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College-aged users behavioral strategies to reduce envy on social networking sites: A cross-cultural investigation

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ABSTRACT

Social networking sites (SNSs) are central to social interaction and information sharing in the digital age. However, consuming social information on SNSs invites social upward comparisons with highly socially desirable profile representations, which easily elicits envy in users and leads to unfavorable behaviors on SNSs. This in turn can erode the subjective well-being of users and the sustainability of the SNS platform. Therefore, this paper seeks to develop a better theoretical understanding of how users respond to envy on SNSs. We review literature on envy in offline interactions to derive three behavioral strategies to reduce envy, which we then transfer to the SNS context (self-enhancement, gossiping, and discontinuous intention). Further, we propose a research model and examine how culture, specifically individualism-collectivism, affects the relationship between envy on an SNS and the three strategies. We empirically test the variance-based structural equation model through survey data collected of Facebook users from Germany and Hong Kong. Our findings provide first insights into the link between envy on SNSs, related behavioral strategies and the moderating role of individualism for self-enhancement.

1. Introduction

In recent years, social networking sites (SNSs) have become ubiquitous social spaces where users connect, communicate, and interact with others (Bolton et al., 2013). On Facebook, users share over 4.75 billion pieces of content such as personal stories, vacation pictures, and social events every day (Libert & Tynski, 2013). 55 million status updates and 350 million photo updates, of which many are self-promoting in content, are posted on a daily basis (Omnicores, 2017). Prior studies have demonstrated that this endless stream of positive social information may elicit upward social comparisons and envious feelings among users, resulting in undesirable consequences to their subjective well-being (e.g., Chou & Edge, 2012; Lee, Ahn, & Kim, 2014; Tandoc, Ferrucci, & Duffy, 2015). Some users attempt to overcome the painful state of envy by posting desirable information about themselves on SNSs, which in turn may further spur feelings of envy in others and erode the interpersonal climate of the SNS (Krasnova, Widjaja, Buxmann, Wenninger, & Benbasat, 2015). In light of increasing concerns regarding unfavorable behavior on SNSs (Kwan & Skoric, 2013; Weinstein, 2017) and the negative effects of envy on users' subjective well-being (see for example Tandoc et al., 2015), research on how users

deal with envy – particularly how they respond to envious feelings on SNSs in order to mitigate them – is necessary.

Envy has long been a topic of research in various disciplines, like anthropology (Burbank, 2014), philosophy (Ben-Ze'ev, 1992), sociology (Foster, 1972; Schoeck, 1969; Smith, 2004), and psychology (Cohen-Charash, 2009; Quintanilla & de López, 2013; Silver & Sabini, 1978), as well as consumer research, business, and management (Duffy & Shaw, 2000; Mui, 1995; Schaubroeck & Lam, 2004; Vecchio, 2005). However, research of envy in the context of SNSs is still at an exploratory stage, with a focus on the antecedents of envy (e.g., Lin, 2018; Lin, van de Ven, & Utz, 2018) and its effect on well-being (e.g., Li, 2019; Weinstein, 2017). There exists little theoretical understanding of how users behave in response to envy on SNSs. In addition, cultural differences have not been the focus of envy studies in the SNS context. This is surprising considering the global nature of popular SNSs. With this paper, we seek to contribute to the existing body of literature by answering the following two research questions:

1. What are the key behavioral strategies that individuals use to respond to envy on SNSs? To answer this question, we conducted a literature review on envy in offline interactions to derive several potential responses to envy. In a second step, we explored their

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relevance for the SNS context and transferred them into SNS behaviors.

2. How does culture affect responses to envy on SNSs? We investigated into the moderating role of individualism-collectivism in explaining the relationship between envy on SNSs and users' behavioral strategies to respond to these undesired feelings. We collected data from college students from Germany and Hong Kong who are active on Facebook. Both societies differ significantly in individualism-collectivism, the cultural dimension of interest to this study.

2. Theoretical background and hypotheses development

2.1. Literature review: behavioral strategies to reduce envy

Envy is a painful emotion triggered by an unfavorable upward comparison with someone who possesses something we desire, but lack (Smith & Kim, 2007). Other than the relevance of the object of envy and the degree of superiority of the comparison person, the target individual also has to be similar to ourselves to provide an adequate benchmark for the own position (Gilbert, Giesler, & Morris, 1995). Consequently, it comes as no surprise that close friends and acquaintances with a low degree of social distance between one another (Liberman, Trope, & Stephan, 2007) are among the most common targets for comparison (Hill & Buss, 2006). Affective reactions such as frustration (Van de Ven, Zeelenberg, & Pieters, 2009), depression, and anxiety (Salovey & Rodin, 1984) are only some of the unpleasant psychological outcomes of envy.

As the source of envy is rooted in an inequity resulting from a social comparison between oneself and the envied other, equity theory suggests that an envious person may react by reducing the distance between the two persons (Adams, 1965). Behavioral attempts of the envious person to reduce this gap include equalizing the positions of the self and the envied other (Heider, 1958). Thus, behavioral reactions to mitigate unfavorable and undesired feelings of envy emerge as a necessary attempt to resolve low personal sense of self-worth and physical pain, as well as to restore balance (see for example Tai, Narayanan, & McAllister, 2012). Envy, being a strong and unpleasant emotion, is undesirable and requires immediate action; thus, feelings of envy are a natural motivator to find alleviation (Hill & Buss, 2008). Extant literature suggests there are two main ways for equalizing distant positions: first, by improving the self, and second, by deteriorating the other (e.g., Cohen-Charash, 2009; Heider, 1958). For example, snide remarks pointed at the other person, or belittlement in front of others (Salovey & Rodin, 1984) can level out perceived imbalances. A third strategy that emerges from previous literature is avoiding the target of envy (e.g., Yoshimura, 2010) or the envy-inducing situation (e.g., Duffy & Shaw, 2000). Although this strategy has been investigated far less, it is expected to be of high relevance since it would evoke the least attention and may keep socially condemned feelings of envy hidden from outside observers. In this work, we will focus on the three identified behavioral strategies to reduce envy: leveling up oneself, leveling down the other, and avoidance. Table 1 provides an overview of previous research on the three strategies and the specific context in which they were investigated.

2.1.1. Leveling up oneself

The first behavioral strategy for reducing envy is to get or achieve what the envied target has and thus improve one's own position in comparison to the target person (e.g., Van de Ven et al., 2012). In an organizational context, this could include improving the job performance (Schaubroeck & Lam, 2004) and enhancing one's position within the company (Cohen-Charash, 2009). Leveling up oneself can be a desire that connects with action to improve oneself in the relevant domain by moving upwards in cognitive tasks (Crusius & Lange, 2014). However, some individuals may only be pretending, for example by acting to be more competent than they actually are (Yoshimura, 2010). This may eventually lead to deceptive behavior (Moran & Schweitzer, 2008).

2.1.2. Leveling down the other

The second behavioral strategy targets the envied person by depriving them of their superiority (e.g., Ben-Ze'ev, 1990). Perceiving the envied person as a threat is one of the most prominently examined envy strategies in extant literature (e.g., Duffy et al., 2002; Duffy et al., 2012; Tai et al., 2012) (see Table 1, column "leveling down the other"). This strategy connects envy to strong negative action tendencies. Indeed, feelings of envy are closely linked to a negative positioning towards the envied person. In this view, envy entails a desire to harm the envied person (e.g., Cohen-Charash & Mueller, 2007; Yoshimura, 2010), hostility towards the other (Lange et al., 2016), and engagement in social undermining (Duffy et al., 2012). Other than taking direct action against the envied person, leveling down the other can also happen in more subtle ways, for example by withholding help or information (Dunn & Schweitzer, 2004), reducing prosocial behavior (Tai et al., 2012), engaging in social loafing (Duffy et al., 2012), or the creation of a negative work atmosphere (Cohen-Charash, 2009).

2.1.3. Avoidance

Avoidance is the least investigated consequence of envy. This strategy takes the form of avoiding the envied person (Yoshimura, 2010), for example by not looking at him or her (Crusius & Lange, 2014), as well as a reduced desire to engage in a friendship with this person (Salovey & Rodin, 1984). In the work context, this behavioral strategy is often related to absenteeism (Duffy & Shaw, 2000), turnover intentions (Vecchio, 2005), and the tendency to quit (Cohen-Charash, 2009). Since an open expression of hostility caused by envy is not socially desirable, this strategy serves as a more covert mean of expressing envy without evoking negative attention.

2.2. Behavioral strategies to reduce envy in the SNS context

Fueled by positive self-presentation of SNS members (e.g., Peluchette & Karl, 2008), SNSs provide a fertile ground for using similar others as a benchmark (Hampton, Goulet, Rainie, & Purcell, 2011) on relevant and interesting domains (Livingstone, 2008). Envy in the context of SNSs and its detrimental effect on users' well-being has been established in previous research (i.e., Krasnova et al., 2015). As shown in Fig. 1, this paper extends previous work by investigating behavioral strategies on SNSs and the moderating role of culture.

As a social emotion, envy occurs during social encounters (Tai et al., 2012). It is a common emotion among employees in the workplace (Vecchio, 2005), among students (Duffy et al., 2002), as well as in private situations (Silver & Sabini, 1978; Yoshimura, 2010). While dispositional envy reflects a person's relatively stable tendency to experience envy, situational envy results from a particular environment where the individual is exposed to unflattering comparisons (Cohen-Charash, 2009). In this work, we focus on the situational conceptualization of envy. In doing so, we consider SNSs as an environment that facilitates the consumption of superior information about others which initiates upward social comparisons. Our applied definition of envy as "an unpleasant and often painful blend of feelings [...] caused by a comparison with a person [...] who possesses something we desire" (Smith & Kim, 2007, p.49) emphasizes on what envy is and keeps it as a separate construct from its consequences. In this paper, we do not consider constructs like benign envy or malicious envy, which confound envy with its action tendencies and obscure the detection of mechanisms that lead to different behavioral outcomes (Cohen-Charash & Larson, 2017; Tai et al., 2012). We focus on the relationship between envy and behavioral strategies that are relevant in the SNS context: self-enhancement, gossiping, and discontinuous intention,¹ as well as the moderating role of culture.

¹ Unfriending someone or hiding content updates from a particular person may serve as alternative avoidance strategies. However, these behaviors are less threatening to the sustainability of the platform, which is heavily dependent on user numbers and user active participation. Therefore, we choose to focus on discontinuous intention as most drastic action reflective of avoidance strategy.

Table 1
Overview of research on behavioral strategies to reduce envy.

Source	Behavioral strategy			Context
	Leveling up the self	Leveling down the other	Avoidance	
Cohen-Charash (2009)	Improving one's position in the organization	Harming the other; Creating a negative work atmosphere	Propensity to quit	Organizational context; employees
Cohen-Charash and Mueller (2007)	Motivation to improve oneself by moving upwards	Desire to harm the other Attention moves towards the envied person	Avoiding looking at the envied person	Organizational context Attention allocation/cognitive processes; students
Crusius and Lange (2014)		Social undermining		Hospital employees; student teams
Duffy, Scott, Shaw, Tepper, and Aquino (2012)		Counterproductive work behaviors	Absenteeism	Organizational context (police) Students (groups)
Duffy, Ganster, and Pagon (2002)		Social loafing in groups		Organizational context
Duffy and Shaw (2000)		Withholding information		University context (lab. experiment)
Dunn and Schweitzer (2004)		Acting dishonestly to hurt the other		Organizational context; students
Gino and Pierce (2009)	Motivation to improve own performance	Entailing hostility towards the other		Negotiations
Lange, Crusius, and Hagemeyer (2016)	Deception	Lower cooperation rates in social dilemmas		Undergraduates (experiment)
Moran and Schweitzer (2008)		Devaluing and belittling the envied target; degrading the rival	Less desire for friendship with target	Organizational context General; based on psychol. literature
Salovey and Rodin (1984)		Disliked the envied person		Laboratory experiment
Schaubroeck and Lam (2004)	Improving work performance	Hostile feelings against the other		Students
Smith and Kim (2007)	Improving one's own situation	Pulling down the superior other		Organizational context
Van de Ven, Zeelenberg, and Pieters (2012)	Motivation for people to improve themselves	Action tendency aimed at degrading the other person		Family members (communicative responses)
Van de Ven et al. (2011)	Raising the self	Undermining the envied target	Turnover intentions	Students
Van de Ven et al. (2009)		Social undermining; reduced prosocial behavior	Avoidance of the target	Organizational context
Vecchio (2000)	Trying to make the self seem more impressive	Make target jealous of self; (threaten to) harm the other		Family members (communicative responses)
Tai et al. (2012)		Willingness to pay money to decrease the other's income		Students
Yoshimura (2010)				
Zizzo and Oswald (2001)				

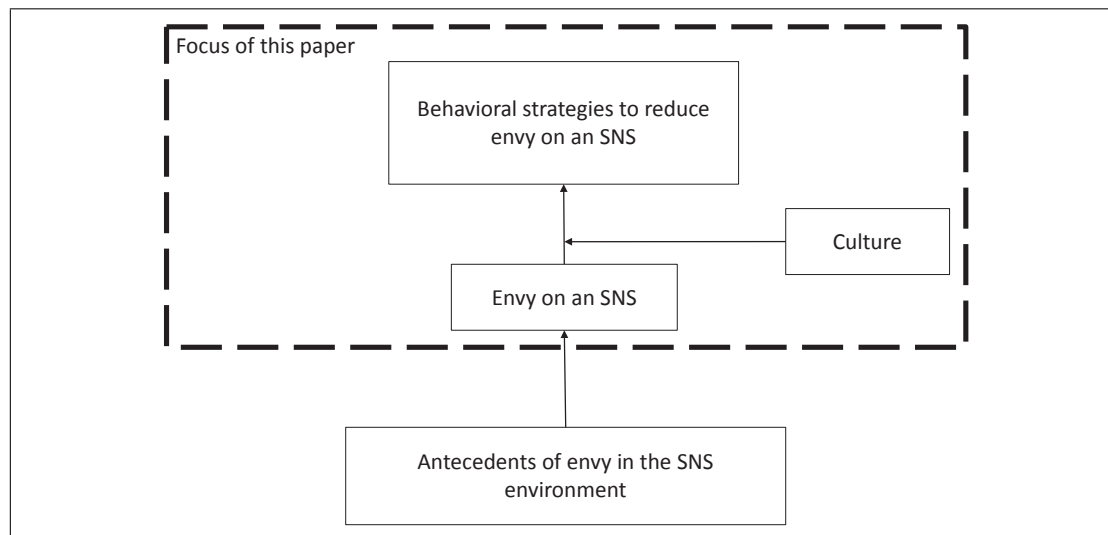


Fig. 1. Conceptual framework for envy on an SNS.

2.3. Envy on an SNS and self-enhancement (leveling up oneself)

Self-enhancement refers to sharing self-promoting content (Hum et al., 2011) and content aimed to impress peers (Peluchette & Karl, 2010). In the context of our study, it represents a strategy to gain equity with the envied target by leveling oneself up. By improving one's impression on others and highlighting own qualities, perceived imbalances to the envied person can be restored. On SNSs, it is common for users to share self-promoting content, for instance by posting posed profile pictures (Hum et al., 2011; Zhao, Grasmuck, & Martin, 2008). In doing so, users are “able to improve their self-concept in relation to others” (Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010, p.112). Negative feelings are rarely shared on platforms like Facebook or Instagram (Leung, 2013). Self-enhancement behavior appears as a quick and attractive remedy for envy-induced feelings of inferiority (Salovey & Rodin, 1988). This is because an individual will not have to admit envy of others openly; rather, self-enhancement aligns with social norms of impression management on SNSs and the sharing of socially desirable, carefully selected, positive information about the self (Bareket-Bojmel, Moran, & Shahar, 2016; Toma & Hancock, 2013). Following from this, we hypothesize:

H1. The intensity of envy on an SNS will have a positive relationship with self-enhancement behavior on an SNS.

2.4. Envy on an SNS and gossiping (leveling down the other)

Gossiping or “participating in evaluative comments about someone who is not present in the conversation” (Foster, 2004, p. 78) tends to be a negative term (Wert & Salovey, 2004). It represents a socially accepted form of leveling down the envied person in comparison to open aggression or hostility that directly targets the other (Lopez-Pradas, Romera, Casas, & Ortega-Ruiz, 2017). Gossiping can be an indirect form of sabotaging the advanced person without having to face direct confrontation with him or her (Smith & Kim, 2007). In gossiping about the envied other, one does not need to admit to the unflattering comparison and recognize one's own disadvantage publicly (Sabini & Silver, 1982). An important function of gossiping is to denigrate the other in their superior position (Wert & Salovey, 2004). By lowering the other to an equal level, the threat to the self and resulting feelings of envy should be mitigated. In addition to the balancing purpose, gossiping also aims to influence others' perceptions (Foster, 2004). This is because gossiping invites others to participate in collective undermining of an envied target. Not only does this reduce the gap between the envied

person and the self, it also fuels the desire to engage in gossiping behavior.

In an electronic setting, virtual gossiping shows considerable overlap in its function and use with offline gossiping with regards to how social information is passed on (Gabriels & De Backer, 2016). As one aspect of cyberbullying, gossiping seems to be more prevalent in the online context than writing directly insulting messages (Festl, Vogelgesang, Scharkow, & Quandt, 2017) and is a common form of relational bullying on communication platforms like Facebook (Kwan & Skoric, 2013). For this work, we assume that gossiping about others is a strategy to level down the superior other encountered on an SNS and thereby serves as a way to release feelings of envy through disparaging the other. Subsequently, we hypothesize:

H2. The intensity of envy on an SNS will have a positive relationship with gossiping about others on SNSs.

2.5. Envy on an SNS and discontinuous intention (avoidance)

Heavy usage of an SNS naturally increases users' exposure to social content that may serve as a foundation for social comparisons on the respective network (Feinstein et al., 2013). Consequently, heavy users are more likely to show higher levels of envy (Tandoc et al., 2015). Thus, reducing the use of an SNS or even signing out from the platform could be a viable strategy to fight SNS-induced envy. Indeed, beyond the attempt to reduce the gap between oneself and the envied person, a user may also choose to avoid the envy-evoking situation completely – avoidance strategy. Instead of dealing with the envied person via self-enhancement or gossiping, an individual may withdraw from the painful envy-triggering environment. This is equivalent to employees' absenteeism (Duffy & Shaw, 2000) or the intention to leave the company (Cohen-Charash, 2009) in an organizational context. Indeed, dissatisfaction caused by interactions with unpleasant others was shown to be a major driver for discontinuous intention in the SNS context (Cao & Sun, 2018). Moreover, social and informational overload are important factors, which contribute to users' intention to use an SNS less frequently (Zhang, Zhao, Lu, & Yang, 2016). Subsequently, it is highly likely that feelings of envy resulting from unfavorable comparisons with others on the platform are linked to an increase in users' intention to discontinue the service, and therefore avoid the platform altogether. Thus, discontinuous intention reflects the intent to decline SNS usage (e.g., Lim, Park, IJIMA, & Ahn, 2017) or the intention to use an SNS less frequently (Zhang et al., 2016). We expect that the intention to discontinue the use of an SNS functions as a

resolution to stressful social exposures (Luqman, Cao, Ali, Masood, & Yu, 2017). We argue that users avoid the pain associated with envy by exempting from the availability of social upward comparisons on an SNS. Thus, we hypothesize the following:

H3. The intensity of envy on an SNS will have a positive relationship with SNS discontinuous intention.

2.6. The moderating role of culture: individualism vs. collectivism

Nowadays, technology use is seldom restricted to national or cultural boundaries. For example, more than 2.32 billion users with various cultural backgrounds are active on Facebook (Facebook, 2018). Instagram connects 500 million active users daily (TechCrunch & Instagram, 2018). Research in information technology shows interest in cultural differences regarding technology use and suggests that studying culture on the individual level contributes to a better understanding of IT behavior than country comparisons (Hoehle, Zhang, & Venkatesh, 2015). This is because individuals with the same country of residence can show considerable variations in culture-related perceptions (Srite, Thatcher, & Galy, 2008). We define culture as a collective set of core values and beliefs which differ between groups of people (Hofstede, 1991; Jackson & Wang, 2013). Cultural values have been shown to shape how people use communication technologies like email and short messaging services (Tan, Sutanto, Phang, & Gasimov, 2014). Recent cultural SNS studies also indicate that individuals from various cultural backgrounds have different motivations for using social media (Jackson & Wang, 2013; Kim, Sohn, & Choi, 2011; Vasalou, Joinson, & Courvoisier, 2010). While research of SNS usage patterns in different cultures exists, research on how cultural differences shape users' responses to envy on an SNS is scarce. With many SNSs serving a culturally diverse audience, we deem the investigation of cultural differences in behavioral strategies on SNSs highly important.

Based on extensive data collection, Hofstede (2017) scores a large number of countries based on a set of cultural dimensions: individualism-collectivism, masculinity-femininity, power distance, and uncertainty avoidance. These cultural dimensions have received considerable attention in the context of IT use and particularly computer-mediated communication (Leidner & Kayworth, 2006) with individualism-collectivism being the most important and prominent dimension of research interest (Jackson & Wang, 2013; Triandis, 2008). While envy is a very human emotion that most people experience occasionally (Cohen-Charash, 2009), envy is difficult to justify in any society, and hence comes with an intensive urge to reduce the gap that causes the strong and undesirable feelings (Foster, 1972). Nonetheless, different cultures cope with feelings of envy in different ways (Quintanilla & de López, 2013). For example, while we observe a tendency in people to achieve similar objects and reach similar status as a reaction to envy in Western societies, Mexican peasants and the Mesoamerican Zapotecs actively engage in avoidance strategies to prevent the emergence of envy-evoking situations in the first place.

In this work, we aim to achieve a better understanding of how culture, specifically the dimension of individualism-collectivism, affects behavioral strategies to reduce envy on an SNS. Individualistic values stem from an urge to be independent from other members of society, whereas collectivism represents a tendency in individuals to strive for harmony in a group and a strong urge to take care of other in-group members. The value orientation of individualism emphasizes individual goals and achievements above those of the group (Triandis, 1995). These individuals are particularly focused on their own person, including their own skills and attitudes (Srite & Karahanna, 2006). Individual initiative is also a characteristic of the cultural dimension of individualism (Earley & Stubblebine, 1989).

The cultural dimension of individualism-collectivism characterizes a pattern of social interaction between members of a society (Hoehle et al., 2015) that could potentially influence the effect of envy – an inherent social emotion – on self-enhancement, which is a behavior focused on the

own person. Positive self-presentation and the prominent display of own achievements should therefore be more pronounced in individualistic than collectivistic individuals. At the same time, collectivistic cultures are more likely to avoid direct self-enhancement to not undermine group harmony (Rodríguez Mosquera, Parrott, & Hurtado de Mendoza, 2010). Indeed, empirical evidence from SNS research suggests that users from the United States, a highly individualistic country, engage more actively in positive self-presentation in comparison to users from collectivistic cultures like Korea on Facebook (Lee-Won, Shim, Joo, & Park, 2014) or Croatia on Instagram (Sheldon, Rauschnabel, Antony, & Car, 2017). Therefore, self-enhancement emerges as a more appropriate strategy to tackle envy for individuals who score high on individualism. Hence, we expect that the degree of individualism-collectivism will positively moderate the relationship between the intensity of envy on an SNS and users' self-enhancement. We hypothesize the following:

H4a. The positive relationship between envy on an SNS and self-enhancement will be stronger for individuals with high levels of individualism.

We hypothesize that the relationship between envy on an SNS and gossiping will be stronger for individuals with high scores in collectivism. Seeking reassuring information about the other person's shortcomings and being attuned to others' perspectives is typical for individuals scoring high on collectivism (Hoehle et al., 2015; Wert & Salovey, 2004). In uncomfortable situations, these individuals are likely to search for reassurance from friends through gossiping in order to reduce their nervousness. In contrast, users scoring high on individualism rather focus on their own achievements (Srite & Karahanna, 2006) and should therefore resort to gossiping much less. Consequently, we expect the degree of individualism to negatively moderate the relationship between the intensity of envy on an SNS and gossiping. Thus, we hypothesize:

H4b. The positive relationship between envy on an SNS and gossiping will be stronger for individuals with low levels of individualism.

Individuals from collectivistic backgrounds are likely to enjoy social group-based platforms, since they tend to enjoy sharing their views with likeminded people and putting group needs before their own (Hofstede, 2001). In contrast, individualistic individuals are generally less keen on collaboration (Hoehle et al., 2015). Therefore, leaving a platform altogether may be seen as a form of self-care; the needs of remaining group members is less of consideration. We thus expect that the degree of individualism positively moderates the relationship between the intensity of envy on an SNS and users' intentions to discontinue their engagement on the platform. Consequently, we hypothesize:

H4c. The positive relationship between envy on an SNS and discontinuous intention will be stronger for individuals with high levels of individualism.

2.7. Control variables

Since several variables may confound the hypothesized relationships, we included a number of control variables in our research model, such as social information sharing, SNS satisfaction, and number of SNS friends (e.g., Krasnova et al., 2015; Lim et al., 2017). Demographics like age and gender are also included in the model as they are relevant to IT use patterns (Venkatesh et al., 2016). Fig. 2 summarizes the research model.

3. Method

3.1. Participants and data collection

To test our research model and hypotheses, we collected data by surveying college-aged Facebook users in Germany and Hong Kong to ensure a sufficient variation regarding users' cultural background and

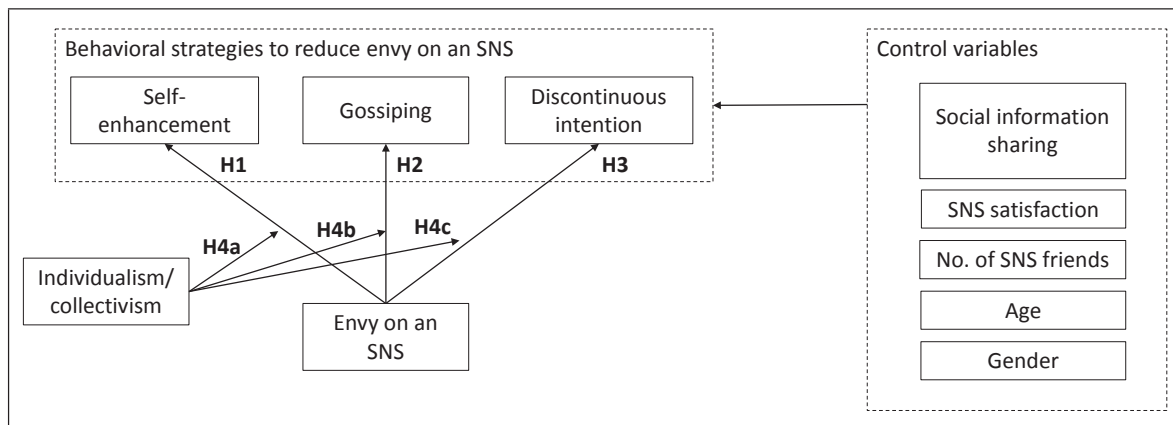


Fig. 2. Research model and hypotheses for behavioral strategies to reduce envy on an SNS.

more specifically in individualism-collectivism scores, which differ widely across the two regions. With a value of 67, Germany scores much higher on Hofstede's individualism scale in comparison to Hong Kong, which only reaches a value of 25, and therefore demonstrates a stronger tendency towards collectivism (Hofstede, 2017). In addition, both are technologically advanced with a high adoption rate of SNSs, which makes them relevant for the purpose of our study. We recruited our respondents by using university mailing lists. To avoid priming, we described the research in general terms as surveys about Facebook usage. Facebook was chosen as a focal SNS platform for the purposes of our study, because Facebook remains a dominant SNS among university students in Germany and Hong Kong (MEEDIA, 2018; We Are Social, 2018). A raffle of Amazon.de gift cards with a value of 10 Euros was offered as an incentive for participation in the German sample. Similarly, we incentivized each respondent from Hong Kong with a coffee-shop voucher with a value of 25 Hong Kong dollars to compensate for the time spent completing the online questionnaire. Based on our experience of collecting data from college-aged users in both regions, we received the highest response rates with the applied incentive method. Our sample is comprised of 182 respondents from Germany and 176 from Hong Kong. Table 2 summarizes the demographic characteristics of the two samples.

3.2. Measurement

All measures were adapted from well-established scales and modified slightly to fit the SNS context. The questions were set in English for the Hong Kong sample. A translation and back-translation procedure was used to translate the scales into German for the German survey (Venkatesh & Sykes, 2013). The following section provides example items, construct means and constructs standard deviations for all key constructs and control variables. An overview about all items, their mean scores, and standard deviations (SD) is provided in Appendix A.

3.2.1. Envy on an SNS

To capture envy on an SNS, we relied on the scale from Krasnova

et al. (2015), who transferred the established traditional situational envy scale by Vecchio (2000) into the SNS context. Participants had to answer six questions about how often they thought about their Facebook friends' superiority on Facebook (from 1 = *(almost) never* to 7 = *very often*). An example item is the following: "It is somewhat annoying to see on Facebook how successful some of my Facebook friends are". Construct mean scores reached 3.26 with a standard deviation of 1.37.

3.2.2. Self-enhancement on an SNS

Self-enhancement was measured based on the scale from Krasnova et al. (2015) ranging from 1 = *strongly disagree* to 7 = *strongly agree* with an opt-out option if the question was not applicable. Three items represent the scale (construct mean = 4.60, SD = 1.21). For example, "In my communication on Facebook, I tend to present myself as successful".

3.2.3. Gossiping

For gossiping, we relied on a combination of existing scales from Nevo, Nevo, and Derech-Zehavi (1993) and Foster (2004), which we transferred into the SNS context: "After using Facebook, I catch myself ...", for example "... gossiping with my friends about what others have posted." Participants could state how strongly they agreed with each of the four statements (1 = *strongly disagree* to 7 = *strongly agree*; construct mean = 4.35, SD = 1.50).

3.2.4. Discontinuous intention

Participants stated their agreement with four statements covering users' SNS discontinuous intention (1 = *strongly disagree* to 7 = *strongly agree*; construct mean = 2.79, SD = 1.35). An example item is the following: "I will unregister from Facebook." The scale was adapted from Maier, Laumer, Eckhardt, and Weitzel (2015).

3.2.5. Individualism-collectivism

We took three items of the cultural dimension of individualism-collectivism from established measures that are widely used in studies covering cultural differences in an IT setting, e.g. "Being accepted as a member of a group is more important than being independent" (Hoehle et al., 2015; Srite & Karahanna, 2006) (Scale: 1 = *strongly agree* to 7 = *strongly disagree*). Thus, higher scores indicate a higher level of individualism. construct mean = 3.29, SD = 1.09).

3.2.6. Control variables

We assessed age (mean = 22.34, SD = 4.35), gender (63% female), and number of Facebook friends (mean = 412.77, SD = 335.79) with one single item each. We measured social information sharing on an SNS with three items based on the scale from Koroleva, Krasnova, Veltri, and Günther (2011), e.g. "On Facebook, how often do you keep your friends updated about yourself?" (answer options ranged from

Table 2
Demographic characteristics of the German and Hong Kong samples.

Characteristics of the sample	Germany	Hong Kong
N (net sample size)	182	176
Female/male (%)	57.1/42.9	70.5/29.5
Age (mean)	24.3	20.3
Number of SNS friends (mean)	315.4	513.9
Time on SNS per day (%)		
More than 1 h (%)	26.4	24.4
Between 30 and 59 min (%)	25.8	32.5
Between 5 and 29 min (%)	37.3	26.7
Less than 5 min (%)	10.4	5.1

1 = *never* to 7 = *several times a day*; construct mean = 3.38, SD = 1.40). SNS Satisfaction was assessed through the following question: “How do you feel about your overall experience of Facebook use?” Participants had to indicate their satisfaction on four different answer pairs, for example 1 = *dissatisfied* to 7 = *satisfied*; construct mean = 4.51, SD = 1.09). The scale was adapted from Au, Ngai, and Cheng (2008).

4. Results

4.1. Descriptive results

First, we investigated the mean differences of responses to the items of envy on an SNS between German and Hong Kong users. To do so, we used t-tests and cross-checked the results using non-parametric Mann-Whitney tests. We found significant differences across all items at 0.01 level or below between the two samples. Across all statements, Hong Kong users show higher levels of envy on an SNS than German users on average (see Table 3 for means).

Interestingly, the item rank order within each sample was comparable. Both groups displayed the highest mean for item SNSe2 (“The posts of my Facebook friends get more attention than mine”) and the lowest mean for item SNSe3 (“I don’t know why, but I usually seem to feel myself as an underdog on Facebook”). Paired samples t-tests support the exposed position of the two items, respectively.

4.2. Variance-based structural equation modeling

Partial least squares (PLS), a variance-based (or component-based) SEM technique, was used to conduct the data analysis for this exploratory study (Ringle, Wende, & Becker, 2015; Lowry & Gaskin, 2014). As it is only a first step towards a better understanding of the dynamics of envy and users’ reactions in the context of SNSs, a variance-based SEM is deemed preferable over the covariance-based SEM approach (Hair, Ringle, & Sarstedt, 2011). Data analysis was conducted in two steps: In the first step, the measurement model was estimated, and the structural model assessed in the second step (Hair, Hult, Ringle, & Sarstedt, 2014).

4.2.1. Measurement model

Before we tested the model, we followed Podsakoff et al.’s (2003) suggestion to assess the existence of common method bias. The results of the principal component factor analysis revealed that there were seven factors with eigenvalues greater than 1.0, which accounted for 73.1% (69.5%/75.1%) of the total variance (Germany/Hong Kong). The first factor accounted for 15.5% (15.1%/14.8%) of the total variance in the combined sample (Germany and Hong Kong). Hence, we believe it is unlikely that common method bias significantly affects our results.

In the next step, we used Smart-PLS 3.0 (Ringle et al., 2015) to assess the measurement model. All evaluations were conducted with a combined sample of German and Hong Kong users to ensure sufficient

variance in the data. To evaluate convergent validity of the measurement model, we assessed Cronbach’s alpha, composite reliability, and average variance extracted (AVE) for all constructs included in the model (Hair et al., 2011; Nunnally, 1978). The Cronbach’s alphas and composite reliability were above the required threshold of 0.7 for all constructs in our sample, with only one exception. Specifically, Cronbach’s alpha was slightly below the required threshold with a value of 0.696 for the individualism-collectivism scale. Since the value is very close to the threshold of 0.7, we decided to keep the scale. The AVE for all constructs was above the required threshold of 0.5 (see Appendix C). Finally, loadings of all items used in the model evaluation exceeded the 0.7 threshold (Hulland, 1999), with only two exceptions (loading of IND2 = 0.687 and SNSe2 = 0.690 were marginally lower than 0.7). This provides evidence of indicator reliability. To test for discriminant validity, we examined the square root of the AVE for each construct and ensured that it was higher than the correlation between this and any other construct in the model (Fornell & Larcker, 1981, see Appendix C). Furthermore, all items loaded highest on their anticipated factor with cross-loadings being relatively low (see Appendix D). Taken together, the measurement model is well-specified.

4.2.2. Structural model

Before testing the hypotheses, basic assumptions (e.g., outliers, multicollinearity) regarding the structure of the data were tested and no apparent problems found. In the first step, the main effects model was tested, excluding the moderating effect of individualism-collectivism (see Table 4, columns “Main effects only”). In the second step, individualism-collectivism was integrated into the model as a moderator (see Table 4, columns “Full model”). We used a two-stage calculation method and a standardized product term generation (Hair, Hult, Ringle, & Sarstedt, 2017). The results from the structural model testing are shown in Table 4. Our findings demonstrate that the main effects model explains 14% of the variance in self-enhancement, 21% of the variance in gossiping, and 17% of the variance in discontinuous intention. A positive relationship between envy on an SNS and self-enhancement ($\beta = 0.23$, $p < 0.001$), gossiping ($\beta = 0.26$, $p < 0.001$), and discontinuance intention ($\beta = 0.28$, $p < 0.001$) were found to be significant, which supports H1, H2, and H3. In the full model, the moderating effect of the cultural dimension of individualism-collectivism was found to be significant in the relationship between envy on an SNS and self-enhancement ($\beta = 0.10$, $p < 0.05$), which supports H4a. The significance p-value for the delta R^2 for the self-enhancement model is smaller than 0.001. To better understand the pattern of the moderating effects, we plotted the significant interactions by following Aiken and West’s, 1991, see Fig. 3). For individuals with a high level of individualism, envy on an SNS had a stronger effect on engagement in self-enhancement behavior. The moderating effect of individualism-collectivism on the relationships between envy on an SNS and gossiping and discontinuous intention, respectively ($p > 0.05$), could not be supported. Thus, H4b and H4c had to be rejected. Although the cultural variable of individualism-collectivism added a significant amount of variance (8%, $p < 0.001$) to gossiping as a dependent variable, we had

Table 3
Comparison of mean values for envy on an SNS items: Germany vs Hong Kong*.

Items Scale: 1 = (almost) never to 7 = very often	Mean Germany	Mean Hong Kong
<i>When using Facebook, how often are you thinking that:</i>		
Most of my Facebook friends have it better than I do. (SNSe1)	2.37	3.99
The posts of my Facebook friends get more attention than mine. (SNSe2)	3.43	4.34
I don’t know why, but I usually seem to feel myself as an underdog on Facebook. (SNSe3)	2.11	3.53
It is somewhat annoying to see on Facebook how successful some of my Facebook friends are. (SNSe4)	2.52	3.72
It is somewhat disturbing to see how popular some others are on Facebook. (SNSe5)	2.45	3.72
It is somehow disturbing when I see on Facebook how much traveling others can afford. (SNSe6)	3.17	3.89

*Significant differences were identified across all items, $p < 0.01$ (based on t-tests and Mann-Whitney tests).

Table 4
Results of the structural model.

Dependent variable	Self-enhancement (H1)		Gossiping (H2)		Discontinuous intention (H3)	
	Main effects only	Full model	Main effects only	Full model	Main effects only	Full model
R ²	0.156	0.220	0.227	0.309	0.178	0.182
Adjusted R ²	0.142	0.203	0.214	0.294	0.165	0.164
Δ Adjusted R ²		0.061***		0.080***		−0.001
Control variables						
Social information sharing	0.21***	0.19***	0.23***	0.23***	0.05	0.06
SNS Satisfaction	0.09	0.04	0.15**	0.09*	−0.21***	−0.22***
Age	0.01	0.01	−0.03	−0.01	−0.14**	−0.14***
Gender (1:Female; 2:Male)	−0.08	−0.08	−0.12**	−0.12**	−0.04	−0.04
Number of SNS friends	0.06	0.05	0.06	0.05	0.05	0.05
Main effect						
SNS envy	0.23***	0.17**	0.26***	0.18***	0.28***	0.27***
Interactions						
Individualism-collectivism		0.23***		0.31***		0.06
SNS envy* individualism-collectivism (H4)		0.10*		−0.04		−0.01

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

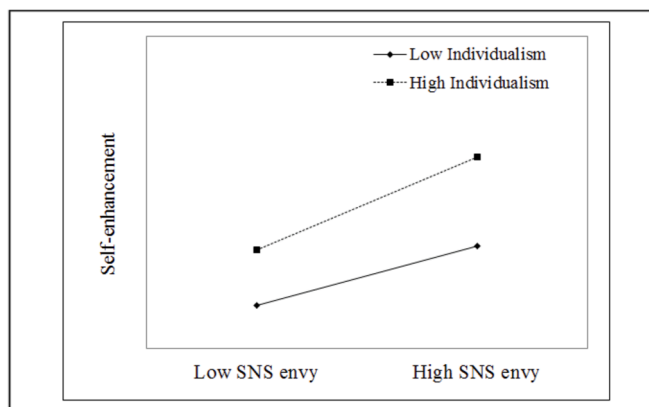


Fig. 3. Interaction effect.

to reject H4b, since the moderation term was not significant ($p > 0.05$). No significant increase of the delta R square value for discontinuous intention as dependent variable could be detected ($p > 0.05$). The assumed direction of relationships displayed in our model are carefully derived from the theory introduced in section 2. Nonetheless, it is important to note that due to the cross-sectional nature of our research design, we can only demonstrate the associations between the core variables in the research model, rather than their causal relationships.

4.3. Robustness tests

Since PLS is nonparametric, this method provides more robust estimates in comparison to covariance-based SEM, when assumptions of normality are violated (Hair et al., 2011). As a general guideline values for skewness and kurtosis between -1 and $+1$ are considered as acceptable, when partial least square structural equation modeling is used (Hair et al., 2017), with some authors suggesting acceptable limits of -2 and $+2$ (Gravetter & Wallnau, 2014). All variables of our core model show values within the suggested conservative interval of -1 and $+1$. However, two of our control variables (age and number of SNS friends) exceed them (skewness: 2.02 and 5.53; kurtosis: 1.58 and 2.81). Therefore, we performed a robustness check for our models. Specifically, we conducted log transformation (base 2) for the respective variables to reduce skewness and kurtosis values. The findings show that the results of the initial models hold. Specifically, we could confirm a positive significant relationship between envy on an SNS and self-enhancement ($\beta = 0.23$, $p < 0.001$), gossiping ($\beta = 0.25$, $p < 0.001$), and

discontinuance intention ($\beta = 0.28$, $p < 0.001$), which supports H1, H2, and H3. Additionally, the moderating effect of the cultural dimension of individualism-collectivism (H4a) was also found to be significant in the relationship between envy on an SNS and self-enhancement ($\beta = 0.10$, $p < 0.05$). Analogically to the already tested full model, H4b and H4c had to be rejected. Details are shown in the appendix (see Appendix E).²

Since we encounter normal data conditions in our data set, we expect comparable results when testing our model with a covariance-based approach to structural equation modeling (Hair et al., 2011). Thus, to further strengthen the already presented results of the variance-based structural equation model, a covariance-based structural equation model was calculated using IBM AMOS 22. The results confirm the findings of the variance-based structural equation model. Specifically, coefficients for envy on an SNS and the tested dependent variables are comparable to the above presented models (self-enhancement: $\beta = 0.25$, $p < 0.001$; gossiping: $\beta = 0.29$, $p < 0.001$; discontinuance intention: $\beta = 0.28$, $p < 0.001$; model fit indices: Chi-square = 891.98, $p < 0.001$; CFI = 0.903, GFI = 0.822, RMSEA = 0.072) supporting H1, H2, and H3. Similarly, the moderating effect of the cultural dimension of individualism-collectivism on the relationship of envy on an SNS and self-enhancement (H4a) could be observed ($\beta = 0.14$, $p < 0.05$; model fit indices: Chi-square = 924.73, $p < 0.001$; CFI = 0.901, GFI = 0.823, RMSEA = 0.070).

5. Discussion

With a major SNS, Facebook, having surpassed the 2.32 billion user mark (Facebook, 2018), our results have societal and individual implications as they contribute to a better understanding of social mechanisms that take place on these platforms. Specifically, this research sought to identify key strategies applied by users to reduce envy on an SNS and deepen understanding of user behavior on SNSs. We reviewed literature on envy in offline interactions to identify three major types of envy strategies users may adopt in response to envy (leveling up oneself, leveling down the other, and avoidance) and derived their respective behavioral counterparts on SNSs (i.e., self-enhancement, gossiping, and discontinuous intention). We further investigated how culture affects the salience of these behaviors on an SNS by testing our model with data collected in Germany and Hong Kong, two regions that differ significantly on the individualism-collectivism cultural dimension.

Our results show that envy on an SNS is related to all three tested

² Please note that data in tables referring to participants' age and number of SNS friends are displayed as raw data, not log transformed.

strategies. Further, we find that the cultural dimension of individualism-collectivism moderates the relationship between envy on an SNS and self-enhancement. Individualistic users are more likely to engage in self-enhancement behavior related to envy on an SNS, while collectivistic users are generally less prone to engage in this behavior. This relationship can be explained by the greater focus on own achievements as practiced by individuals from individualistic cultures (Triandis, 1995) making self-enhancement an effective way to self-affirm. For the strategies of gossiping and discontinuous intention, we could not detect an interaction effect of individualism-collectivism on their relationship with envy on an SNS. This result indicates that the relationship between envy on an SNS and tendencies towards gossiping and discontinuity is of a universal nature and not contingent on the level of individualism. Since gossiping is often seen as gateway behavior to more severe forms of leveling down others we see in cyberbullying (Lopez-Pradas et al., 2017), our results may help to explain the rising level of cyber harassment, denigration, outing, and trolling observed on social media on a global scale (Li, 2007; Wong, Cheung, & Xiao, 2017). The results are also a first indicator for assuming that discontinuous intention, as a strategy to reduce SNS-induced envy, is likely a global phenomenon rather than a cultural one.

5.1. Theoretical implications

Although the cross-sectional design of this study does not allow for claims of a causal relationship between envy and users' SNS behavior, the results suggest possible strategies that are in line with research on envy in offline social encounters and make several theoretical contributions. First, it enriches the theoretical understanding of envy on SNSs. Prior studies argued that when people experience envy, they attempt to mitigate this unpleasant emotional state by adopting certain strategies (e.g. Tai et al., 2012 for envy among employees in organizations). This work extends this line of research by deriving behaviors users apply in an SNS environment to reduce envy and restore balance between themselves and the envied person. Until now, only self-enhancement behavior – an SNS-related counterpart of the offline strategy of leveling up oneself – has been investigated in the context of SNSs (Krasnova et al., 2015). The other two strategies of leveling down the envied person and avoidance (expressed through gossiping and discontinuous intention) have not yet received sufficient attention in previous studies in the SNS context. Our results show that envy on SNSs is not limited to self-enhancement (leveling up oneself) but also linked to gossiping (leveling down the other) and discontinuous intention (avoidance). Therefore, we believe that our work offers a more comprehensive understanding of behavioral strategies to reduce envy on SNSs.

Second, this work provides an alternative interpretation to behaviors common on SNSs. Specifically, we argue that certain widespread SNS behaviors can partly be explained in terms of users' response to envy. For instance, self-enhancement is common on SNSs (Kaplan & Haenlein, 2010). So far, the prevalence of self-enhancement on SNSs has been interpreted either as users' compliance with the social norm of positive self-presentation (Bergman, Fearnrighton, Davenport, & Bergman, 2011) or as positive response to the positive sharing of others – the phenomenon of emotional contagion (Kramer, Guillory, & Hancock, 2014). However, our study offers an alternative explanation for the prevalence of self-enhancement by suggesting that envy may be underlying these processes. Additionally, we witness an increase in destructive behavior on SNSs, such as gossiping, which is understood as gateway behavior for cyberbullying (Lopez-Pradas et al., 2017). While personality traits (Kokkinos, Baltzidis, & Xynogala, 2016) and cyberbullying experience from the perspective of victims (Marcum, Higgins, Freiburger, & Ricketts, 2014) are known antecedents, our investigation provides a supplemental view on why users may engage in such undesirable behaviors on SNSs: a response to unwanted feelings of envy triggered by various opportunities of upward social comparison on SNSs. Furthermore, discontinuous use of IS has been a growing topic of

interest among researchers. So far, extant literature has linked such undesirable consequences of SNS usage, as dissatisfaction (Lim et al., 2017), social overload (Maier et al., 2015), or exhaustion and technostress (Luqman et al., 2017) to an intention to quit the network. Our results add to this by showing that envy is another important factor for explaining discontinuity of SNS services. Hence, we believe that including the construct of envy can enrich and advance current understanding of IS discontinuance phenomena (Luqman et al., 2017; Sun, 2013), especially in the specific context of SNSs.

Finally, our study adds to a better understanding of the role of culture and SNS use, which has been established a crucial factor for explaining differences in user motivations and usage behaviors on SNSs (e.g., Benson & Filippis, 2018; Jackson & Wang, 2013; Kim et al., 2011; Sheldon et al., 2017; Vasalou et al., 2010). This work advances existing research by suggesting that the cultural dimension of individualism-collectivism plays an important role in explaining self-enhancement as a response to user envy on SNSs. Thus, different cultures respond differently to SNS-induced feelings of envy. Moreover, while most of the existing studies on SNSs compared users between countries (e.g., Cho & Park, 2013; Huang & Park, 2013), our work demonstrates that culture studied at the individual level offers important theoretical insights into SNS usage.

5.2. Practical implications

This research has practical implications for users and SNS platform providers. A greater understanding of user behavior on SNSs is important to maintain a healthy and sustainable platform environment. Addressing this goal, our work confirms that envy on an SNS may have some harmful outcomes to online social platform users, beyond being an unpleasant emotion as such. We find that to overcome envious feelings, users engage in self-enhancement behavior, gossip about others, reduce their use of a platform temporarily or sign out altogether. Self-enhancement creates an SNS environment with an overwhelming amount of positive information on other users who seem superior in relevant domains, which can further spur feelings of envy in others – the phenomenon of envy spiral (Krasnova et al., 2015). The cultural dimension of individualism-collectivism is found to strengthen the relationship between envy on an SNS and self-enhancement. This finding suggests that the spiral of envy, and its harmful effects, is likely to be more pronounced in users high on individualism. Gossiping, the second behavioral response to envy, can cause substantial damage to online social communities, since it is targeted against the envied person (Zizzo & Oswald, 2001). The third one, avoidance, can harm the network's sustainability, when users decide to refrain from using the platform any longer. Thus, by reducing user exposure to envy-evoking encounters with social information, SNS providers can reduce undesirable behavior in users and counteract to increasing sign outs to ensure platform sustainability.

Taken together, our findings help to raise awareness about the underlying motivations of users to perform self-enhancement, gossiping, and discontinuing usage, which, according to our findings, can be at least partially rooted in users' attempt to act upon unpleasant feelings of envy.

5.3. Limitations and future research

Our investigation holds several limitations, which offer promising opportunities for future research. First, our study relies on a cross-sectional research design that only covers associations between the key variables in the model. This has been a dominant approach in prior research on envy (Cohen-Charash & Larson, 2017). However, future work could extend our findings by taking a closer look at the “dynamic mutually reciprocal relationship” (Folkman & Lazarus, 1990) between envy on an SNS, users' behavioral reactions and resulting emotional change. For example, a longitudinal design would allow researchers to further explore the effectiveness of the three behavioral strategies for

reducing envy on an SNS. Second, in response to a call for more holistic studies of envy patterns across user groups from different cultural backgrounds (Krasnova et al., 2015), we looked at two culturally different populations of SNS users (i.e., Germany and Hong Kong). Future research should include a greater number of cultural groups and examine the differences in how they respond to envy on SNSs. Third, our study participants are all college-age Facebook users. They are relevant target respondents as they have limited experience with envy strategies and are likely to engage in undesirable behaviors (Salovey & Rodin, 1988; Smith & Kim, 2007). However, future research should explore how other demographic segments respond to envy given the increasing penetration of SNS use across all age groups. Additionally, other platforms may offer interesting environments for further investigations. Although we would expect similar results for SNSs like Instagram, where favorable self-presentation is common and comparable features are provided, the results of this study are purely based on responses from Facebook users. Fourth, there are more behavioral responses than those investigated in this study, such as unfollowing a friend on an SNS as a milder example of avoidance strategy, or more desirable behaviors such as greater willingness to improve own performance and standing (Cohen-Charash, 2009; Schaubroeck & Lam, 2004). Fifth, future research should investigate the three behavioral strategies in more detail by exploring further relevant antecedents as well as testing rivaling explanations. Finally, because envy is a maladaptive emotion with associated undesirable behaviors on an SNS (i.e. gossiping), respondents might not have answered questions from our survey truthfully due to

social desirability. However, we think that the web-based anonymous survey design has limited the potential influence of social desirability (Bennett & Robinson, 2003). To conclude, we believe that our work has significantly extended and enriched prior SNS studies on envy and provides a valuable foundation for future research.

6. Conclusion

With the growing popularity of SNSs, the undesirable envy-driven effects of these platforms on users' subjective well-being have recently received attention from both researchers and practitioners. This work contributes to the emerging literature on envy on SNSs by developing a systematic understanding of how users respond to envy and how culture, specifically the dimension of individualism-collectivism, influences behavioral strategies to reduce envy on an SNS. Overall, this paper extends previous research on envy and helps to expand our current perception of how SNS-induced emotions relate to user behavior. By doing so, this study serves as a starting point for future research on the dysfunctional outcomes of SNS use.

Acknowledgments

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Appendix A. Sample-specific descriptive statistics

Items	Hong Kong sample		German sample		Combined sample	
	Mean	SD	Mean	SD	Mean	SD
Envy on an SNS based on Krasnova et al. (2015), and Vecchio (2000); Scale: 1 = (almost) never to 7 = very often						
<i>When using Facebook, how often are you thinking that:</i>						
Most of my Facebook friends have it better than I do. (SNSe1)	3.99	1.37	2.37	1.50	3.17	1.66
The posts of my Facebook friends get more attention than mine. (SNSe2)	4.34	1.50	3.43	2.09	3.89	1.86
I don't know why, but I usually seem to feel myself as an underdog on Facebook. (SNSe3)	3.53	1.41	2.11	1.49	2.81	1.63
It is somewhat annoying to see on Facebook how successful some of my Facebook friends are. (SNSe4)	3.72	1.33	2.52	1.52	3.11	1.57
It is somewhat disturbing to see how popular some others are on Facebook. (SNSe5)	3.72	1.38	2.45	1.62	3.07	1.65
It is somehow disturbing when I see on Facebook how much traveling others can afford. (SNSe6)	3.89	1.36	3.17	1.81	3.53	1.65
Self-enhancement on an SNS based on Krasnova et al. (2015); Scale: 1 = strongly disagree to 7 = strongly agree						
<i>In my communication on Facebook, I tend to ...</i>						
... show positive feelings when posting something. (SE1)	4.61	1.29	4.87	1.53	4.72	1.42
... share posts/photos showing me as a happy person. (SE2)	4.83	1.30	4.66	1.57	4.75	1.43
... present myself as successful. (SE3)	4.43	1.33	4.18	1.59	4.33	1.46
Gossiping adapted from Nevo et al. (1993), and Foster (2004); Scale: 1 = strongly disagree to 7 = strongly agree						
<i>After using Facebook, I catch myself ...</i>						
... gossiping with my friends about what others have posted. (GOS1)	4.87	1.18	3.97	1.77	4.42	1.59
... discussing with others the photos my Facebook friends have shared. (GOS2)	4.90	1.15	3.29	1.78	4.10	1.72
... telling my friends about interesting details I have learnt about others from Facebook. (GOS3)	5.06	1.12	3.93	1.82	4.46	1.65
... gossiping with my friends about other people's news from Facebook. (GOS4)	4.99	1.12	3.82	1.86	4.40	1.67
Discontinuous Intention based on Maier et al. (2015); Scale: 1 = strongly disagree to 7 = strongly agree						
<i>To what extent do you agree with the following statements?</i>						
I will unregister from Facebook. (DI1)	2.84	1.49	2.11	1.41	2.45	1.48
In the future, I will use another social networking site. (DI2)	3.94	1.46	2.15	1.31	3.01	1.64
In the next 3 months, I won't use Facebook. (DI3)	3.93	1.53	1.99	1.38	2.92	1.74
If I could, I would stop my membership with Facebook. (DI4)	3.01	1.55	2.61	1.80	2.79	1.68
Individualism-collectivism based on Srite and Karahanna (2006), and Hoehle et al. (2015); Scale: 1 = strongly agree to 7 = strongly disagree (Thus, higher scores, indicate a higher level of individualism.)						
<i>To what extent do you agree with the following statements?</i>						
Being accepted as a member of a group is more important than being independent. (IND1)	3.06	1.19	4.23	1.57	3.66	1.53
Group success is more important than individual success. (IND2)	3.32	1.24	3.65	1.46	3.51	1.39
Being accepted by the members of the workgroup is very important. (IND3)	2.71	1.06	2.71	1.36	2.71	1.23
Social information sharing on an SNS based on Koroleva et al. (2011); Scale: 1 = never to 7 = several times a day						
<i>On Facebook, how often do you?</i>						
... react to posts of your friends (e.g., by commenting, "liking" etc.). (SIS1)	4.79	1.79	3.93	1.64	4.35	1.77
... post something (e.g., status update, photos, links etc.). (SIS2)	3.20	1.50	2.27	1.21	2.81	1.44

... keep your friends updated about yourself. (SIS3)	3.74	1.83	2.24	1.28	2.98	1.73
SNS Satisfaction adapted from Au et al. (2008) ; Scale: 7-point scale						
How do you feel about your overall experience of Facebook use?						
Dissatisfied – satisfied (SAT1)	4.80	1.15	4.29	1.17	4.55	1.19
Displeased – pleased (SAT2)	4.79	1.21	4.31	1.03	4.55	1.14
Frustrated – content (SAT3)	4.61	1.42	4.24	1.00	4.43	1.14
Terrible – delighted (SAT4)	4.81	1.18	4.19	0.71	4.50	1.02

Appendix B. Square root of AVE (diagonal elements) and correlation between latent variables (off-diagonal elements) (combined sample)

	AGE	GEN	SNSf	SIS	SAT	SNSe	SE	GOS	DI	IND
AGE	1.00									
GEN	0.10	1.00								
SNSf	–0.24	0.00	1.00							
SIS	–0.06	–0.02	0.29	0.85						
SAT	–0.14	–0.09	0.07	0.18	0.86					
SNSe	–0.25	–0.05	0.14	0.25	–0.07	0.86				
SE	0.09	–0.10	0.16	0.30	0.12	0.27	0.93			
GOS	–0.15	–0.15	0.18	0.36	0.20	0.32	–0.18	0.90		
DI	–0.20	–0.05	0.13	0.11	–0.18	0.35	0.07	0.30	0.82	
IND	–0.14	–0.04	0.08	0.13	0.20	0.26	0.33	0.41	0.09	0.78

Note: GEN = gender, SNSf = number of SNS friends, SIS = social information sharing, SAT = SNS satisfaction, SNSe = SNS envy, SE = self-enhancement, IND = individualism-collectivism, GOS = gossiping, DI = discontinuous intention. Values on diagonal are square root of AVE.

Appendix C. Quality criteria of the constructs

	Hong Kong sample			German sample			Combined sample		
	CA	CR	AVE	CA	CR	AVE	CA	CR	AVE
Social Information Sharing	0.886	0.848	0.652	0.767	0.848	0.650	0.807	0.884	0.719
SNS Satisfaction	0.903	0.932	0.774	0.838	0.890	0.670	0.885	0.920	0.742
SNS Envy	0.872	0.905	0.656	0.882	0.915	0.684	0.904	0.916	0.680
Self-enhancement	0.902	0.939	0.871	0.923	0.951	0.867	0.926	0.953	0.871
Gossiping	0.913	0.939	0.794	0.903	0.932	0.775	0.925	0.947	0.817
Discontinuous Intention	0.827	0.897	0.747	0.838	0.902	0.754	0.837	0.891	0.673
Individualism-collectivism	0.717	0.829	0.622	0.676	0.803	0.583	0.696	0.820	0.614

Note: CA = Cronbach's Alpha, CR = Composite Reliability, AVE = Average Variance Extracted.

Appendix D. Factor loadings and cross loadings of latent variables

	GEN	AGE	SNSf	SIS	SAT	SNSe	SE	GOS	DI	IND
GEN	1.000	0.100	0.001	–0.015	–0.092	–0.044	–0.102	–0.151	–0.045	–0.052
AGE	0.100	1.000	–0.236	–0.056	–0.140	–0.247	–0.090	–0.153	–0.198	–0.146
SNSf	0.001	–0.236	1.000	0.287	0.077	0.158	0.155	0.179	0.119	0.090
SIS1	–0.072	–0.077	0.231	0.845	0.195	0.180	0.290	0.399	0.036	0.143
SIS2	0.018	0.058	0.258	0.834	0.115	0.177	0.206	0.161	0.094	0.063
SIS3	0.043	–0.085	0.247	0.853	0.148	0.280	0.240	0.243	0.156	0.107
SAT1	–0.064	–0.101	0.061	0.160	0.839	–0.093	0.144	0.160	–0.196	0.224
SAT2	–0.134	–0.151	0.105	0.161	0.867	–0.005	0.099	0.181	–0.155	0.158
SAT3	–0.048	–0.091	0.025	0.089	0.861	–0.120	0.038	0.139	–0.173	0.139
SAT4	–0.067	–0.136	0.068	0.227	0.881	0.008	0.138	0.216	–0.127	0.166
SNSe1	–0.071	–0.240	0.110	0.266	0.031	0.890	0.255	0.334	0.300	0.274
SNSe2	–0.037	–0.191	0.041	0.200	0.068	0.690	0.289	0.255	0.165	0.220
SNSe3	–0.037	–0.207	0.125	0.247	–0.065	0.863	0.250	0.268	0.346	0.237
SNSe4	–0.047	–0.173	0.135	0.197	–0.067	0.884	0.222	0.278	0.315	0.165
SNSe5	0.024	–0.261	0.187	0.185	–0.081	0.852	0.225	0.274	0.342	0.229
SNSe6	–0.065	–0.163	0.119	0.163	–0.082	0.800	0.177	0.199	0.184	0.153
SE1	–0.072	–0.095	0.157	0.275	0.112	0.239	0.921	0.431	0.036	0.292
SE2	–0.100	–0.062	0.118	0.249	0.097	0.217	0.932	0.410	0.054	0.311
SE3	–0.110	–0.094	0.158	0.311	0.142	0.284	0.947	0.482	0.091	0.341
GOS1	–0.138	–0.120	0.175	0.284	0.179	0.241	0.428	0.914	0.112	0.398
GOS2	–0.074	–0.160	0.191	0.363	0.197	0.321	0.388	0.881	0.228	0.320
GOS3	–0.176	–0.130	0.116	0.301	0.183	0.314	0.456	0.916	0.102	0.402
GOS4	–0.162	–0.139	0.165	0.290	0.177	0.275	0.445	0.904	0.106	0.376
DI1	0.026	–0.113	–0.007	0.019	–0.236	0.235	0.030	0.059	0.854	–0.015
DI2	–0.087	–0.231	0.197	0.224	0.005	0.310	0.119	0.280	0.770	0.228
DI3	–0.087	–0.253	0.168	0.133	–0.105	0.386	0.064	0.168	0.878	0.143

DI4	0.019	−0.009	0.005	−0.063	−0.324	0.204	−0.006	−0.037	0.775	−0.070
IND1	−0.077	−0.198	0.124	0.164	0.189	0.273	0.365	0.407	0.157	0.912
IND2	0.075	−0.062	0.061	0.084	0.144	0.106	0.133	0.244	0.124	0.687
IND3	−0.056	−0.016	−0.010	0.023	0.133	0.146	0.206	0.267	−0.086	0.717

Notes: The bolded numbers are the factor loadings of the measurement items on their corresponding constructs. GEN = gender, AGE = age, SNSf = SNS friends, SIS = social information sharing, SAT = SNS Satisfaction, SNSe = envy on an SNS, SE = self-enhancement, GOS = gossiping, DI = discontinuous intention, IND = individualism-collectivism. All evaluations were conducted with a combined sample.

Appendix E. Robustness test: results of the variance-based structural model (controls age and number of SNS friends are log transformed)

Dependent variable	Self-enhancement (H1)		Gossiping (H2)		Discontinuous intention (H3)	
	Main effects only	Full model	Main effects only	Full model	Main effects only	Full model
R ²	0.163	0.227	0.236	0.316	0.184	0.188
Adjusted R ²	0.149	0.210	0.223	0.301	0.171	0.170
Δ Adjusted R ²		0.061**		0.078**		−0.001
Control variables						
Social information sharing	0.20***	0.18***	0.21***	0.21***	0.05	0.05
SNS Satisfaction	0.08	0.03	0.15**	0.09*	−0.22***	−0.22***
Age	0.03	0.04	−0.02	0.01	−0.17***	−0.17***
Gender (1:Female; 2:Male)	0.08	−0.07	−0.12**	−0.11**	−0.04	−0.04
Number of SNS friends	0.11	0.10	0.12*	0.05	0.03	0.03
Main effect						
SNS envy	0.23***	0.17**	0.25***	0.18***	0.28***	0.26***
Interactions						
Individualism-collectivism		0.23***		0.31***		0.05
SNS envy* individualism-collectivism (H4)		0.10*		0.04		0.01

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

Model tested with SmartPLS 3.0.

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