneself. Just like attending a stronger school, getting exposed to narcissistic self-presentations of others on an SNS makes it difficult to avoid feeling envious, because imposed unflattering social comparisons force a user to benchmark oneself against the mass of relevant "achievements" reported by others (Krasnova et al. 2013, Smith and Kim 2007, Tandoc et al. 2015). For example, Chou and Edge (2012, p. 3) find that users who spend more time on an SNS are more likely to agree that others have "better lives" and are "happier." Providing further support to this claim, Haferkamp and Kraemer (2011) demonstrate that perceptions of oneself, such as body image, are likely to suffer if one is exposed to the profiles of attractive others in the SNS-related context. Therefore, since higher engagement in social information consumption[5] increases the risk of envy-inducing information encounters, these users will be more prone to the resulting experience of envy beyond their personal predispositions.

Hypothesis 1 (H1). *The intensity of social information consumption on an SNS is positively associated with envy experienced on an SNS.*

[5] Please note, we use "social information consumption" as a proxy for the likelihood of unfavorable upward social comparisons with similar others in self-relevant domains on SNSs. See also Table 2 linking envy-inducing characteristics of social information to functionalities of SNSs.

3.2. The Role of Envy on an SNS in Influencing Users' Subjective Well-Being

Spanning such key notions as happiness, self-fulfillment, and life satisfaction, SWB is defined as "a person's cognitive and affective evaluations of his or her life" (Diener et al. 2009, p. 187). The cognitive component of well-being reflects a rational, "from-the-head" response, and is often equated with life satisfaction—"a global summary of one's life as a whole" (Diener 1994, p. 107). This judgment-based premise of life satisfaction stands somewhat in contrast to the fleeting nature of affective experiences, including feelings, "from-the-heart" sentiments, positive and negative affect, level of happiness, and moods, which together provide the basis for affective well-being (Diener 1994, Diener et al. 2003).

So far, research investigating the link between SNS use and SWB has provided some evidence on the negative association between social information consumption on an SNS and both affective and cognitive components of SWB (e.g., Burke et al. 2010, Haferkamp and Kraemer 2011, Wenninger et al. 2014; see Table 1). However, there is little clarity on the underlying nature of these observed effects. Since past research on envy has provided solid evidence on the detrimental impact of envy on individual well-being (see Table A.1 in Online Appendix A), we argue that feelings of envy can indeed be an important factor explaining the undesirable SWB-related outcomes registered in the SNS context (Smith and Kim 2007). Particularly for young adults, these processes are likely to be pronounced, because envy reaches its peak during reproductive years (Hill and Buss 2008), and younger users have limited experience in coping with its detrimental consequences (Salovey and Rodin 1988, Smith and Kim 2007).

Indeed, reflecting "the perceived discrepancy between aspiration and achievement" (Campbell et al. 1976, p. 8), life satisfaction may be undermined by envy. This is because envious emotions imply a gap between what one desires for oneself and "how little" one has accomplished in contrast to a comparison target (Smith et al. 1999). Moreover, envy feelings often imply that the desired object is out of reach, even though an envying subject is able to imagine possessing this desired attribute—a state described as "frustrated longing" (Smith 2004, p. 46). Together, these evaluations may negatively tap into cognitive processes that form individual evaluations of life satisfaction (Pavot and Diener 1993). For example, envy-induced stress has been shown to "deplete limited self-regulatory resources" of experiment subjects (Hill et al. 2011, p. 653) and reduce their life satisfaction (Smith et al. 1999).

Hypothesis 2 (H2). *Envy experienced on an SNS is negatively associated with users' cognitive well-being.*

Affective perceptions are equally vulnerable to the feelings of envy. Smith (2004) argues that envy may transmute into a variety of emotional outcomes, depending on individual responses to inferiority feelings and social constraints imposed on envy expression. For example, in off-line settings, feelings of envy have been associated with such undesirable emotional outcomes as frustration (van de Ven et al. 2009), resentment (Smith et al. 1999), mood disturbance (Cohen-Charash 2009), and emotional pain (Tai et al. 2012). Even when subjects are reluctant to admit to envy (Farber 1966, Schoeck 1969, Silver and Sabini 1978), its painful consequences may manifest themselves in negative affective reactions, such as feelings of ill will and hostility (Smith 2004). Moreover, since affective reactions tend to reflect responses to immediate impulses (Pavot and Diener 1993), they may be particularly susceptible to envy-inducing social comparisons experienced on SNSs.

Hypothesis 3 (H3). *Envy experienced on an SNS is negatively associated with users' affective well-being.*

Together, Hypotheses 1–3 suggest a chain of relationships linking social information consumption with feelings of envy, which in turn are hypothesized to be negatively related with the cognitive and affective well-being of SNS users. Moreover, considering the central role that envy plays in the interpretation and internalization of information about others (Foster 1972, Hill et al. 2011), it is plausible that the undesirable outcomes associated with social information consumption on SNSs, as reported in past research (see Table 1), may partly be due to the envy processes this activity may trigger (see Table A.1 in Online Appendix A). In other words, it is presumably not social information consumption per se that is linked to detrimental SWB-related outcomes, such as reduced life satisfaction (Wenninger et al. 2014) and negative affective states (Haferkamp and Kraemer 2011). Rather, it is the feelings of envy that this social information consumption may evoke that are responsible for the observed undesirable outcomes. In this case, envy operates as a mediating mechanism that, triggered by social information, works to reduce cognitive evaluations of life and affective experiences of SNS members.

Hypothesis 4 (H4). *Envy on an SNS mediates the relationship between the intensity of social information consumption on an SNS and users' cognitive well-being.*

Hypothesis 5 (H5). *Envy on an SNS mediates the relationship between the intensity of social information consumption on an SNS and users' affective well-being.*

3.3. The Role of Envy on an SNS in Users' Self-enhancement

Beyond their potential impact on individual perceptions of well-being, feelings of envy may also trigger a set of behavioral responses in the form of envy-coping strategies. As such, these strategies have a self-defensive nature, with individuals trying to respond to or suppress these unwanted feelings (Elster 1998, Salovey and Rodin 1988; see Table A.2 in Online Appendix A). In the context of SNSs, the strategy of self-enhancement and its related counterparts (boasting and narcissistic impression management) are particularly appealing because self-enhancement is common on SNSs designed for private use, especially among younger users (Bergman et al. 2011), and hence can be applied without a concern of social retaliation (Mehdizadeh 2010) and the fear that one's envy might become apparent to others (Foster 1972).

Self-enhancement is motivated by the "value users derive from being able to improve their self-concept in relation to others" using SNSs (Krasnova et al. 2010, p. 112). It "refers to the process by which individuals attempt to control the impressions others form of them," as can be witnessed in the qualitative properties of the information users share on the network (Leary and Kowalski 1990, p. 34). Among others, these properties are reflected in the positive, strategically selected, desirable, and self-affirming nature of the information shared (Mehdizadeh 2010, Toma and Hancock 2013). Experiencing envy, an individual may thus engage in self-enhancement by inwardly or verbally stressing her advantages, thereby attempting to diminish the sense of inferiority triggered by envy (Salovey and Rodin 1988, Yoshimura 2010). For example, research by Brown and Gallagher (1992) has shown that private failure may lead individuals to overstate their superiority over others. In this context, Foster (1972) argues that boasting, complimenting, or just mentioning the possession of the same objects as the ones causing envy can be the strategy to deal with and to hide envy. Moreover, sharing news about oneself is intrinsically satisfying, because this activity helps to activate brain regions responsible for motivated behaviors and positive rewarding states (Alcaro et al. 2007, Tamir and Mitchell 2012), suggesting that self-enhancement may additionally work to refocus individual cognitive resources. Empirical evidence from an SNS context also supports the healing effect of this activity for college-age users. For example, an experiment conducted with students by Gonzales and Hancock (2011) demonstrates that updating one's profile on an SNS boosts one's sense of self-worth and, therefore, could be used to mitigate envy.

Hypothesis 6 (H6). *Envy on an SNS is positively associated with users' engagement in personal self-enhancement on an SNS.*

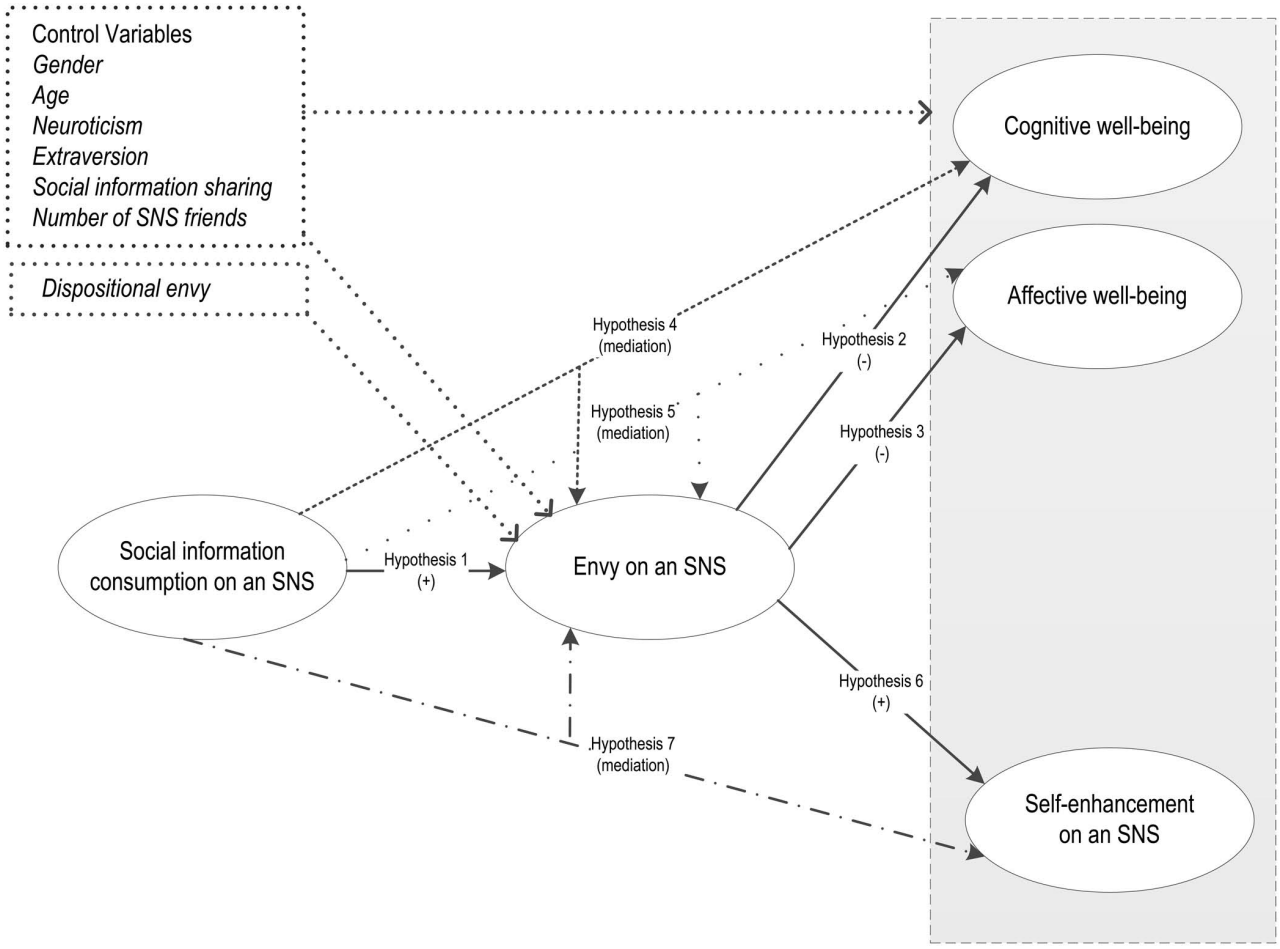
Among others, widespread engagement in self-enhancement has been linked to general SNS use (e.g., Rosen et al. 2013, Mehdizadeh 2010), with existing research emphasizing the asynchronous nature of communication (Ellison et al. 2006, Krasnova et al. 2009) and special network norms (Boyd and Ellison 2007) as possible reasons behind the observed dynamics. Complementing these views, we suggest a competing explanation of this phenomenon. Specifically, we argue that the observed level of self-enhancement on SNSs is indirectly associated with the intensity of social information consumption, because the latter increases the risk of encountering envy-inducing social information and thereby may evoke the need for protective envy-coping strategies. Our theorizing advances the view that it may not be the use of SNSs per se that motivates self-enhancement, as previous studies suggest (e.g., Rosen et al. 2013), but rather it is the feelings of envy that such platforms evoke that are partly responsible for the observed self-promotion activities on SNSs. Altogether, these arguments speak for the mediating role of envy in the relationship between the social information consumption and self-enhancement activities of users on SNSs.

Hypothesis 7 (H7). *Envy on an SNS mediates the relationship between the intensity of social information consumption and users' engagement in self-enhancement on an SNS.*

3.4. Control Variables

Several factors may confound the hypothesized relationships in our model and therefore need to be controlled for. SNS participation patterns, such as *social information sharing* and *number of SNS friends*, may affect users' perceptions and behavior (e.g., Manago et al. 2012, Oh et al. 2014). For example, *social information sharing* on an SNS may counterbalance the undesirable effect of social information consumption (Lee et al. 2011). Furthermore, Burke et al. (2010) find a positive link between *number of SNS friends* and different forms of social capital, which suggests a favorable impact on users' well-being. In addition, personality characteristics may influence the emotional outcomes of SNS users (Diener et al. 2003), with a large body of research pointing out *extraversion* and *neuroticism* as traits that may affect well-being (Costa and McCrae 1980, Lucas and Fujita 2000). Moreover, *dispositional envy* is likely to impact the frequency of envy experiences (Smith et al. 1999). Finally, demographic characteristics, such as *age* and *gender*, may also influence SNS users' perceptions and behavior (e.g., Arjan et al. 2008). For example, women are

Figure 1 Theoretical Model



generally more likely to experience negative affect (Nolen-Hoeksema and Rusting 2003) and depressive episodes (Eaton and Kessler 1981) off-line and to engage in impression management on SNSs (Rui and Stefanone 2013). Hence, considering their potential importance, all these factors are integrated as control variables into our theoretical model.

Figure 1 shows our theoretical model, reflecting our seven hypotheses, including the posited impact of the control variables.

4. Research Method

Two studies were conducted, with Study 1 based on qualitative data and Study 2 based on quantitative data. Beyond demonstrating the prevalence of envy on SNSs, Study 1 was used to show the differences in envy on an SNS compared to the traditional off-line context, and in that regard addressed two questions: Is envy on an SNS driven by a different set of objects compared to the off-line settings? And is it (at least partly) induced by information that is unlikely to be available off-line? Together, these insights justified the need for an in-depth exploration of the role of envy on an SNS in defining users' SWB and behavior along the lines of our theoretical model in Study 2 (see Figure 1). Complementing each other, the two studies allow for a better understanding of the envy phenomenon in the novel context of SNSs.

4.1. Sampling for Study 1 and Study 2

Targeted at college-age SNS users, data for both studies were collected using a convenience sampling procedure. Specifically, online surveys for both Study 1 and Study 2 were advertised using a mailing list of a large university in Germany with approximately 30,000 subscribers. To avoid priming, the surveys were positioned as being for research into the "emotions of Facebook users." FB was chosen as a focal platform for the purposes of our study because this site is a dominant hedonic SNS in Germany and worldwide (Alexa.com 2015). A raffle of €10 Amazon .de gift cards was offered as an incentive to participate: 50 cards for Study 1 and 150 cards for Study 2. In Study 1, 1,319 respondents accessed the first page of their survey, and 787 completed the survey, leading to a response rate of 2.6%. In Study 2, 1,130 respondents accessed the first page of their survey, and

Table 3 Demographic Characteristics of the Samples Used in Study 1 and Study 2

Characteristics of the sample	Study 1	Study 2
N (net sample size)	684	509
Female/male (%)	66.1/33.6	66.8/33.2
Age (median)	23	24
Country: Germany (%)	91.8	89.8
Number of SNS friends (median)	250	200
Time on SNS per day (%)		
• Less than 5 min. per day (%)	8.0	6.8
• Between 5 and 30 min. (%)	47.7	41.6
• Between 30 and 60 min. (%)	25.5	24.3
• More than 1 hour (%)	18.7	27.3

810 completed the survey, leading to a response rate of 2.7%. Only responses from college students were accounted for in the final evaluation for both studies. Furthermore, we excluded participants who were aware of the envy topic as a result of their participation in past studies and participants who took an exceptionally short time to complete the surveys in Study 1 and Study 2, respectively. Furthermore, casewise replacement procedure was used to treat missing values during the assessment of the structural model in Study 2. As a result, the net sample used for evaluation was 684 respondents in Study 1 and 509 respondents in Study 2. Table 3 summarizes the demographic characteristics of both samples.

4.2. Study 1: Exploring the Prevalence and Nature of Envy on SNSs

In the survey for Study 1, two question blocks (QB1 and QB2), with a mixture of open and closed-ended questions, were central. Whereas QB1 was included to elicit the scale of envy, QB2 aimed to enhance our understanding of SNS-induced envy as opposed to a traditional off-line context in terms of envy objects. Since past research suggests that envy is a secretive and hidden emotion (Foster 1972, Habimana and Massé 2000), some respondents may avoid admitting to envy when asked directly, which calls for the complementary use of projective techniques as a means to mitigate social pressure and promote honesty in responding (Donoghue 2000). Hence, the first open question in QB1 was not directed at respondents per se, but concentrated on the emotional outcomes of "*others*" when confronted with social information on an SNS (Question 1.1): "Think about how your Facebook friends present themselves on Facebook. In your opinion, which emotions do others experience when they see this on Facebook?" By using this technique, we expected respondents to project their *own* feelings and attitudes into the situation, while the focus on "others" served as an "ego-protecting" mechanism (Malhotra 2010). In a direct follow-up question, respondents were asked about their own feelings in the aftermath of seeing social information on an SNS (Question 1.2): "Think about how your Facebook friends present themselves on Facebook: Which emotions do you experience when you see this on Facebook?"

For Question 1.1, 660 participants provided interpretable responses, resulting in a data corpus of 10,343 words. For Question 1.2, 644 participants provided interpretable responses, resulting in a data corpus of 12,695 words. Since previous research does not offer a systematic unified view on the categorization of emotional responses in social settings, the data corpus was inductively content analyzed to derive an appropriate coding scheme as recommended by Corbin and Strauss (1990). Prior research on emotions was consulted to inform our decisions in the process of open coding as well as at the stage of merging open codes into more global categories (Ekman 1992, Hareli and Weiner 2002, Sander and Scherer 2009). For example, Plutchik's (1980) wheel of emotions was used to guide our decisions with regard to such families of emotions as "anger" and "sadness." As a result, 18 coding categories were derived, including six negative and seven positive emotional states (see Table 4). The responses were first open-coded by one author of the study, and an independent coder was subsequently trained to ensure the reliability of the coding process. Comparison of the two coding solutions revealed a high level of agreement between both coders, with Cohen's kappa—a measure of the inter-rater reliability (IRR)—reaching 0.91 and 0.85 (p-value = 0.000) (Landis and Koch 1977) for Questions 1.1 and 1.2, respectively. In the case of a disagreement, the authors made the final decision on the attribution of a code by consensus.

Interpreting the results of Questions 1.1 and 1.2, we observe a substantial level of negativity triggered by the social information shared on SNSs, with college students frequently reporting feelings of envy, anger, and contempt as a reaction of "others" and of themselves. Particularly envy emerges as the category of importance, with 53.3% of respondents mentioning envy as a reaction to the social information of "others" (in response to Question 1.1), thereby potentially indirectly admitting to envy. Interestingly, this magnitude of envy feelings by far surpasses the largest positive category "pleasure" (37.3%) ascribed to "others," which is the key value proposition of hedonic SNSs. Moreover, with Question 1.2, 24.5% of the respondents indicated envy is a major negative emotional reaction that they experienced themselves. All in all, with college students readily linking envy to social information shared on SNSs in both projective and direct settings, envy appears to be a serious consequence of social information consumption on SNSs.

Whereas QB1 helped establish the presence of envy on SNSs, QB2 was used to enhance understanding

Table 4 Emotions Resulting From Viewing Social Information of Friends on an SNS

Main categories of feelings	Key subcategories from open coding	Share of respondents: Question 1.1: Ascribed to others, $n = 660$ (%)	Share of respondents: Question 1.2: Admitted for oneself, $n = 644$ (%)
Negative emotional states			
Envy	Envy, envious	53.3	24.5
Anger	Angry, irritated, annoyed, furious, horrified	16.4	23.8
Contempt	Contempt, ridicule, head shaking, disregard (for others)	13.0	17.5
Shame	Ashamed, embarrassed	6.8	9.8
Sadness	Sad, frustrated, disappointed, unhappy	2.9	3.7
Boredom	Being bored	2.7	5.1
Negative other	Distrustful, schadenfreude, inferior, negatively surprised, etc.	15.3	9.6
Positive emotional states			
Pleasure	Pleased, delighted, happy, glad (for others), joyful, excitement	37.3	37.1
Interest	Curious, interested, being informed	17.0	22.8
Empathy	Compassionate, pitiful, sympathetic, empathetic	15.0	8.1
Admiration	Admiring, appreciative, inspired, feeling respect (towards others)	13.5	6.2
Amusement	Fun, amused, entertained	11.5	12.4
Affiliation	Being accepted, being part of the group, liked, identification	2.4	2.5
Pride	Being proud	1.8	0.5
Positive other	Positively surprised, astonished	7.0	6.7
Further categories			
Neutral	Neutral, indifferent, absence of feelings, disinterested	12.6	22.8
Other	Longing, wanderlust, response open to interpretation	8.6	9.6
No knowledge	"Don't know"; "don't remember"	1.5	0.0

Note. Responding for themselves (Question 1.2) and "others" (Question 1.1) respectively, 28.6% and 25.6% of the respondents reported one feeling, 35.7% and 32.1% reported two feelings, and the remaining 35.8% and 40.8% of respondents reported three or more feelings.

of the differences of SNS-induced envy compared to that in traditional off-line settings. In QB2, college students were asked to specify the objects that elicited their envy in their most recent envy encounter on an SNS (Question 2.1) and in an off-line context (Question 2.2), respectively: "What did you envy the last time you experienced envy on Facebook?" and "What did you envy the last time you experienced envy after a personal encounter (not online)?" This autobiographical narrative methodology has been used successfully in eliciting envy-related experiences as well as other similar phenomena characterized by high secrecy (DelPriore et al. 2012). Using the same procedure for the analysis as in QB1, our content analysis of the data corpus of 6,190 and 5,253 words (provided by 665 and 658 respondents) for the SNS and off-line contexts, respectively, rendered 12 categories of envy objects and two supporting categories (see Table 5). The IRR measured by Cohen's kappa again surpassed a cutoff level of 0.8 in both cases, reaching 0.88 and 0.86 (p-value = 0.000), respectively (Landis and Koch 1977).

We observe that in the SNS context, "travel and leisure" represents the dominant object of envy, by far surpassing any other domain (Question 2.1). By contrast, the structure of envy is relatively balanced in the *off-line* setting, with "travel and leisure" and "money and material possessions" working as the leading triggers (Question 2.2). Moreover, Wilcoxon signed rank tests have revealed differences in the patterns of envy objects on SNSs and off-line, suggesting that these contexts emphasize different domains (see Table 5). To further elicit the degree of uniqueness of SNS-induced envy, respondents were asked Question 2.3: "Would you have learned this information (that has caused envy) also in a personal encounter (not online)?"[6] In response, 37.4% of respondents specified the "somewhat unlikely," "unlikely," or "very unlikely" option, suggesting that this proportion of envy episodes is likely to be unique to the novel social context of SNSs—another particularity we observe.

The intent of Study 1 was to justify a more detailed investigation into the effects of envy on SNSs by providing evidence for its prevalence among college-age users and its differences compared to the off-line context. Having supported this claim, we now move on to Study 2, where the model presented in Figure 1 will be tested with the aim of understanding the antecedents and the consequences of envy in the context of SNSs.

4.3. Study 2: Understanding the Antecedents and Consequences of Envy on SNSs

4.3.1. Survey Design. To operationalize the model shown in Figure 1, pretested measures were used

[6] Answer options ranged from 1 = very unlikely, 2 = unlikely, 3 = somewhat unlikely, 4 = somewhat likely, 5 = likely, to 6 = very likely.

Table 5 Objects of Envy in the SNS and Off-line Contexts

Main categories of objects of envy	Key subcategories from open coding	Share of respondents: Question 2.1: SNS, $n = 665$ (%)	Share of respondents: Question 2.2: Off-line, $n = 658$ (%)	Wilcoxon sig. rank test (p-value)
Travel and Leisure	Vacations, trips, visits to foreign countries, leisure events and experiences (e.g., concerts, get-togethers), free time	62.1	17.5	0.000
Relationship and Family	Romantic relationship, girlfriend/boyfriend, baby, pregnancy, family, love, marriage	6.8	10.0	0.015
Success in:				
Money and material possessions	Money, material objects (e.g., clothing, devices, car, apartment)	5.9	14.7	0.000
Job	Job offer, job, internship	4.5	9.4	0.000
Studies	Grades, place of studies, conditions at the university	2.7	7.6	0.000
General/other	Success in other/undefined areas (e.g., sports), achievements	3.0	3.6	0.537
Social Interaction	Attention, friends, (social) network	4.1	4.1	1.000
Appearance	Appearance, beauty, nice profile picture, being fit	5.3	9.0	0.004
Personality	Specific personality traits, confidence, life attitude	1.1	8.4	0.000
Abilities	Abilities (e.g., in math, music), talents, knowledge	1.1	9.3	0.000
Happiness	Happiness, being satisfied with the situation	0.8	0.9	0.763
Other	Lifestyle, (undefined) experience, object not directly interpretable, other unlisted objects	4.5	7.8	0.017
No envy	No envy reported (also derived from previous answers)	8.7	2.7	0.000
No knowledge	"Don't know"; "don't remember"	1.7	5.8	0.000

Notes. For SNS and off-line contexts, respectively, 77.3% and 81.8% of the respondents reported only one object of envy, 8.0% and 8.7% reported two objects, and 1.0% and 1.1% reported three objects. Paired Wilcoxon signed rank tests were used to establish the presence of statistically significant differences in mentions of specific categories by respondents for SNS (FB) as opposed to off-line "personal encounter" contexts.

where possible, as summarized in Table 6. However, some scales had to be modified slightly to fit the SNS context (see Table B.1 in Online Appendix B). *Cognitive well-being* was conceptualized as a "*satisfaction with life*," since it has been routinely used as the most critical marker of SWB in the cognitive domain (Diener 1994, p. 107). To reflect the rather fleeting nature of affective experiences, "*sadness on an SNS*" was used in our study as a reversed operationalization for *affective well-being* following SNS use (Diener 1994; all items were reversed prior to evaluation). *Sadness* represents a well-established component of the expanded Positive and Negative Affect Schedule (PANAS-X) (Watson and Clark 1994).

To capture *envy on an SNS*, we relied on a widely used operationalization of *situational envy* by Vecchio (1995). Insights on the objects of envy on SNSs were used to adapt this scale to the SNS context (see Table 5). For example, the workplace-specific item "It is somewhat annoying to see others have all the luck in getting the best assignments" (Vecchio 2000, p. 169) was reworded as "It is somewhat annoying to see on Facebook how successful some of my Facebook friends are."

Following Brislin (1970), Brislin et al. (1973), and the best practices of IS research in this domain (e.g., Venkatesh and Sykes 2013), we used a translation and back-translation procedure (see Table 6) to ensure equivalence. We thus initially set the questions in English, after which the scales were carefully translated into German by two native speakers. Differences between the translations were discussed until a consensus was reached. Next, a bilingual independent translator was employed to translate the German items back into English. Minor differences registered at this stage were once more analyzed, and item formulations were improved. In the final step, all scales were pretested in a survey with 38 SNS users, which resulted in minor wording changes. All constructs were modeled as reflective.

4.3.2. Empirical Results. First, following Armstrong and Overton (1977), we compared the first 25% with the last 25% of the received answers to examine whether participants' interest in the topic had any effects. Using t-tests to compare answers to questions across the same variables, we identified no significant differences. Second, we conducted Harman's single factor test (Podsakoff et al. 2003) to assess the existence of common method bias. The results of the principal components factor analysis revealed that there were 10 factors with eigenvalues greater than 1.0, which accounted for 69.9% of the total variance (the first factor accounted for 23.9% of the total variance). This outcome suggests that it is unlikely that common method bias significantly affects our analyses and results.

Table 6 Construct Scales with Sources and Translation Sources

Construct	Based on source	Source for translation into German
Social information consumption on an SNS	Koroleva et al. (2011)	Translation and back-translation
Envy on an SNS	Vecchio (1995, 2000)	Translation and back-translation
Self-enhancement on an SNS	Krasnova et al. (2010), Kim and Lee (2011)	Translation and back-translation
Social information sharing on an SNS	Koroleva et al. (2011)	Translation and back-translation
Cognitive well-being: Satisfaction with life	Diener et al. (1985)	Glaesmer et al. (2011)
Affective well-being: Sadness on an SNS	Watson et al. (1988), Watson and Clark (1994)	Krohne et al. (1996), Röcke and Grühn (2003)
Dispositional envy	Smith et al. (1999)	Bucher (2012)
Extraversion	Rammstedt and John (2007)	Rammstedt and John (2007)
Neuroticism	Rammstedt and John (2007)	Rammstedt and John (2007)

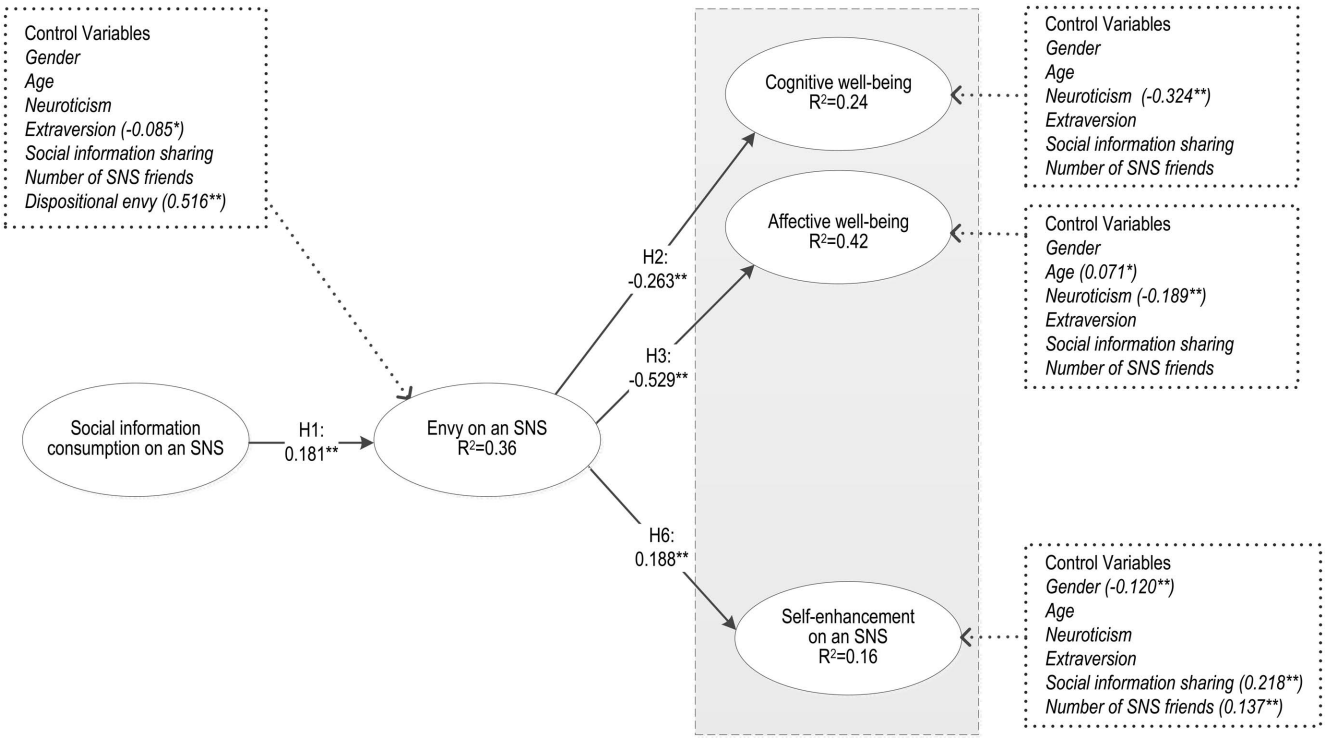
Next, the theoretical model was evaluated in two steps: assessment of the measurement model, followed by evaluation of the structural model. Because of the exploratory nature of our research, we used SmartPLS (Ringle et al. 2015) to estimate the parameters in the outer and inner models (with a path weighting scheme as a weighting method). To evaluate internal consistency of the measurement model, Cronbach's alpha was evaluated first, exceeding the required level of 0.7 for all constructs in our model (see Table B.1 in Online Appendix B; Nunnally 1978). The only exception was the *neuroticism* construct, for which Cronbach's alpha was only slightly lower, reaching 0.67. Moreover, the composite reliability values for all constructs were above the required threshold of 0.7 (Hair et al. 2011). In the next step, the loadings were assessed: Only two items had loadings in the 0.6–0.7 range, and the rest exceeded the 0.7 benchmark (see Table B.1 in Online Appendix B; Chin 1998). Furthermore, each of the measurement items had a significant loading ($p < 0.01$) on the respective latent construct, which was below the 0.05 threshold proposed by Gefen and Straub (2005). The average variance extracted (AVE) values for all latent variables were higher than 0.5, the threshold recommended by Fornell and Larcker (1981) (see Table B.1 in Online Appendix B). In sum, the model's convergent validity could be established. Next, we assessed discriminant validity following Gefen and Straub (2005), which resulted in the expected loading patterns (see Table C.1 in Online Appendix C). Furthermore, we verified that the square root of the AVE for each construct was higher than the correlation between this and any other construct in the model, as suggested by Fornell and Larcker (1981) (see Table C.2 in Online Appendix C). In addition, the recently proposed heterotrait–monotrait ratio (HTMT) of the correlations was utilized to further assess discriminant validity (Henseler et al. 2015). The highest absolute HTMT value for our measures was 0.69 (see Table C.3 in Online Appendix C), which satisfies the most conservative threshold of 0.85 (Henseler et al. 2015). Moreover, the observed strength of correlations between the constructs in our model is theoretically expected. Taken together, the discriminant validity of the measurement model was established.

Next, the structural model was assessed[7] as summarized in Figure 2 and Table C.4 in Online Appendix C.[8] The significance of path coefficients was determined via a bootstrapping procedure by setting the number of cases equal to the sample size (as recommended by Tenenhaus et al. 2005) and the number of bootstrap samples to 5,000. The analyses indicate that *social information consumption* has a significant positive relationship with *envy on an SNS* for college students (H1 supported; $\beta = 0.181$; p-value = 0.000). Furthermore, *envy on an SNS* has a significant negative relationship with users' *cognitive* (H2 supported; $\beta = -0.263$; p-value = 0.000) and *affective well-being* (H3 supported; $\beta = -0.529$; p-value = 0.000), and is positively related to users' engagement in *self-enhancement* activities (H6 supported; $\beta = 0.188$; p-value = 0.000). Among the seven control variables tested, only *dispositional envy* and *extraversion* were shown to have an association with *envy on an SNS*. With regard to the three dependent variables in our theoretical model, only the control variable neuroticism had a significant effect on the *cognitive well-being* of college students (see Table C.4 in Online Appendix C). The *affective well-being* was influenced by *neuroticism* and the *age* of the participants. Interestingly, *social information sharing* is not directly linked to any of the well-being-related outcomes we tested. In addition, being female, having a higher *number of SNS friends*, and *sharing* more about oneself and one's environment on SNSs are linked to stronger engagement in *self-enhancement on an SNS*. In terms of explanatory power, we find that our model explains 24% of users' *cognitive well-being* and 42% of their *affective well-being*. For users' engagement in *self-enhancement on the SNS*,

[7] Please note that this study relies on a cross-sectional research design that implies associations (rather than causality) between latent variables. For further elaboration on this issue, see §5.3.

[8] The maximum value of the variance inflation factor was 1.466, which is far below the threshold of 10 proposed by Gefen et al. (2011). We could thus conclude that our results were not threatened by multicollinearity concerns.

Figure 2 Analysis Results (Structural Model)



Note. The construct *cognitive well-being* was operationalized as *satisfaction with life*, and the construct *affective well-being* was operationalized as *sadness on an SNS* (items were reversed prior to evaluation).

*Significant at 5%; **significant at 1% or lower.

R^2 is 16%. Overall, this suggests that *envy on an SNS* may play a role in the experiences and behavior of college students.

Finally, in Hypotheses 4, 5, and 7, we argued that *envy* acts as a mediator between the intensity of *social information consumption on an SNS* and users' *cognitive well-being*, *affective well-being*, and engagement in *self-enhancement on an SNS*. To test for these effects, we followed the procedure proposed by Zhao et al. (2010), who advanced Baron and Kenny's (1986) method. To follow this approach, we estimated another extended PLS model (Iacobucci et al. 2007) that included the direct paths (i.e., the paths between *social information consumption* and *cognitive well-being*, *affective well-being*, and *self-enhancement on an SNS*). The inner and outer estimates of this extended model remained stable (see Online Appendix D for details on the structural model). To estimate the significance of the three indirect effects in this extended model, we utilized the method suggested by Preacher and Hayes (2008) and Zhao et al. (2010), and bootstrapped the sampling distributions of the three indirect effects (5,000 samples, no sign changes).

According to Zhao et al. (2010), if the corresponding indirect effect is significant, then mediation is present. This was true for all three relations examined in our model (see Table 7). However, according to Zhao et al. (2010), direct effects have to be examined to establish the type of mediation: "indirect-only" mediation (i.e., "full mediation" in terms of Baron and Kenny 1986), "competitive mediation," or "complementary mediation" (i.e., "partial mediation" in terms of Baron and Kenny 1986). For full mediation, the direct effect in the extended model has to be insignificant. Indeed, in our study, the direct effects of *social information consumption on an SNS* are not significant for *cognitive well-being* and *affective well-being* (see Table 7 or Figure D.1 in Online Appendix D). Therefore, we conclude that *envy on an SNS* fully mediates the relationship between *social information consumption on an SNS* and *cognitive well-being* (H4 is supported; indirect effect = −0.048, p-value = 0.001; direct effect = 0.054, p-value = 0.281) as well as between *social information*

Table 7 Significance Levels of the Direct and Indirect Effects

Social information consumption on an SNS → envy on an SNS → ...	Indirect effect[a]	Direct effect	Type of mediation
... → Cognitive well-being	−0.048**	0.054 (n.s.)	Full
... → Affective well-being	−0.096**	-0.041 (n.s.)	Full
... → Self-enhancement on an SNS	0.034**	0.159**	Partial

[a]The magnitude of the indirect effect is also comparable to SNS studies investigating similar psychological outcomes (e.g., Maier et al. 2014).

**Significant at 1% or lower.

consumption on an SNS and *affective well-being* (H5 is supported; indirect effect = −0.096, *p*-value = 0.000; direct effect = −0.041, *p*-value = 0.340) in the context of college students. For the relationship between *social information consumption* and *self-enhancement on an SNS*, the direct effect is significant. Therefore, the sign of the direct effect determines whether the mediation is complementary (indirect and direct effect have the same sign) or competitive (indirect and direct effect have different signs). Since the corresponding direct effect between *social information consumption* and *self-enhancement on an SNS* remains significant and both direct and indirect effects have the same sign, our results indicate that *envy on an SNS* complementarily mediates the relationship between *social information consumption* and *self-enhancement on an SNS* for college students (i.e., "partial mediation" in terms of Baron and Kenny 1986; H7 is partially supported; indirect effect = 0.034, *p*-value = 0.004; direct effect = 0.159, *p*-value = 0.002).

5. Discussion and Implications

5.1. Theoretical Implications

Participation in SNSs can exert both favorable and unfavorable impacts on one's SWB—a key measure of human quality of life (e.g., Burke et al. 2010). Although academic SNS research has so far mainly focused on explaining the favorable consequences of SNS usage (e.g., Apaolaza et al. 2013), recent studies have extended this perspective by shifting the focus to investigations of unfavorable consequences (e.g., Kramer et al. 2014, Maier et al. 2014). Hence, to contribute to the growing body of research on the dysfunctional consequences of IS use in general and SNS use in particular (Ayyagari et al. 2011, Ragu-Nathan et al. 2008, Tarafdar et al. 2007), the primary goal of this study was to offer a possible explanation for the undesirable effects of SNS use in terms of the well-being of college-age users and the narcissistic character of their information sharing.

By applying Festinger's (1954) social comparison theory and its extensions to the novel context of SNSs, we theoretically derive and empirically validate a new set of relationships that offer a new perspective on the undesirable impact of SNSs on users' SWB. In particular, we demonstrate that social information consumption on an SNS is associated with unintended feelings of envy, which, in turn, are negatively linked to users' cognitive and affective well-being and act as a mediator in this relationship. By uncovering a potentially threatening influence of social information consumption (a dominant activity on SNSs; Constine 2012, Pempek et al. 2009), our findings add to the growing body of research on the "dark sides" of social media use, while highlighting the importance of differentiating between distinct participation patterns (social information consumption versus social information sharing) when studying the outcomes of SNS use.

In addition to their impact on SWB, feelings of envy are shown to encourage self-enhancement on SNSs—a phenomenon we term as the "self-enhancement envy spiral." Although self-enhancement emerges as a suitable strategy to respond to envy on SNSs (Salovey and Rodin 1988, Yoshimura 2010), this behavior may ironically magnify envy in others. Interestingly, past research has hinted at the presence of this vicious cycle from another perspective. van de Ven et al. (2011, p. 993) observe that subjects are willing to buy more when they are envious, which inevitably leads to the envy of others. Hence, envy may act as the "emotional multiplier" in this "continuing cycle." By demonstrating that self-enhancement may be rooted in envy, our study offers a potential alternative explanation to the nature of self-promotion witnessed on SNSs (Boyd and Ellison 2007, Mehdizadeh 2010). This in some way contradicts a popular assumption that positive emotions are contagious and automatically trigger truly positive feelings (Kramer et al. 2014). Apparently, some self-enhancement activities take place in response to an ego threat and therefore are defensive in nature. Finally, by showing that the self-promotional character of information sharing on SNSs may be, even though indirectly, associated with social information consumption, our study provides preliminary evidence for a possible interplay between these two mutually dependent participation patterns on SNSs.

Furthermore, our study offers a new perspective on the far-reaching and unintended impact of certain functional characteristics common in SNSs as potential facilitators of envy. For example, since SNSs empower their users with control over their identity in terms of the content and its accessibility as well as operate in a "one-to-many" mode (Antheunis et al. 2010, Kane et al. 2014), they may promote the sharing of self-promotional and relevant content. In addition, this content is consumed by SNS members who often share a high degree of similarity with each other, as supported by existing friending mechanisms (e.g., "People You May Know" feature) and information filtering algorithms (e.g., EdgeRank.net, 2015; see Table 2). Considering that these conditions may also be present in other fields of computer-mediated communication (e.g., enterprise social systems), our results also inform research and practice in these domains.

Finally, taking a broader view, our results may also extend the "post adoption" stream of SNS research in particular (e.g., Cheung et al. 2011, Shi et al. 2009), and IS research in general (e.g., Bhattacherjee 2001,

Bhattacherjee and Premkumar 2004). So far, both positive and negative experiences have been shown to exert competitive influences on users' intentions to continue using an IT system (e.g., Venkatesh et al. 2011). However, insights into the nature of negative experiences in the SNS context remain scarce, with studies mainly focusing on privacy when discussing users' intentions to continue using the system (e.g., Ku et al. 2013). We contribute to this discourse by establishing envy as a new type of cost associated with participation on SNSs that may arise as users engage with the system and are increasingly made aware of their social environment. This emphasizes the importance of the sociopsychological perspective when studying the continued use of SNSs and possibly other systems in which social information is involved (Tsai and Bagozzi 2014).

5.2. Practical Implications

Our finding that social information consumption on SNSs can be associated with envy has consequences for SNS providers, advertisers, and users.

First, the presence of envious feelings on SNSs may be of concern to SNS providers. In Study 1, 24.5% of college students admitted that they themselves felt envy as a result of following social information on SNSs; this is a conservative estimate since 53.3% attributed envy to "others," with "travel and leisure" being the most common envy target. Experiencing envy, users may strive to mitigate this unpleasant emotional state by adopting a number of envy-coping strategies, particularly by engaging in self-enhancement when sharing. Such spiraling behavior may erode the interpersonal climate of the SNS and possibly contribute to a growing dissatisfaction with the platform. Therefore, in the interest of attracting users and sustaining the SNS, providers may benefit from reducing user exposure to particularly envy-inducing content. This is especially advisable for younger users because they lack the experience to recognize, admit to, and cope with the detrimental consequences of envy (Salovey and Rodin 1988, Smith and Kim 2007).

Second, our findings may inform advertisers on how to optimize the targeting of their banners on SNSs. Indeed, the presence of negative emotions associated with social information consumption on SNSs may bias users' perception of advertisements (Gardner 1985). Moreover, since envy may work to enhance the desirability of products that caused it in the first place (Chan and Sengupta 2013, van de Ven et al. 2011), advertisers may seek to monetize this knowledge by promoting common envy-inducing objects (see Table 5). For example, since travel and leisure represent the major cause of envy on SNSs (as observed in Study 1), ads for travel destinations may be effective with users who have a high level of social information consumption.

Third, with popular SNSs having over a billion users (Facebook 2015, eMarketer 2013), the impact of SNSs on its members' everyday lives is of social importance. By establishing that social information consumption on these platforms may be associated with loss of well-being, our findings call for scrutiny and possibly caution when it comes to the use of these sites by young adults in various settings.

5.3. Limitations and Future Research

Reflecting the preliminary nature of our study, our investigation has several limitations that offer promising opportunities for future studies. First, most respondents in our studies were from Germany. We expect our main results to hold across cultures, since envy is a ubiquitous feeling, representing an important building block of evolutionary processes (Foster 1972, Smith and Kim 2007). Nonetheless, an in-depth cross-cultural study may reveal differences in envy patterns across user groups with different cultural backgrounds (Ger and Belk 1996).

Second, this research relies on a convenience sample of college-age users. This is a particularly distinct population group, because of their almost ubiquitous adoption of SNSs (Smith et al. 2011, Duggan and Brenner 2013) and their reliance on social comparison during the process of identity formation (e.g., Doster 2013, Thompson 2013). Furthermore, envy processes and the associated undesirable outcomes may be especially pronounced for younger users because they have limited coping experience (Salovey and Rodin 1988, Smith and Kim 2007). These sample characteristics should be kept in mind when generalizing the results of our study to other demographic segments. Indeed, studying other demographic segments is a promising direction for further research, particularly because of the pervasive adoption of social media applications across other population groups (Duggan and Smith 2013).

Third, FB was chosen as the focal site in our study. However, a cross-platform perspective may deepen our findings. Indeed, some countries and demographic segments show preferences for other online platforms for socializing, including VKontakte in Russia or Sina Weibo in China. In this context, future research may also further explore the linkage between different IT-enabled features of SNSs and envy feelings, thereby informing the design of future social media platforms. Future studies may also expand the scope of our research by investigating how the character of the platform may influence the nature and the intensity of the resulting feelings of envy. For example, a hedonic (e.g., FB) versus a utilitarian (e.g., LinkedIn) focus of a particular SNS may imply certain content-relevant norms and constraints that may

encourage or hinder the envy processes. Adding to the complexity, user motivations may not correspond directly to the character of the platform, since users may utilize both hedonic and utilitarian platforms for both intrinsic (e.g., pleasure) and extrinsic (e.g., job search) reasons (e.g., Lin and Lu 2011). Hence, disentangling a platform's purpose from an individual motivation for use, especially in the context of envy, could be another fruitful direction for future research.

Fourth, our Study 2 relies on a cross-sectional research design that implies associations (rather than causality) between latent variables. So far, this approach has been dominant in prior research on the SWB of SNS users, considering the nascent nature of these investigations. All in all, the nomological network of relationships tested in Study 2 is aligned with social comparison theory (Festinger 1954), research on envy, experimental evidence from the SNS context, and our findings from Study 1 (e.g., Smith and Kim 2007). For example, the hypothesized directionality between social information consumption and envy on an SNS is indirectly supported by Study 1, which shows that SNSs have the potential to induce situational envy among its members. Nonetheless, experimental and longitudinal designs are needed to make more definite claims concerning the causal nature of the focal relationships.

Fifth, our study solely focuses on the undesirable cognitive and emotional states and behaviors associated with social information consumption. However, positive outcomes—such as informational and networking benefits—are also possible, calling for a more comprehensive analysis of the produced effects (Koroleva et al. 2011). In addition, our analysis suggests that there is a conceptual difference between the active and passive uses of SNSs, including their differential impact on users' SWB. Against this background, we advise future studies to account for different types of user behaviors when exploring the influence of SNSs on users' perceptions. Finally, the interplay between sharing and consumption types of participation with regard to a variety of SWB-related outcomes should be further explored to gain an in-depth understanding of the undergoing dynamics.

5.4. Conclusion

Building on the responses of 1,193 FB users, this study provides the first evidence for illustrating the role of envy in promoting undesirable developments associated with SNS use in college-age users. Arising as a consequence of social information consumption (a dominant type of SNS use), envy is shown to negatively interfere with users' cognitive and affective well-being, as well as trigger reactive self-enhancement. Successive rounds of envy and self-enhancement could result in what we term as the "self-enhancement envy spiral." As a result, our study offers an alternative perspective on the widespread self-promotion observed among users on SNSs and contributes to a better understanding of dysfunctional consequences of social media applications in particular and IT use in general.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/isre.2015.0588.

Acknowledgments

The authors express their gratitude to the senior editor for her motivating guidance, encouragement, and help in developing this manuscript. The authors are also very grateful to the associate editor and three anonymous reviewers for their most helpful suggestions. The authors greatly appreciate their feedback and expertise.

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