Emotions and Spillover Effects of Social Networks Affective Well Being

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ABSTRACT

A growing body of literature supports the notion that the well-being of individuals is influenced by their social networks site (SNS) experiences. In this research, the authors analyze the effect of such SNS experience perceptions, termed social networks affective well-being (SNAWB) on behavior in non-SNS sites. Specifically, the authors ask if the visual interface design of a non-SNS site affects the level to which the decisions made in that site are influenced by the decision maker's SNAWB. Relating to theory on emotion and action readiness, this research hypothesizes on the expected effects of a visual interface design that includes elements that may trigger SNS-related emotions. To test the hypothesis, this paper conducts two experiments: 1) an online experiment and 2) a controlled lab experiment with eye-tracking. The results show that individuals' decisions are affected by the level to which the website interface design may trigger SNS emotions. The results further provide evidence on the emotional process leading to different effects according to the type of decision made.

KEYWORDS

Affective Well-Being, Decision Making, Emotions, SNS

INTRODUCTION

The prevalence of technology-based activities in the lives of individuals is raising increasing attention on the possible effects they may have on individuals' emotions and feelings. Specifically, the ubiquitous human interaction through social network sites (SNS) is expected to affect one's subjective well-being, a construct that relates to people's evaluation of their lives. These evaluations include emotional reactions to events, moods, and judgments they form about their life satisfaction and fulfillment (Diener et al., 2003).

While the active contribution of SNS content can have positive aspects (Boughzala, 2016; Carlson et al., 2016; Verduyn et al., 2015), there is increasing evidence for the negative relationship between viewing social network sites and well-being (Krasnova et al., 2015; Labrague, 2014; Pantic et al., 2012; Shaw et al., 2015; Smith & Kim, 2007; Tandoc et al., 2015; Verduyn et al., 2015). For example, it has been suggested that excessive use of social media sites can result in strong pathological and maladaptive psychological dependency on social media (Turel & Serenko, 2012) and a tendency to discontinue interactions (Turel, 2015). It has also been shown that online social networks use can be

linked with perceived loneliness (Matook et al., 2015) and that envy plays a significant role in SNS use (Krasnova et al., 2015). Overall, given the range of possible effects related to SNS, different individuals may have different emotions and feelings associated with the use of social networks (Krasnova et al., 2015). These feelings may be termed *social networks affective well-being* (SNAWB), and in this research, we ask how one's SNAWB affects his/her decision behavior online.

Theory related to emotion and action suggests that similarities in emotional structure may trigger similarities in action tendencies (Frijda, 1987). This means that when an arbitrary system renders its users to (subconsciously) build an emotional structure similar to that of social networks, actions in that environment may also be moderated by the user's SNAWB. This may be true even if the purpose and nature of the system or site is unrelated to social networks (which we term a *non-SNS site*).

Accordingly, in this research, we analyze whether the visual design of a non-SNS site may trigger SNS related emotions due to subtle visual design similarities (which we term *design cues*) and whether decisions made in that environment are biased and influenced by the SNAWB of the interacting users. In two experiments, we test whether similarities in visual design render SNAWB relevant in decision making, and how that emotional process takes place.

Our two experiments are designed to analyze the extent to which decision making is moderated by SNS design cues found in the non-SNS site in which the decision is made. We analyze both a decision that is primarily driven by rationality and competence (*investment decision*) and a decision that is more driven by affect (*employment decision*).

Specifically, since social network content is known to be considerably about outdoor activities and travel, that is, individuals often refer to activities (Hu et al., 2014), as well as positive portrayals of individuals (Hu et al., 2014; Krasnova et al., 2015; Lee-Won et al., 2014), the two decision sites differ in the extent to which they provide cues to positive portrayals of individuals and the outdoors as typically projected in SNS. We establish this by having the pictures of the company executive team portrayed in one site (henceforth, the *SNS-triggering site*) in a positive manner with an outdoor background, while the pictures of the executive team of the other site are portrayed with no SNS design cues (henceforth, the *non-SNS-triggering site*). Thus, the non-SNS-triggering site provides a control environment for behavior and emotion, against which we compare behavior and emotion in the SNS triggering site.

Our first experiment is an online experiment. This experiment allows for a large sample size and enables us to analyze whether the integrated design cues render SNAWB relevant in different types of decisions. That is, we analyze the mean effect of SNAWB on decision making, and possible differences in effects according to the type of decision made. Our second experiment is conducted in a controlled eye-tracking lab environment and comes to analyze the conditions for having such effects—namely, emotional structure and conditions of processing SNAWB design cues. Based on theory on emotion and action, we conjecture that the higher the exposure to SNS triggering design cues, the more they are internalized and processed, and the stronger the effect of SNAWB on the decision made. Overall, the results of both experiments support our hypothesis about the moderating effect of SNAWB on decision making in an environment with SNS-triggering design cues.

This study contributes to the understanding of the relationship between emotions and technology-based user behavior. Previous research associated with emotions and technology has focused on emotions when using social network sites (Cheikh-Ammar & Barki, 2013; Koch et al., 2012), communication of emotions (Wang et al., 2004), and the role of emotions in technology adoption (Beaudry & Pinsonneault, 2010; Partala & Saari, 2015). The current study adds to this line of research by enhancing our understanding of the role of emotional spillovers across different online environments. That is, we analyze how emotion-effects may propagate from one site to another and how this propagation of emotion affects decision making.

This study also contributes to the growing literature on the dark side of technology. Indeed, typically the information systems (IS) literature studies positive aspects of technology, and deficiencies are less often highlighted. For example, it has been noted that with effective interface design user

satisfaction can be enhanced (e.g., Hsieh et al., 2012), knowledge creation can be supported (e.g., Khodakarami & Chan, 2014), and engagement can be facilitated (e.g., Kim et al., 2013). However, technological innovations can come at a cost. While different interface designs come to facilitate enjoyment and ease of use, they can result in "bad habits" and addiction (Turel & Serenko, 2012). While online reviews are often thought to empower users, they may instead reshape preferences (Liu & Karahanna, 2017). Rather than improve communication in a workplace, work-related instant messaging technology can negatively affect task performance due to interruptions (Gupta et al., 2013). Our study relates to possible decision biases stemming from experience in SNS. We show that also here, potential positive outcomes of technology may be reduced due to spillover of negative effects of SNAWB.

The rest of this paper continues as follows. Section 2 provides a literature review. Sections 3 and 4 describe our two experiments, their analyses, and the results. Section 5 concludes with a summary and discussion.

RELATED LITERATURE

For almost two decades, social media penetrates almost every aspect of our lives, from the way we learn (Haythornthwaite, 2005; Paul et al., 2012), work with our colleagues (Ollier-Malaterre et al., 2013), consume products (Goh et al., 2013; Hajli, 2014), obtain information (Bond et al., 2012), vote (Spierings & Jacobs, 2014) and interact (Papacharissi, 2010; Jiang et al., 2013). As such, whether we are aware of it or not, our exposure to social networks affects the perception we develop regarding the quality of our lives, i.e., subjective well-being (Argyle, 2013; Diener et al., 2003).

Subjective well-being is composed of rational responses to events, as well as emotional, affective, experiences and sentiments (Diener et al., 2003). When considering the effect of social networks on subjective well-being, the latter, emotional responses, are especially relevant, as social networks have been shown to have unique emotional effects (Krasnova et al. 2015; Lee et al., 2013; Smith & Kim, 2007). Further, much of the content shared and consumed online is based on emotional sentiments (Brady et al., 2017; Chmiel et al., 2011; Coviello et al., 2014; Stieglitz & Dang-Xuan, 2013; Jin et al., 2017), stressing the potential of social networks to affect the emotional contributors to subjective well-being., i.e., SNAWB. Indeed, it has been suggested that excessive use of social media sites can result in strong pathological and maladaptive psychological dependency on social media (Turel & Serenko, 2012), and a tendency to discontinue interactions (Turel, 2015). It has also been shown that online social networks use can be linked with perceived loneliness (Matook et al., 2015), and that envy plays a significant role in reducing the cognitive and affective well-being of a user (Krasnova et al., 2015).

While the relationship between social networks and subjective well-being has recently gained increasing attention, the possible online behavioral aspects, outside SNS, that stem from perceptions of social network experiences, have been largely unexplored. This is unfortunate since it is highly conceivable that feelings associated with social networks experience would affect behaviors in other online contexts.

More specifically, one's interaction with social networks would be associated with different memories and images, which may be recalled in other, non-SNS, online contexts through visual design. In turn, when SNS memories and images come to a person's mind in other contexts, they make for emotional triggering events, or *internal events of emotion elicitation* (Scherer, 2005). That is, such recalled or imagined representations are facilitators of emotions (Ekman, 1994; Frijda, 2017; Scherer, 2004, 2005). In this context, one of the primary properties of social networks is their high use of photographs and videos (Rainie et al., 2012). For example, Snapchat experiences about 400 million snaps a day, with around 9,000 photos being shared every second (Lister, 2018). Notably, photos posted in social networks predominantly include positively self-posed pictures of a single person and are associated with outdoor activities in various locations (Hu et al., 2014; Krasnova et

al., 2015; Lee-Won et al., 2014). When the design of a non-SNS site incorporates such images, that site is expected to facilitate similar emotion elicitation, even if the online setting is not of an SNS.

Importantly, it is well agreed in theoretical frameworks that emotions involve states of action readiness (e.g., Ellsworth & Scherer, 2003; Frijda, 2017; Scherer, 2005; Strack & Deutsch, 2004). Arnold (1960) defines emotion as "felt action tendency." Frijda (1986, p.71) further defines *emotion* as "the readiness (or unreadiness) to enter into contact or interaction with some object, and the mode of that contact or interaction. … Emotions are tendencies to establish, maintain, or disrupt a relationship with the environment." These definitions have been proven to have much validity both in empirical studies (Frijda et al., 1989; Hardy, 2006; Roseman et al., 1994) and natural observations (e.g., Sheets-Johnstone, 1999; Susskind et al., 2008). For example, in empirical experiments, individuals identify emotions they have with action tendencies (Roseman et al., 1994); and neurological observations show that the facial expressions associated with emotions do not merely come to support communication, but rather are related to changes in action readiness (Susskind et al., 2008).

The relevance of emotions for actions has been recognized in IS research, mostly in the context of technology adoption. In this context, Straub (2009) has noted that there is a need for a more empirical basis for understanding the influence of emotions on the technology adoption process. The research on emotion-related constructs in technology adoption is mostly limited to such constructs as enjoyment and anxiety as deriving perceptions on ease of use (Venkatesh & Bala, 2008), rather than a more general emotional structure indicating action readiness. Further, these studies have looked at emotions within the context of a single system's use.

Related to this, while studies on IS and emotions were typically studied within the context of a single system, the theory above suggests their relevance across systems. Indeed, Partala and Saari (2015) show evidence that emotions experienced in "the most influential adoption events," affect adoption tendencies of other systems. This further lends support to the notion that similarities in design between an arbitrary website and SNS may trigger emotions that are similar, yielding similarities in decision actions. We hypothesize and test for such effects in two experimental studies, which we discuss next.

EXPERIMENTAL STUDY 1

In our first study, we analyze the relationship between SNAWB and the action readiness associated with a non-SNS site. Our main hypothesis is that the readiness of a decision-maker to take action in a non-SNS site is moderated by the interaction of the decision-maker's SNAWB and the level to which the site design has SNS emotion triggering design cues.

Hypotheses Development

Social networks have dual effects on one's well-being. On the one hand, people rationally engage with social media and appreciate its ability to fulfill their social needs (Malik et al., 2016; Sheldon & Bryant, 2016; Whiting & Williams, 2013). Specifically, individuals find social media useful in overcoming boredom and passing idle time, enabling social interactions, providing entertainment, and facilitating free expression (Whiting & Williams, 2013). On the other hand, the consumption of such media is associated with loneliness, excessive consumption of media, and the surveillance of others (Sheldon & Bryant, 2016; Whiting & Williams, 2013), acts which are linked to negative effects (Appel et al., 2016; Kross et al., 2013; Steers et al., 2014; Tandoc et al., 2015; Verduyn et al., 2015).

The less positive aspects of SNS experiences are most pronounced when considering one of SNS's most dominant features, namely, their facilitation of the extensive use of photos. Such photos are typically positively posed in various backgrounds, but the unique emotional-oriented experience in social networks renders these typically positive aspects of happiness, optimism, and fun also as a source for negative emotional outcomes (Krasnova et al., 2015). That is, while positive expressions of

individuals are typically contagious upon the observing individual, the effects may be less pronounced and even detrimental in the case of SNS.

More specifically, outside the SNS realm, research on emotional contagion has shown that exposure to an individual expressing positive emotions would produce a corresponding change in the emotional state of the observer. It has specifically been found that exposure to images of an individual smiling or frowning produced congruent changes in subjects' own facial expressions as well as physiological and self-reported measures of emotion, a process termed primitive emotional contagion (Hatfield et al., 1994; McHugo et al., 1985). In agreement with this, it has been shown that people sometimes deliberately show positive emotional displays to receive favorable social feedback (Pugh, 2001). For example, service employees often show positive emotional expressions in order to enhance consumers' consumption experiences (Barger & Grandey, 2006). Furthermore, people who express smiles are often perceived highly in many dimensions, such as kindness, sociability, pleasantness (Mueser et al., 1984), and politeness (Bugental, 1986).

Accordingly, our first hypothesis on the effect of positively posed photos in a non-SNS site is regarding the emergence of positive attitudes by the interacting individuals:

H1: A non-SNS website incorporating positively posed photos will enhance the propensity for engagement with the entity represented by the website.

Related to this, the positive contagious effect happens through subconscious imitation (Hatfield et al., 1994; Pugh, 2001; Tsai & Huang, 2002). In fact, the process is noted as "primitive emotional contagion," and defined as an individual's tendency to "mimic and synchronize facial expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally" (Hatfield et al., 1994, p.5). Indeed, Sutton (1991) showed that bill collectors expressed an emotion of urgency through their vocal tones to make debtors feel anxious and consequently pay off their debts. Similarly, Pugh (2001) showed that when bank tellers smile more and increase eye contact, the customers exhibit similar behaviors. Accordingly, due to the contagious effect of a positive display of attitude, we expect that a positive display of individuals in a website's pictures would have positive effects across different decisions:

H2: A non-SNS website incorporating positively posed photos will enhance the propensity for engagement with the entity represented by the website, regardless of the nature of the engagement considered.

While positively posed pictures are expected to have the noted positive contagion effect, SNS emotional perceptions may moderate this effect. Namely, there is substantial evidence for a negative effect of SNS use on affective well-being (e.g., Kross et al., 2013), giving rise to feelings of depression and loneliness (e.g., Selfhout, 2009). Since one of the core aspects of SNS is positive self-portrayal in pictures and posts (e.g., Appel et al., 2016; Qiu et al., 2012), exposure to such positively posed photos in other websites may trigger some of the emotions associated with SNS use. The less positive the perceived SNS experience one has, the less positive will the effect of the positively posed picture would be. We thus hypothesize the following:

H3: SNAWB moderates the positive effects of positively posed photos on the propensity of the interacting individuals for engagement with the entities represented by the website.

While contagion through emotional expression happens through subconscious imitation (Hatfield et al., 1994; Pugh, 2001; Tsai & Huang, 2002), emotions triggered through memory require some processing of their relevance to the action at hand. Experiences or events are emotionally relevant

when they appear to favor or harm the individual's goals, and emotions are expected to play a central role when it comes to actions taken towards fulfilling goals (Frijda, 2017). Such emotional processes are similar to processes of familiarity and recollection (Hajcak et al., 2012; Rugg & Curran, 2007; Yonelinas, 2001), which are evident in psychology (Philippot et al., 2003; Watkins et al., 2008) and pervasive in neurological studies (e.g., Aggleton et al., 2005).

Hence, further related to the moderating effect of SNAWB, we look at the level to which SNS related emotions may be processed as relevant for the engagement decision. An engagement can differ along the two dimensions of affect and competence (Judd et al., 2005; Ybarra et al., 2001). The more affective the expected engagement, the more the SNS related triggering emotions are relevant. That is, some engagements may entail affective consequences more than others, and the more affective the expected consequences of an engagement, the more relevant the SNS related emotions would be.

Under this framework, the affect dimension is more relevant in a work environment setting, while the competence dimension is more relevant in an investment setting. While both workplace engagements and investment engagements include both competence and affective dimensions, workplace engagements can be considered more prone to affect consequences than investment engagements. A work environment has many emotional consequences on the individual as the identity of the individual interacts on a daily basis with the identity of the organization he or she works at (Ashforth et al., 2008). Indeed, emotions have been shown to affect career choices (Farnia et al., 2018).

In the workplace, positive and negative affective events have been found to be directly related to intentions to leave or stay (Grandey et al., 2002). For example, by sampling employee job satisfaction ratings on a daily basis, Dimotakis, Scott, and Koopman (2011) show that workplace interpersonal interaction characteristics are highly associated with job satisfaction. Rosin and Korabik (1991) show that female managers identify office politics and a socially male-dominated environment as a core determinant of job satisfaction. It has further been shown that workplace-related events can lead to emotional exhaustion and various detrimental consequences stemming from it (Cropanzano et al., 2003; Goel & Thakor, 2005). In contrast to this, while investment decisions incorporate an affective dimension (e.g., Epstein & Freedman, 1994; Shepherd et al., 2009; Xie et al., 2005), they are more highly associated with the competence dimension (Farraghe et al., 1994; Marino, 1996). Namely, an investor's engagement with a company is mostly related to the following of relevant information. As such, while not irrelevant, affective-related information takes a secondary role. Such affective information includes corporate responsibility, customer care, and employee treatment (Epstein & Freedman, 1994; Hockerts & Moir, 2004).[1] Competence related performance information, on the other hand, is core in company investor relationships (Bushee & Miller, 2012; Farraghe et al., 1994).

Since investment engagements are primarily associated with the competence dimension while employment engagements are primarily associated with the affective dimension we hypothesize:

H4: The moderating role of SNAWB is more pronounced in the propensity to work for than propensity to invest in the entity represented by the website.

Methodology

We conduct an online experiment in which we ask users to make engagement decisions in two very similar online sites that differ only in the level to which their visual design is expected to trigger SNS emotions. Namely, the sites differed in the level to which the photographs are positively posed in various environments, which, as noted, is a dominant aspect of social networks (Hu et al., 2014; Krasnova et al., 2015; Lister, 2018; Rainie et al., 2012). For example, compare Figure 1 and Figure 2.

Participants were United States-based Amazon's Mechanical Turk workers. We opted for "master" workers, as they are considered by Amazon to be more reliable. Each subject was presented with two web pages pertaining to the executive teams of the two companies. Immediately after viewing

Figure 1. Example of company page designed to trigger SNS related emotions

each site, subjects were asked to decide on their propensity to engage with the company associated with that site further. The order of the companies was counterbalanced across subjects. Decisions were made along the two dimensions of affective and competence engagements, using measures of propensity to work for and propensity to invest in the company, respectively.

Finally, following their assessment of the companies, subjects were asked to indicate their level of SNAWB, with a scale based on Krasnova et al. (2015). Subjects also reported their general tendency to feel envy (Cohen-Charash, 2009), with a dispositional envy scale based on Smith et al. (1999). All items loaded as expected and showed both discriminant and internal validity (reported in Table 6 of the Appendix).

To rule out any bias related to the perception of team members in terms of their appearance and description, the photos' backgrounds and the postures of the team members were counterbalanced between subjects.[2] That is, the team members that were part of the SNS-triggering site for one subject would be part of the non-SNS-triggering site for another. An example of such counterbalanced information pages is depicted in Figure 3 of the Appendix. In total, our balanced sample includes 184 subjects.

Figure 2. Example of company webpage designed not to trigger SNS emotions

Results

We begin by analyzing the effects of team members expressing more positive facial emotions compared to more neutral ones. Table 1 provides the results of ANOVA tests pertaining to the difference between intention to work for (invest in) a company with more positive expressions vs. less positive expressions, when each company is evaluated independently.

Table 1. Difference between intention to work for (first row) and invest in (second row) a company with more positive expressions vs. less positive expressions

Variable	N	Mean	Std. Dev	Sig.	t stat
(1) Difference "work for" for individuals with positive emotions vs less positive emotions	184	0.33	1.12	0.0001	3.97
(2) Difference "invest in" for individuals with positive emotions vs less positive emotions	184	0.27	1.17	0.002	3.14
Difference (1–2)	184	0.05	0.86	0.37	0.89

Consistent with H1, the tests clearly show that individuals are more inclined to work with and invest in a company when its executive team members exhibit a more positive emotional expression. The results are significant at the 0.01 level in both cases, suggesting a process of emotional contagion. As for our H2 hypothesis, that the positive contagion effect would be similar across different decisions, we find supporting results as well. While the mean contagion effect on the working decision is slightly higher than on the investment decision, the difference in engagement propensity across the two decision types is insignificant (t = 0.89, $p < 0.37$).

We next turn to H3 and H4 and test the moderating effect of the SNAWB of the individual making the decision on the two types of engagements. In these regressions, we include the dispositional envy and the age of the respondents as control variables. The dependent variable in these estimations is the difference between the two sites in the propensity to work for the company (Table 2) and to invest in the company (Table 3).

The results depicted in both tables support hypothesis H3 on the moderating effect of SNAWB. SNAWB is significant at the 5% level across all estimation models, which supports the notion that one's SNAWB affects engagement decisions in non-SNS sites when such sites include SNS-emotion triggering elements.

However, the results do not support H4. While we have hypothesized that SNAWB would be more relevant for the work-related decision than the investment-related decision, Chi-square tests for

Table 2. OLS estimations of difference in the propensity to work for a company based on emotional expressions on the site

Work diff.	(1)	(2)	(3)	(4)
SNAWB	0.16*	0.17*	0.17*	0.17*
	(0.08)	(0.08)	(0.07)	(0.08)
Age	-0.004		-0.005	
	(0.01)		(0.01)	
Dispositional envy	-0.01	-0.01		
	(0.06)	(0.06)		
N	184	184	184	184
R^2	0.09	0.09	0.09	0.09

Standard deviations are in parenthesis. * indicates significance at 5%.

Table 3. OLS estimation of the difference in the propensity to invest in a company based on emotional expressions displayed on the site

Invest. diff.	(1)	(2)	(3)	(4)
SNAWB	0.19*	0.20*	0.18*	0.18*
	(0.09)	(0.09)	(0.08)	(0.08)
Age	-0.007		-0.007	
	(0.01)		(0.01)	
Dispositional envy	0.05	-0.05		
	(0.06)	(0.06)		
N	184	184	184	184
R^2	0.03	0.03	0.03	0.03

Standard errors are in parenthesis. * indicates significance at 5%.

the difference of coefficient across the decision types are insignificant. We investigate this further in Study 2.

Overall, the results support the notion that SNAWB is relevant in decision making in online environments that include SNS emotion triggering visual design. When a website's design includes visual cues that may trigger SNS emotions, the actions in that website will be moderated by the interacting person's SNAWB. While this experiment has provided evidence for the relevance of SNAWB according to the level to which SNS design cues are present, we have not related to the emotional process that takes place. In our next experiment, we further analyze the emotional process when visiting an SNS emotion-triggering site.

EXPERIMENTAL STUDY 2

In our second study, we seek evidence for the similarities in one's emotional structure after interacting with an SNS and after visiting a website with an SNS emotion triggering design. We further analyze the relationship between the level to which one processes the SNS emotion triggering design and the relevance of the established emotional structure for decision outcome.

Hypotheses Development

We extend our analysis regarding the incorporation of the triggered SNS emotion in decision making by investigating the formed emotional structure and the processing of emotions.

Emotional structure can be defined through the relevance of individual emotion-related words to one's state (Frijda, 1987), and this emotional structure amounts to action readiness. More specifically, Frijda (1987) provided a set of 36 words related to emotion and has shown that the same emotion-related word is associated with similar action tendencies by different individuals. Accordingly, a person's emotional structure and overall action readiness can be quantified based on the level to which that person identifies with each of those 36 words. Examples of these emotional words are: *attentive*, *indignant*, *anxious*, *restless*, *neutral*, *suspicious*, *relaxed*, *energetic*, and *serious*.

Emotions relate to one's experience from events. In the context of our research, this is the event of viewing a webpage with a certain design. If emotions triggered by SNS design cues are responsible for one's decision outcome, her emotional structure is expected to be similar to the emotion structure she forms upon an SNS experience. Accordingly, our first hypothesis is that the emotional structure following the act of viewing a webpage with an SNS triggering design is similar to the emotional structure following the act of viewing an actual SNS:

H1: An individual viewing a non-SNS website incorporating SNS design cues would have an emotional structure that is similar to the emotional structure that an individual has when viewing an SNS site.

In his comprehensive review of emotions, Frijda (1986) notes that action tendencies and emotions are equivalent. More specifically, "emotions are modes of relational action readiness either in the form of tendencies to establish, maintain, or disrupt a relationship with the environment or in the form of model of relational readiness as such" (Frijda, 1986, p. 71). Given the negative aspects associated with viewing SNS content (e.g., Krasnova et al., 2015; Smith & Kim, 2007; Verduyn et al., 2015), the more similar the emotional structure established in a site to that established in an SNS site, the lower the propensity for engagement with entities represented by that site.

H2: The more similar the emotional structure established in the site to that established in an SNS site, the lower the propensity for engagement with entities represented by the site.

To this end, much of emotional behavior is intentional rather than only brief and sudden (Frijda 1986, p. 98). Contrary to moods that appear and persist in the absence of obvious stimuli (Ekman, 1994), emotions can be defined as short-term affective responses to appraisals of particular stimuli, situations, or events having reinforcing potential (Matthews et al., 1998; Rolls, 1999). That is, emotions' effect on the action is contingent on what is termed *intentional structures*, which are motivated by signals processing (Frijda, 1986; Frijda, 2017).

For example, in some cases, a person may ignore stimuli and not change action readiness based on the stimulus; in other cases, the change in action readiness may be fully materialized (LeDoux, 2003). Overall, emotional response involves some level of cognition (Frijda, 2017; Lazarus, 1982). Rather than only brief and sudden emotions extend to intentions involving processing. The important role of these intentional cognitive structures is most obvious when considering complex (i.e., non-primitive) emotions (Frijda, 1986), such as those related to SNS. As opposed to primitive emotions, such as fear, the emotions triggered by SNS would not be sudden nor result in an instantaneous change. They are expected to be more complex and followed by some level of processing and yield an intentional structure. In the SNS environment, the emotion associated with envy, for example, may lead to an intentional structure to refrain from visiting the SNS, based on some level of processing rather than due to pure impulse. Correspondingly, similarities in emotional structure may yield similarities in intentional structure, subject to the emotions being processed as relevant for the goals of the user in that site.

Accordingly, we hypothesize that one's propensity to engage with entities represented in a website is moderated by the interaction of one's processing of the SNS emotion triggered as relevant, and the level to which the emotion triggered is similar to that experienced in an SNS site:

H3: The more the emotional structure established following the viewing of a non-SNS site is similar to the emotional structure of an SNS site, the more the processing is relevant to establish differences in decision outcome.

Related to the above, emotions are appraised for their relevance. That is, while emotions are triggered by an event would yield changes in action readiness, the change may not be equally materialized as the emotions are not equally relevant for any action. Through a cognitive process, as noted, an individual may find emotions relevant and change action accordingly, or, in contrast, may find the emotions irrelevant and suppress them (Lazarus, 1982).

Seeking support to the notion that the effect of SNS design cues is different across decision types, we extend our analysis and hypothesize in this study with respect to when such differences may emerge. Namely, in Study 1, we have not analyzed the extent to which similarity of emotional structure and the processing of emotions leads to differences in decision outcomes. In this study, we seek to learn if accounting for these aspects can help identify differences in decision outcomes according to decision type. Specifically, as previously noted, SNS are expected to support affective relations more than competence relations. Therefore, the similarity in emotional structure to an SNS site and the processing of the triggered emotions is expected to be more relevant for affect-related engagement decisions than to competence related engagement decisions. Since the affect dimension is more relevant in a work environment setting (Cropanzano et al., 2003; Dimotakis et al., 2011; Goel & Thakor, 2005), while the competence dimension is more relevant in an investment setting (Bushee & Miller, 2012; Farraghe et al., 1994; Marino, 1996), we expect the similarity of in emotional structure to that of an SNS, and the processing of the triggered emotions to yield a stronger behavioral response in work-related decisions than in investment-related decisions. We therefore hypothesize:

H4: Emotional-structure similarities between a website and SNS, and the processing of these emotions, impacts work-related decisions more than investment-related decisions.

Methodology

We conduct an eye-tracking experiment to observe the level to which 16 subjects (62% male, age between 23 and 48, all US-based) view and process the SNS emotion triggering design elements.

In the beginning of the experiment, subjects are asked to view their Facebook feeds for 3 minutes and then rate the level to which each of the 36 emotion-related words currently (at time of answering) applies to them. We then confront users with action decisions with respect to the sites of Study 1, which differ only in the level to which they are expected to trigger SNS-related emotions. Following the exposure to each of the two sites, we repeated the same emotion-related word questions.

We compare the answers to the emotion-related words following the viewing of Facebook and following the viewing of a stimulus site to assess the level of similarity in emotional structure experienced by the subject when viewing the site and when viewing an SNS.[3] Finally, the eye-tracking device was constantly recording the areas on the screen that the subjects were looking at. This enabled us to analyze the extent to which each subject gazed at the SNS emotion-triggering element of images with similar properties to those typically found in SNS.

Results

We begin by analyzing the emotional structure following an SNS viewing event and following each of the events of viewing the individual sites, i.e., following the viewing of an SNS-emotion-triggering site and a non-SNS-emotion-triggering site. Table 4 provides the t-test results of a difference in means between the two sites, regarding the level to which they differ in emotional structure from the emotional structure when visiting Facebook. Consistent with hypothesis H1, we see that the difference between the emotional structure following Facebook is more similar to the emotional structure following an SNS-emotion triggering site than to the emotional structure following a non-SNS-emotion triggering site.

We next analyze the effects of the SNS-triggering elements in the emotional cognition process. We consider the emotional structure established and the cognitive processing of the emotions. For this purpose, we utilize the eye-tracking data to obtain a measure of the level to which each individual has gazed at and processed the emotion-triggering elements (i.e., the photos) in the two sites. We devise two such measures, one based on the average time the individual has spent viewing the photos in the sites (*AvgFixation*), and the other based on the amount of time spent on viewing the first photo in the sites (*FirstFixation*).

We estimate the following regression model with fixed effects for company ordering:

$$DecisionDiff_i = \alpha_0 + \beta_0 EmoDiff_i + \beta_1 GazeTriggers_i + \beta_2 Interaction_i + \varepsilon_i$$

Table 4. Differences emotional structure after viewing Facebook and after viewing an SNS emotion triggering site (first row) and after viewing Facebook and a non-SNS emotion triggering site (second row)

Variable	N	Mean	Std. Dev.	Sig.	t stat
(1) Difference in emotional structure between SNS triggering site and FB	16	2.32	0.88		
(2) Difference in emotional structure between non-SNS-triggering site and FB	16	2.67	0.93		
Difference (1–2)	16	-0.34	0.63	0.04	-2.18*

* indicates significance at 5%.

where $DecisionDiff_i$ is the difference in decision outcome of individual i following the viewing of an SNS-emotion-triggering site compared to a non-SNS-emotion-triggering site. Namely, (propensity for engagement decision following viewing the SNS-emotion-triggering site *minus* propensity for engagement decision following viewing the non-SNS-emotion-triggering site) $EmotionalDifference_i$ is the difference in emotional structure difference (compared to SNS emotional structure) between the two sites, as experienced by individual i. $GazeTriggers_i$ is the level to which the individual has gazed at and processed the emotion-triggering design elements in the two sites (i.e., either *AvgFixation* or *FirstFixation*). Finally, $Interaction_i$ is the interaction effect of processing the emotions and the emotional structure difference, i.e.:

$$Interaction_i = EmotionalDifference_i \, GazeTriggers_i$$

The results of the estimations are presented in Table 5. Estimations 1 and 2 are with respect to differences in work decisions. Estimation 3 and 4 are with respect to differences in investment decisions. In estimations 1 and 3, the processing of emotion-triggering elements is measured using *AvgFixation*, and in estimations 2 and 4 using *FirstFixation*.

The results broadly support the hypotheses made. Beginning with the affective, i.e., work-related, decisions. With respect to H2, *Emotional Difference* is significant at the 0.05 level ($p = 0.05$) and at the 0.1 level ($p = 0.06$) in Estimations 1 and 2 respectively. That is, the more similar the emotional structure established in the SNS-emotion-triggering site to that established in an SNS site, the lower the propensity to respond positively in the work-related decision. With respect to H3, the *Interaction* variable is significant at the 0.01 level in both Estimations 1 and 2. That is, we find that the more the emotional structure of the SNS triggering site is similar to that of an SNS site, the processing of the raised emotions is relevant for the negative results to emerge, and this result is significant at the 0.01 level in both Estimations 1 and 2.

Table 5. OLS estimation of the difference in the propensity to work for a company (specifications 1 and 2) and invest in a company (specifications 3 and 4) based on emotional expressions displayed on the site

	Work diff. (1)	Work diff. (2)	Invest. diff. (3)	Invest. diff. (4)
	1.66*	1.62^	-0.14	-0.56
	(0.76)	(0.80)	(1.25)	(1.18)
$GazeTriggers$ (AvgFixation)	-0.0011		-0.0003	
	(0.0008)		(0.001)	
GazeTriggers (FirstFixation)		-0.0008		-0.0004
		(0.0007)		(0.001)
	-0.01**	-0.008**	0.003	0.004
	(0.0027)	(0.0026)	(0.0045)	(0.0038)
N	16	16	16	16
R^2	0.66	0.62	0.14	0.22

Note: Standard errors are in parenthesis. ^, *, and ** indicate significance at the 10%, 5%, and 1% level, respectively.

Estimations 3 and 4 are relevant for testing Hypothesis 4, that SNS triggered emotions would affect work decisions more than investment decisions. The insignificant coefficients in both estimations related to investment decisions, i.e., Estimations 3 and 4, support this. The results provide evidence that the emotional structure difference and their processing are relevant only in work-related decisions and not in investment-related decisions. Chi-square tests for the difference of the coefficients provide consistent results. The emotional structure similarity significantly differs in its effect on decision outcome of work decisions compared to investment decisions (χ^2 (1,16) = 5.89, p = 0.015 and χ^2 (1,16) = 3.61, p = 0.057 for *AvgFixation* and *FirstFixation*, respectively). Also, the effect of the interaction term, of emotional structure and processing, significantly differs between investment decisions and work decisions (χ^2 (1,16) = 11.12, p = 0.015 and χ^2 (1,16) = 8.43, p = 0.003 for *AvgFixation* and *FirstFixation*, respectively). In other words, the level to which the decision is affect-related rather than competence-related appears to determine whether SNS-emotion-triggered emotions yield changes in decision outcome.

SUMMARY AND DISCUSSION

In this research, we have analyzed the emotional processes that may emerge in non-SNS sites, due to emotions associated with SNS sites. We find evidence that positive contagion effects coming from photos with positive emotional gestures may be moderated by such photos' potential to trigger SNS emotions. Our findings show that due to SNS emotions, the propensities to work for or invest in a company represented by a website is reduced.

As such, our findings show that visual elements that may typically be considered as positive may also have negative effects. Specifically, we show evidence that while positive emotional gestures are typically considered to facilitate a favorable reaction, this effect may be moderated by emotions related to social networks experience.

Taken together, the results of our studies have shown evidence that the emotional structure of individuals viewing a webpage that includes positively posed photos, resembles their emotional structure after viewing an SNS. We further find that the higher the similarity in emotional structure established, and the more the photos are processed, the lower the favorable contagion effect of positive gestures in the photos. Finally, the negative emotions associated with social network perceptions are correlated with the level to which positive contagion effects are mitigated.

Implications for Research

These results have many implications for both researchers and practitioners. For research, the findings of this study facilitate a better understanding of the ramifications of SNS. Information Systems research is increasingly interested in the effects of SNS, and many studies have dealt with various direct effects they may have on individuals. While there is evidence of positive effects that come from the ability to self-express and obtain help (Tamir & Mitchell, 2012; Wang, 2013), negative emotions are largely associated with passive consumption (e.g., De Vries & Kühne 2015; Verduyn et al. 2015). The current research improves our understanding of how those negative emotions propagate to affect behavior in other online activities. As such, we propose a promising link between social networks and other online behaviors. Namely, since social networks are highly related to emotional content, social network experience manifests emotions that one triggered in other online contexts affect behavior. We believe that our approach of relating to theories on emotions and actions (e.g., Ellsworth & Scherer 2003; Frijda, 2017; Scherer, 2005; Strack & Deutsch, 2004) provides a promising venue for researchers interested in analyzing the effects of social networks experience on other online behaviors. We further believe that our findings about the relevance of emotional structure similarity, and the different effects of contagion and cognitive emotion can prove useful in research focusing on the analysis of emotional processes online.

Implications for Practice

For practitioners, this research can help facilitate the better design of online environments. We show that visual elements that may trigger emotions related to social networks may have detrimental effects. As such, designers may wish to mitigate their use of visual elements commonly found in social networks, especially if their users are also SNS users. In that case, the site may avoid including social networks triggering design elements in their websites. For example, companies that are interested in recruiting young individuals in congested areas may prefer not to include photos of their management team taken in outdoor areas. On the other hand, companies aiming for attracting investors from the older and wealthier social segments would benefit more from including such elements through emotional contagion. System designers may utilize advancement in cloud computing to better analyze their userbase, their demographics, and contexts of web interaction (Vahdat-Nejad et al., 2018; Psannis et al., 2018) and accordingly achieve efficient interface design with low computational complexity. Additionally, even if organizations wish to integrate some social *functionalities* in their sites in order to exploit potential benefits (Di Gangi & Wasko, 2016; Díaz-Díaz & Pérez-González, 2016), they may want to carefully consider which *interface* to include to support this. For example, such organizations may wish not to include profile pictures so that the previous SNS emotions would not be triggered in their websites.

Further, the results of this study may have more broad implications for practitioners, namely, that in general, it would be useful to consider the level to which their online environment is similar to other online environments, and thus may trigger emotions related to other online experiences. For example, it is possible that design elements commonly found in sites aimed at community support and positive causes can help trigger positive emotions in other sites. Another example is the "act" button commonly found in moral activities related sites may raise positive emotions. It is also possible that since written reviews are often with emotional experiences (Jing et al., 2018), that the inclusion of a freeform review interface may raise emotional triggers based on past experiences in reading reviews.

Future Research Directions

This study can facilitate many directions for future research. Related to the previous paragraph, it would be interesting to see how emotions are triggered in different platforms due to their visual similarity to other common platforms. We have analyzed visual elements commonly associated with social network sites, but analysis of other platforms may be similarly suggested. For example, knowledge community sites, such as Wikipedia and Stack Overflow, may trigger positive emotions due to their concentration on content related to knowledge sharing, which is not expected to be negative. Future research can examine whether borrowing design elements from such sites can prove beneficial. It is also possible to explore how some emerging specialized social networks, such as multimedia social networks (Zhang et al., 2017), may have special design elements and trigger unique emotional experiences. Another possible direction for future research is to analyze possible differences in emotional processes that take place based on user characteristics such as cultural differences, and design elements that are associated with specific regions (e.g., western vs. eastern).

Finally, a promising avenue for future research can be with respect to other effects of SNS-related emotions. While we have shown effects on interaction decisions, other effects may be analyzed. For example, future research may analyze how SNS emotion may affect the propensity to adopt or interact with new technological artifacts.

Overall, this research takes a step in advancing our understanding of the possible effects of SNS in online behavior and on the possible effects of interface design on emotions.

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ENDNOTES

[1]   Or possible herding behaviors, which may be considered as a sign of emotions associated with trading in general (Lin et al., 2011; Caparrelli et al. 2004).

[2]   The order of viewing the non-SNS triggering site vs the SNS triggering site was counterbalanced between subject.

[3]   The comparison measure is the vector distance between the two. That is, the square root of the summed square distance with respect to the agreement with each of the 36 emotion words.

APPENDIX

Table 6. Factor loadings

	Propensity for investment	Propensity for working	SNAWB	Dispositional envy
When you think about investing in this company, you feel …				
… excited	**0.88**	0.12	-0.01	-0.02
… happy	**0.86**	0.11	0.02	0.04
… motivated	**0.95**	0.02	0.01	0.03
… that this is something you would like to do	**0.88**	0.09	-0.01	-0.03
When you think about yourself working for this company, you feel …				
… excited	0.17	**0.80**	0.00	-0.02
… happy	0.15	**0.83**	0.02	0.04
… motivated	0.07	**0.84**	0.02	-0.02
… that this is something you would like to do	0.02	**0.90**	-0.00	-0.03
When you think about how you typically feel when using Facebook, to what extent do you feel …				
… happy	0.00	0.02	**0.94**	0.05
… optimistic	-0.02	-0.03	**0.86**	-0.03
… excited	0.11	0.04	**0.74**	0.08
… good about myself	-0.06	0.01	**0.86**	-0.11
The bitter truth is that I generally feel inferior to others.	-0.05	-0.01	-0.00	**0.92**
Feelings of envy constantly torment me.	0.15	-0.08	0.05	**0.68**
I am troubled by feelings of inadequacy.	-0.07	0.06	-0.06	**0.91**

Figure 3. Example of counterbalancing between subjects. The same team members were depicted in different design settings between subjects—triggering an SNS emotional structure, and a non-SNS emotional structure.

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