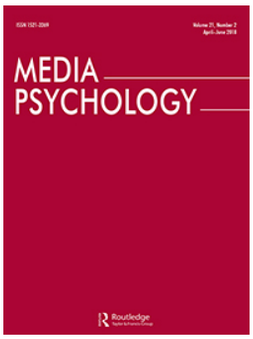

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Social Comparison as the Thief of Joy: Emotional Consequences of Viewing Strangers' Instagram Posts

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ABSTRACT

This experiment investigates the emotional consequences of viewing strangers' positive posts on Instagram. From a social comparison perspective, strangers' positive posts on social media are expected to negatively affect viewers' emotions. From an emotional contagion perspective, strangers' positive posts should positively affect viewers' emotions. The current lab experiment examines both the social comparison and the emotional contagion perspective while taking individual differences into account. Participants viewed positive, neutral, or no posts of confederates. In support of the social comparison perspective, individuals who tend to compare themselves to others reported lower positive affect if they had viewed positive posts than if they had viewed neutral or no posts. In support of the emotional contagion perspective, individuals who tend not to engage in social comparison reported higher positive affect after viewing positive posts than after viewing neutral or no posts. These findings indicate that individual differences in processing tendencies lead people to respond to social information on social media in opposite ways.

The pervasive use of social media has sparked concerns about the effect these websites have on users' mental health (e.g., O'Keeffe & Clarke-Pearson, 2011; Pantic, 2014). The American Academy of Pediatrics voiced worries in particular about "Facebook Depression" (O'Keeffe & Clarke-Pearson, 2011) and warns that the use of social media can lead to depressive symptoms. Although some authors indeed find that social media use is related to increased depressive symptoms (e.g., Pantic et al., 2012; Tsitsika et al., 2014), others show that social media use is not related to depressive symptoms (e.g., Datu, Valdez, & Datu, 2012; Jelenchick, Eickhoff, & Moreno, 2013) or is associated with decreased depressive symptoms (Thorsteinsson & Davey, 2014). One explanation for these contradicting

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findings is that the effects of social media use depend on the specific social media activities that individuals engage in (Frison & Eggermont, 2016). Therefore, research must focus on the effects of specific social media activities in order to understand the emotional consequences of social media use and to be able to provide explicit recommendations. The current study, thus, examines the affective consequences of one type of social media activity: browsing strangers' posts.

On social media, individuals will predominantly encounter positive posts, as people tend to present the most positive sides of themselves and their lives on these platforms (Lin & Utz, 2015; Qiu, Lin, Leung, & Tov, 2012; Reinecke & Trepte, 2014). Viewing these positive posts may have positive or negative consequences for the viewer's mood (Lin & Utz, 2015). A growing body of research studying social media from a social comparison perspective suggests that browsing others' positive posts has negative effects on mood through envy and the feeling that others have a better life (Chou & Edge, 2012; Haferkamp & Krämer, 2011; Sagioglou & Greitemeyer, 2014; Tandoc, Ferrucci, & Duffy, 2015). In contrast, emerging research focusing on this topic from an emotional contagion perspective suggests that positive posts from others evoke positive emotional responses among viewers, as individuals adopt the positive emotions expressed by others in their posts (Ferrara & Yang, 2015; Hancock, Gee, Ciaccio, & Lin, 2008; Kramer, Guillory & Hancock, 2014). Social comparison and emotional contagion perspectives, thus, predict opposing ways in which viewing positive social media posts affects mood.

The emotional consequences of viewing positive posts are currently not only theoretically but also empirically unclear. Studies have tested the emotional consequences of viewing others' posts in general (e.g., Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Sagioglou & Greitemeyer, 2014; Vogel, Rose, Okdie, Eckles, & Franz, 2015) or manipulated other factors such as (un)attractiveness or (un)successfulness of the poster (Haferkamp & Krämer, 2011) or tie strength between the poster and the viewer (Lin & Utz, 2015). However, the current experiment specifically compares the effects of viewing strangers' positive posts with viewing neutral or no posts while keeping all other factors constant. By systematically examining the emotional consequences of viewing positive posts from strangers in a controlled manner, we examine the validity of the theoretical premises that viewing strangers' positive posts affects mood negatively (social comparison perspective) or positively (emotional contagion perspective).

The effect of exposure to strangers' positive posts on mood may also depend on the viewer's characteristics. Media effects research indicates that there are important individual differences in how messages are processed and, as a result, in how they affect the viewer (Fikkers, Piotrowski, & Valkenburg, 2016;

Valkenburg & Peter, 2013; van Oosten, Peter, & Boot, 2015). Most relevant to the current topic, a number of experiments show that individuals' tendency to engage in social comparison influences the effects of exposure to social media content (Fardouly et al., 2015; Kleemans, Daalmans, Carbaat, & Anschutz, 2016; Vogel et al., 2015). The current study tests whether the tendency to compare the self to others moderates the effects of exposure to strangers' positive social media posts on mood. Testing if such a difference in processing tendencies impacts the affective consequences of viewing positive social media posts will tell us more about how social media posts are processed and what the consequences of these different types of processing are for emotional wellbeing. In addition to this theoretical contribution, the findings will guide practical recommendations about who should avoid and who may reap emotional benefits from browsing strangers' posts on social media.

Instagram

The current study examines the effects of viewing strangers' positive posts on Instagram, currently one of the fastest growing social media platforms (Duggan, 2015). Instagram is a mobile application through which users can share posts that consist of photos or videos and an accompanying caption (short text). Other users can like and comment on these posts. A defining characteristic of photo sharing on Instagram is the possibility to use a "filter." After users have taken a picture on their smartphone, they can give the photo a different look by changing the colors through the choice of a filter (e.g., black and white). In a survey of the general population of the Netherlands, 58% of participants aged between 15 and 19 used Instagram (Newcom, 2016). Similarly, in a sample of adults with online access in the United States, 55% of persons aged between 18 and 29 used Instagram, and 59% of Instagram users visited this platform daily (Duggan, 2015). Because the popularity of Instagram is still relatively new, less research has focused on Instagram than on other social media platforms (e.g., Facebook). However, it is important to study the effects of Instagram activities on users' emotional wellbeing given the popularity of this platform among adolescents and young adults (Duggan, 2015; Newcom, 2016). Furthermore, evidence is already emerging that Instagram use is related to mood (Lup, Trub, & Rosenthal, 2015).

Authors argue that the social information encountered on Instagram differs from social information on other social media platforms in a number of ways (Lup et al., 2015; Pittman & Reich, 2016). First, the centrality of images on Instagram sets it apart from more text-central social media platforms such as Twitter (Pittman & Reich, 2016). Initial research suggests that image-based social media posts have different consequences for viewers'

mood than text-based social media posts (Johnson & Knobloch-Westerwick, 2016).

Second, during Instagram use, individuals are particularly likely to view posts from strangers (Lup et al., 2015). On Instagram, connections are nonreciprocal, which means that users can choose to follow a person's updates without this person also subscribing to their updates (Hu, Manikonda, & Kambhampati, 2014). In addition, Instagram profiles and updates are often public, which enables users to view posts from people who they are not connected to online or offline (Hu et al., 2014). Research suggests that engaging with strangers' social media updates affects social media users in a different way than engaging with friends' posts and may have different implications for their emotional wellbeing (Chou & Edge, 2012; Lup et al., 2015). In a survey study among 117 young adults aged 18–29, Lup et al. (2015) found that Instagram use was related to increased depressive symptoms among individuals who followed relatively more strangers on Instagram. However, Instagram use was associated with decreased depressive symptoms among individuals who followed fewer strangers on Instagram (Lup et al., 2015). Similarly, in a survey among 425 undergraduate students, Chou and Edge (2012) found that individuals with more Facebook connections to persons who they did not know offline were more likely to agree that others have a better life than they do compared to individuals with fewer Facebook-only connections.

Third, posts on Instagram tend to be positively biased (Lup et al., 2015). Individuals engage in self-presentation and tend to select and emphasize the most positive aspects of themselves and their lives on social media in general (e.g., Lin & Utz, 2015; Qiu et al., 2012; Reinecke & Trepte, 2014). Although formal comparisons are lacking, scholars have argued that Instagram posts may be even more positively biased than Facebook posts, as the photo-enhancing feature may create a culture of polishing and perfecting (Lup et al., 2015). These characteristics of Instagram raise the question of how *positive* Instagram *images* from *strangers* affect viewers' mood. The current study, therefore, tests the affective consequences of viewing Instagram images with filters and captions that emphasize positive aspects of strangers' lives.

Social comparison

Instagram provides information about a vast amount of other people, what they are doing, and how they are feeling. According to social comparison theory (Festinger, 1954), people use such social information to learn about their own situation. Individuals compare themselves and their lives to others based on the information they receive about these others. Given the vast amounts of social information that social media offer, it is not surprising that

university students said in interviews that they compared themselves to others on social media (Fox & Moreland, 2015).

Social comparison has consequences for negative and positive affect (Dijkstra, Gibbons, & Buunk, 2010). Negative affect is the degree to which an individual experiences aversive emotions such as hostility or fear (Watson, Clark, & Tellegen, 1988). Positive affect, on the other hand, is the degree to which one feels enthusiastic, active, and alert (Watson et al., 1988). When individuals engage in social comparison, they decide whether they are doing worse or better than the comparison target (Dijkstra et al., 2010; Festinger, 1954). When individuals conclude that they are worse off than others, this can spark frustration and resentment and, therefore, increase negative affect (Dijkstra et al., 2010). Conversely, feeling that one is better off than others can produce feelings of relief and pride and, thus, increases positive affect (Dijkstra et al., 2010).

Research to date suggests that social media use increases the feeling that others are doing better and, as a result, increases negative affect and decreases positive affect (for a review see Appel, Gerlach, & Crusius, 2016). In survey research among college-aged young adults, social media use was positively related to the belief that others are better off (Chou & Edge, 2012; de Vries & Kühne, 2015). The belief that others are better off, in turn, was negatively related to emotional wellbeing (Feinstein et al., 2013). Furthermore, cross-sectional, prospective, and experience sampling research has shown that Facebook use is related to the negative emotion envy (for a review see Appel et al., 2016). In addition, university students reported in interviews that social comparison on Facebook made them feel jealous (Fox & Moreland, 2015). Also, in an experiment among 112 female students and staff members of a university participants (aged 17–25) reported a more negative mood balance after using social media platform Facebook than after using a control website (Fardouly et al., 2015). Furthermore, in one quasi-experiment among 89 depressed and non-depressed adults, individuals who viewed profiles of attractive peers (in terms of job and education, friends, likes, and comments) reported more envy than those who viewed unattractive profiles (Appel, Crusius, & Gerlach, 2015). Moreover, Haferkamp and Krämer (2011) performed an experiment with 91 participants (mean age 22.5) and found that people who viewed profiles of physically attractive others reported decreased positive affect in comparison to those viewing unattractive others.

The negative effects of general social media use on mood (Appel et al., 2016; Chou & Edge, 2012; Feinstein et al., 2013) have been attributed to the positivity bias on social media, that is, people's ability and tendency to present the most positive sides of themselves and their lives on these platforms (Lin & Utz, 2015; Qiu et al., 2012; Reinecke & Trepte, 2014). The current study tests if exposure to positively biased Instagram posts from

strangers has consequences for positive and negative affect relative to viewing no posts or neutral posts by the same strangers. Based on social comparison theory and previous research, we expect that after viewing positive posts from strangers on Instagram, individuals are more likely to conclude that they are worse off than others and less likely to conclude that they are better off than others in comparison to when they view neutral posts from strangers or no posts. As a result, individuals who view positive posts from strangers on Instagram are expected to experience increased negative affect and decreased positive affect. Based on social comparison theory and previous research we hypothesize:

H1: Instagram users who view positive posts from strangers experience a) more negative affect and b) less positive affect than Instagram users who view neutral posts from strangers or no posts.

Emotional contagion

Social comparison is not the only process through which browsing others' social media posts can have emotional consequences (Lin & Utz, 2015). Social information encountered on social media may also impact the viewer's affect through emotional contagion (Johnson & Knobloch-Westerwick, 2016; Lin & Utz, 2015). Emotional contagion is a process in which people adopt emotions expressed by others (Hatfield, Cacioppo, & Rapson, 1993). Initially, scholars believed that emotional contagion is caused by interaction partners automatically mimicking each other's facial expressions (Hatfield et al., 1993). However, more recent evidence suggests that facial mimicking is not a necessary condition for emotional contagion to occur (Hess & Blairy, 2001; Neumann & Strack, 2000). Instead, the mere detection of an emotion in another person seems to be sufficient to transfer this emotion to the person who detected the emotion (Neumann & Strack, 2000).

Emotional contagion is also not limited to face-to-face communication. Receivers of written messages are able to successfully detect emotions as intended by the source (Harris & Paradice, 2007) despite the limited social cues in written messages (Sproull & Kiesler, 1986). As a result, individuals can also adopt the emotions of another person without directly viewing them (Neumann & Strack, 2000). In one study among 88 students, participants were able to detect experimentally induced negative affect in interaction partners with whom they engaged in computer-mediated chat (Hancock et al., 2008). Moreover, engaging in computer-mediated chat with partners who were assigned to experience negative affect led participants to experience more negative affect themselves (Hancock et al., 2008).

Emotional contagion can also occur as a result of viewing others' social media posts (Ferrara & Yang, 2015; Johnson & Knobloch-Westerwick, 2016; Kramer et al., 2014; Lin & Utz, 2015). In a large experimental study among over 600,000 Facebook users, individuals who were presented with fewer positive posts from others on their experimentally manipulated Facebook timelines shared fewer positive posts and more negative posts themselves (Kramer et al., 2014). Conversely, participants who were exposed to fewer negative posts produced fewer negative posts but more positive posts (Kramer et al., 2014). Similarly, in a random sample of 3,800 Twitter users, posters who viewed relatively more positive tweets subsequently posted more positive tweets themselves, whereas posters who viewed more negative content posted more negative content themselves (Ferrara & Yang, 2015). In another study among 207 Facebook users (mean age 41.7), participants reported positive emotional responses to the majority of viewed Facebook posts (Lin & Utz, 2015). As the posts were mostly positive (Lin & Utz, 2015), this study also suggests that others' positive posts can elicit positive emotions among viewers. Furthermore, a study among 152 university students found that the more time participants spent looking at mock social media profiles and posts reflecting other people's career success, the more positive affect they reported themselves (Johnson & Knobloch-Westerwick, 2016).

Evidence to date, thus, suggests that individuals detect emotions in social media posts and adopt the emotions displayed in the posts themselves. Since positive posts will convey more positive and fewer negative emotions, viewing positive posts from strangers is expected to increase positive affect and decrease negative affect through emotional contagion. We test this notion in the current study and, in contrast to the first hypothesis, hypothesize based on emotional contagion theory and research:

H2: Instagram users who view positive posts from strangers will report a) more positive affect and b) less negative affect than Instagram users who view neutral posts from strangers or no posts.

Individual differences: The moderating role of social comparison orientation

According to recent advances in media effects research, the same media messages can result in different effects depending on how these messages are processed (e.g., Fikkers et al., 2016; Oliver, 2002; Valkenburg & Peter, 2013; van Oosten et al., 2015). In line with this perspective, the literature and reasoning above illustrate two ways of processing social information that can result in opposing effects on mood. Namely, the two contradicting hypotheses propose that a positive post from a stranger on Instagram will either

negatively or positively affect mood, depending on whether one responds with social comparison or emotional contagion. In line with this notion, Tandoc et al. (2015) found in a survey among 736 college students that viewing others' social media posts was related to increases in depressive symptoms when social media users engaged in negative social comparison. However, viewing others' posts was associated with decreased depressive symptoms when individuals did not engage in negative social comparison (Tandoc et al., 2015). Whether the emotional consequences of viewing strangers' social media posts are positive or negative, therefore, likely depends on how the viewer processes these posts.

The way social information on social media is processed, in turn, is subject to individual differences (de Vries & Kühne, 2015; Lee, 2014; Lup et al., 2015). People differ in the degree to which they compare themselves to others on social media (Lee, 2014) and in the degree to which they feel like they are worse off than others on social media (de Vries & Kühne, 2015; Lee, 2014; Lup et al., 2015). Some people are more likely to compare themselves to others and pay more attention to information that can be used for social comparison in general (Buunk & Gibbons, 2007). These individuals are labeled as having high levels of social comparison orientation (Buunk & Gibbons, 2007). Individuals with high levels of social comparison orientation are also affected more by social comparison and are particularly affected by social comparison in a negative way (for a review see: Buunk & Gibbons, 2007). Individuals who report high levels of social comparison orientation also process the social information encountered on social media in a different way than individuals with lower levels of social comparison orientation (Lee, 2014). A survey among 191 college students showed that students with higher levels of social comparison orientation used Facebook with an increased intensity, reported more frequent social comparison on Facebook, and reported more negative feelings from social comparison on Facebook (Lee, 2014).

As individual differences in social comparison orientation are related to differential processing of social information on social media (Lee, 2014) and the processing of social information is, in turn, related to differential effects of media messages (Fikkers et al., 2016; Valkenburg & Peter, 2013; van Oosten et al., 2015), social comparison orientation also moderates the effects of social media use (Fardouly et al., 2015; Kleemans et al., 2016; Vogel et al., 2015). In an experiment among 112 female participants aged 17–25, women with high levels of appearance comparison orientation were unhappier with their face, skin, and hair after browsing Facebook for 10 minutes than after browsing a control website, while this difference did not emerge among women lower in appearance comparison orientation (Fardouly et al., 2015). Another experiment, among girls aged 14–18, shows that social comparison orientation also moderates reactions to strangers' idealized Instagram posts (Kleemans et al., 2016).

Adolescent girls who viewed Instagram posts of other girls reported lower body satisfaction when the photos were retouched (using filters or manipulation of body appearance) than when the photos were not retouched (Kleemans et al., 2016). These negative effects on body image were stronger among girls who reported higher levels of social comparison orientation (Kleemans et al., 2016).

Evidence that individual differences in social comparison orientation also play a role in the emotional responses to others' social media posts is starting to emerge (Vogel et al., 2015). In one experiment among 120 undergraduate students, social comparison orientation was negatively related to affect balance (a composite measure of positive and negative affect) among students who viewed the Facebook profile of an acquaintance (Vogel et al., 2015). No such relationship was found among participants who viewed their own profile (Vogel et al., 2015). The results of this study suggest that when viewing others' social media posts, the tendency to engage in social comparison has negative affective consequences.

In the current study we test if social comparison orientation moderates the effect of viewing strangers' positive Instagram posts on positive and negative affect. Previous research indicates that individuals high in social comparison orientation respond more negatively to others' posts on social media due to their tendency to engage in social comparison and conclude that they are worse off than others (Fardouly et al., 2015; Kleemans et al., 2016; Lee, 2014; Vogel et al., 2015). We, therefore, expect that Instagram users with high levels of social comparison orientation will engage in social comparison when they see strangers' positive Instagram posts, which will have detrimental consequences for their mood (see Hypothesis 1).

Less is known about how individuals who do not have a tendency to compare themselves to others respond to social media posts. The finding that viewing others' social media posts is related to decreased depressive symptoms when Facebook users do not engage in negative social comparison (Tandoc et al., 2015) suggests that, when negative social comparison does not take place, social media messages are processed in a way that is beneficial to mood. Given the evidence described earlier, emotional contagion is a likely candidate for this alternative way of processing social information on social media. We, thus, expect that individuals who do not tend to engage in negative social comparison, that is, individuals with low levels of social comparison orientation, will process social information through emotional contagion, which has negative consequences for mood (Hypothesis 2). We, thus, expect individual differences in social comparison orientation to moderate the processing of strangers' posts and, as a result, the consequences of viewing strangers' posts for the viewers' affect. We hypothesize:

H3: The effects of viewing positive Instagram posts of strangers on affect are moderated by social comparison orientation in such a way that a)

individuals high in social comparison orientation report less positive and more negative affect after seeing positive posts from strangers (relative to viewing neutral or no posts), whereas b) individuals low in social comparison orientation report more positive and less negative affect after seeing positive posts from strangers (relative to viewing neutral or no posts).

Method

To test our hypotheses, we performed a one-factorial between-subjects experiment with three conditions (positive posts, neutral posts, and no posts). In this study, participants were asked to take a photograph of themselves (i.e., a selfie) with a smartphone and to post it on Instagram after they had viewed positive, neutral, or no posts (selfies) by strangers (confederates). By making the posting of a selfie the main activity rather than explicitly directing participants' attention to the posts of others we limited demand bias. Furthermore, this combination of activities mimics actual Instagram use in which posting and viewing posts of others can be combined.

Participants

We recruited 130 participants who received course credit or 5 euros as compensation for their participation. One participant withdrew from the study. In addition, three participants were excluded from the data because they failed the manipulation check. The final sample consisted of 126 participants (19% male, age range: 18–30 years, M_{age} = 21.4 years, SD_{age} = 2.4). According to Cohen (1992) a sample of this size offers sufficient power (.80) to detect a medium effect size at a .05 significance level using multiple regression analyses with three independent variables. The majority of the sample (92.1%) consisted of students from a wide range of study programs. On average, participants reported that, in the past week, they had spent 93.6 (SD = 95.4) minutes per day on social media in general and 14.9 minutes per day (SD = 22.6) on Instagram.

Procedure

Participants were recruited through the University of Amsterdam's website dedicated to the recruitment of participants for Psychology and Communication Science Research. The recruitment text informed participants that they could participate in an experiment about social media use by reporting to the university lab. Upon arrival, participants were asked to wait in a waiting room where they could read written information about the study

while the researcher prepared the experiment. After providing their informed consent, participants were lead to a cubicle. In the cubicle the researcher gave participants a smartphone and asked them to take a photograph of themselves and to upload this photo to the Instagram account linked to the smartphone.

The researcher asked participants to complete a questionnaire on the computer after they had posted their photograph and told them that they could report to the researcher again when they had completed the questions. A printed handout contained additional instructions for the participants to take a picture of themselves, upload it to the Instagram account, and to add a caption (short text) to accompany the photo. The researcher then left the cubicle. After completion of the tasks, the researcher checked that the participant had indeed uploaded a photo to the Instagram account and then deleted the photo from the account and from the phone. Two weeks after data collection was complete all participants received a debriefing through e-mail revealing the true purposes of the study. Ethical approval was obtained from the University of Amsterdam before recruitment for the experiment started.

Stimuli

Participants were randomly assigned to one of the three conditions. Participants who were assigned to the positive posts or the neutral posts condition were shown three posts on Instagram (see Figure 1). Each post showed a photograph of one of the three confederates with a caption (short text). To prevent suspicion about the aims of the study and to maximize external validity, participants were not explicitly told to view posts of other people. Instead, the Instagram homepage was loaded automatically when participants opened the Instagram mobile app on the smartphone to take and upload their own photograph. Depending on the condition, this homepage contained three positive posts or three neutral posts seemingly from previous participants (in fact confederates) or no posts. For this purpose, we used three smartphones that were each linked to one condition and were each signed into a different Instagram account. The photographs that functioned as stimulus material were selfies made by two female confederates and one male confederate. These photographs were also taken in the lab where the experiment was conducted to make it look like the posts were from previous participants. Similar to the participants in the study, the age of the confederates was between 18 and 30. After a participant had taken a picture of himself or herself and uploaded it to Instagram, the post was removed from the phone and from Instagram before the next participant took part in the experiment. This way, participants only viewed posts from confederates (or no posts).

Figure 1. Anonymized stimulus materials for the positive and neutral posts conditions and translations of the captions.

Positive posts condition. Participants who were assigned to the positive posts condition viewed three posts on Instagram containing the same photographs also presented to participants in the neutral posts condition. Although the original photographs were the same in the positive and the neutral posts

condition, a visual filter was applied to the photographs in the positive posts condition. In addition, the text that was presented as a caption to accompany these photographs was positively toned. The topic of the caption of each confederate post was the same in the positive and neutral posts conditions. The positive posts and their translations are shown in Figure 1.

Neutral posts condition. No visual filters were applied to the photographs viewed by participants in the neutral posts condition. In addition, the captions that accompanied these photographs consisted of a neutral text. The neutral posts and their translations are shown in Figure 1.

No posts condition. Participants who were assigned to the no posts condition did not view any posts or photographs on the Instagram homepage.

Measures

Manipulation check. Participants responded to a number of questions aimed to check if they were correctly exposed to the manipulation and perceived the manipulation as it was intended. A first question asked if the participants saw posts of others on the smartphone that they used to create their own post (yes or no). In addition, participants who answered that they had seen posts by others were asked if they knew any of the people in the photographs, as we were interested specifically in the effects of viewing strangers' posts. Finally, participants who had seen others' posts rated the extent to which they agreed that these posts were positive on a 5-point scale (1 = *absolutely disagree* to 5 = *absolutely agree*). We also asked participants who had seen others' posts to which extent they agreed that these posts were negative on a 5-point scale (1 = *absolutely disagree* to 5 = *absolutely agree*).

Positive and negative affect. To measure participants' positive and negative affect we used a validated Dutch translation of the Positive and Negative Affect Schedule (PANAS; Engelen, De Peuter, Victoir, Van Diens, & van den Bergh, 2006), as originally developed by Watson et al. (1988). Participants were presented with twenty different emotional states and indicated how much this emotional state corresponded with how they felt at that moment on a 5-point scale (1 = *not at all* to 5 = *completely*). Half of the emotional states corresponded to the positive affect dimension and half of the emotional states referred to the negative affect dimension. Results of a factor analysis confirmed the two-factor structure and the two factors together explained 49.7% of the variance. One factor formed the positive affect subscale (α = .85). Scores on these ten items were averaged to create a mean positive affect score per participant (M = 3.34, SD = 0.58). The ten other

items together formed the negative affect subscale (α = .90). Scores on these items were averaged to create a mean negative affect score per participant (*M* = 1.64, *SD* = 0.63). A higher score on the positive affect dimension means the person is more enthusiastic, active, and alert, whereas a lower score on the positive affect scale means that the person experiences more lethargy. The negative affect scale, on the other hand, ranges from calmness to aversive mood states such as anger and fear.

Social comparison orientation. To measure social comparison orientation, we used a shortened version of the Iowa–Netherlands Comparison Orientation Measure (INCOM). The original measure was developed and validated by Gibbons and Buunk (1999) in both Dutch and English. We downloaded the Dutch shortened version from Professor Abraham Buunk's website (http://www.apbuunk.com/pdf/questionaires/Scale-Social-Comparison-Orientation-NL.pdf). Participants indicated the degree to which they agreed with six statements on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). The statements presented situations in which one compares oneself to others (e.g., "I often compare what I have achieved in life with what others have achieved"). One item needed to be reverse-recoded. A factor analysis of the six items showed that they together formed one factor that explained 48.6% of the variance. We created a reliable scale (α = .78) by calculating the mean score of the six items for each participant (*M* = 3.47, *SD* = 0.68). A higher social comparison orientation score indicates that one has a greater tendency to compare the self to others, that is, across more situations.

Results

Randomization check

Analyses of variance and cross-tabs analyses showed that the conditions did not differ significantly in terms of age, $F(2, 123) = .273$, $p = .761$, gender, χ^2 $(2, N = 126) = .623$, $p = .732$, or social comparison orientation, $F(2, 123) = 1.87$, $p = .159$, of the participants. Furthermore, participants did not significantly differ in their social media use, $F(2, 122) = 2.87$, $p = .061$, or their Instagram use, $F(2, 122) = 1.67$, $p = .193$, across conditions. Randomization was, thus, successful.

Manipulation checks

To test our manipulation, we first checked whether the participants in the positive and neutral posts conditions indeed did see posts from others and if the participants in the no posts condition did not see posts from others as

intended. Three participants answered this manipulation check incorrectly. These three participants, who all indicated that they had not seen others' posts, while based on their assigned condition they should have, were excluded from all analyses. We then tested if the confederates and the participants were acquainted. As intended, all participants indicated that the photographs that they had seen were all of people who they did not know.

We then examined the means of the positivity and negativity measures to check if the posts in the positive posts condition were indeed perceived as positive and as more positive than the posts in the neutral posts condition. Participants in the positive posts condition rated the posts as positive, as the mean score was on the high end of the 5-point scale (M = 4.03, SD = 0.62). The mean score of the posts in the neutral posts condition was close to the mid-point of the positivity scale (M = 3.16, SD = 1.07), indicating that participants neither agreed nor disagreed that the posts were positive. A t test showed that the positive posts were perceived as significantly more positive than the neutral posts, $t(68) = -4.54$, $p = .000$. Regarding the perceived negativity of the posts, mean scores showed that the positive posts (M = 1.75, SD = .71) and the neutral posts (M = 2.60, SD = 1.35) both scored on the lower end of the negativity scale, indicating that the posts were not viewed as negative in either of the conditions. A t-test showed that the positive posts were viewed as significantly less negative than the neutral posts, $t(64) = 3.65$, $p = .001$. In summary, the neutral posts were neither seen as negative nor positive, the positive posts were seen as positive and not negative, and the positive posts were seen as significantly more positive and less negative than the neutral posts. The manipulation was, thus, successful.

Tests of hypotheses

In order to test the hypotheses using multiple regression, we first constructed dummy variables that distinguish between the different conditions. Because we were primarily interested in the differences between the positive posts condition and the other conditions we first constructed a dummy variable that distinguishes between the positive posts condition and the other conditions (1 = positive posts condition and 0 = other conditions). We also constructed a dummy variable that distinguishes between the neutral posts condition and the other conditions (1 = neutral posts condition and 0 = other conditions), so that we could check if potential differences between the positive posts condition and the other two conditions should be attributed to the effects of exposure to the positive posts or to effects of the neutral posts. To test Hypotheses 1 and 2, we conducted two multiple regression analyses, one for positive and one for negative affect (Model 1 in the Tables 1 and 2). To test the moderating effect of social comparison orientation proposed in

Table 1. Regression coefficients with standard errors for positive affect.

	Model 1			Model 2			Model 3		
Variable	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Direct effects									
Positive posts vs. rest	.087	.128	.497	1.24	.572	.032			
Neutral posts vs. rest	.144	.126	.254				–.840	.645	.196
SCO				–.009	.091	.923	–.191	.087	.029
Interaction effects									
Positive posts x SCO				–.370	.166	.028			
Negative posts x SCO							.272	.179	.133

Note. SCO = social comparison orientation.

Table 2. Regression coefficients with standard errors for negative affect.

	Model 1			Model 2			Model 3		
Variable	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
Direct effects									
Positive posts vs. rest	–.040	.138	.774	–.556	.619	.371			
Neutral posts vs. rest	.042	.136	.758				.104	.697	.881
SCO				.125	.098	.206	.176	.093	.062
Interaction effects									
Positive posts x SCO				.159	.180	.379			
Negative posts x SCO							–.020	.194	.917

Note. SCO = social comparison orientation.

Hypothesis 3, we used PROCESS for SPSS (Hayes, 2012) (Models 2 and 3 in the tables). Tables 1 and 2 summarize the findings for, respectively, positive and negative affect for the three different models.

Hypotheses 1 and 2 predicted, respectively, negative (reduced positive and increased negative affect) and positive consequences (increased positive and decreased negative affect) of exposure to strangers' positive posts. To test these hypotheses, we conducted two multiple regression analyses with the dummy variable distinguishing between the positive posts condition and the other two conditions and the dummy variable distinguishing between the neutral posts condition and the other two conditions as the two predictor variables. As a result, the no posts condition was the reference condition to which the other two conditions were compared. In the first analysis, positive affect was the dependent variable. This analysis (Table 1, Model 1) showed no significant difference in positive affect between the positive posts condition and the no posts condition, $\beta = .070$, $B = .087$, $SE = .128$, $p = .497$, and also no difference in positive affect between the neutral posts condition and the no posts condition, $\beta = .118$, $B = .144$, $SE = .126$, $p = .254$. In the second analysis we included the same predictors, but now negative affect was the dependent variable. According to this analysis (Table 2, Model 1), there was no difference in negative affect between the positive posts condition and the no posts condition, $\beta = -.030$, $B = -.040$, $SE = .138$, $p = .774$, and also no difference in negative affect between the neutral posts condition and the no

posts condition, β = .032, *B* = .042, *SE* = .136, *p* = .758. We, thus, found no main effects of viewing positive posts or neutral posts on affect. Both the first and the second hypothesis were, therefore, rejected.

Hypothesis 3 predicted that social comparison orientation would moderate the effects of exposure to strangers' positive Instagram posts on affect. Hypothesis 3a predicted that viewing positive posts would result in decreased positive and increased negative affect among individuals with higher levels of social comparison orientation. Hypothesis 3b predicted that viewing positive posts would result in increased positive and decreased negative affect among individuals with lower levels of social comparison orientation. We were, thus, interested not only in whether social comparison orientation moderated the effects of viewing positive posts but also wanted to know at which levels of the moderator these effects were positive and negative. We, therefore, used PROCESS for SPSS, a regression-based macro, to probe significant interactions in two ways. First, PROCESS estimated the effect of the independent variable at different levels of the moderator. Second, the Johnson–Neyman technique was used to estimate between which levels of the moderator the effect of the independent variable on the outcome variable was significant (Hayes, 2012).

The moderation analyses employed PROCESS for SPSS Model 1. We first investigated the interaction between the positive posts condition and social comparison orientation on positive affect. In this analysis, the dummy variable distinguishing between the positive posts condition and the other conditions was entered as a predictor, social comparison orientation was entered as a moderator, and positive affect was regressed on the predictors. In this analysis (Table 1, Model 2), the interaction term was significant, *B* = –.370, *SE* = .166, *p* = .028. In line with Hypothesis 3, the differences in positive affect between the positive posts and the neutral and no posts conditions, thus, varied depending on participants' level of social comparison orientation. Table 3 shows the effects of viewing positive posts at different levels of social comparison orientation. Johnson–Neyman significance regions showed that among individuals who scored 4.5 or higher on social comparison orientation, exposure to positive posts lead to significantly less positive affect than exposure to no or neutral posts. However, among individuals who scored 1.9 or lower on social comparison orientation, viewing positive

Table 3. Conditional effects of positive posts on positive affect.

Level of SCO	*B*	*SE*	*t*	*p*
1	0.868	0.411	2.11	.037
2	0.500	0.255	1.95	.053
3	0.127	0.128	1.00	.321
4	−0.243	0.151	−1.61	.111
5	−0.613	0.291	−2.11	.037

Note. SCO = social comparison orientation.

posts resulted in significantly more positive affect than viewing no or neutral posts. These results offer support for Hypothesis 3.

Next, we investigated the interaction effect for negative affect. Again, the variable distinguishing between the positive posts condition and the other conditions was entered as a predictor and social comparison orientation was entered as a moderator. However, now negative affect was regressed on the predictors. In this analysis (Table 2, Model 2), the interaction term was not significant, $B = .159$, $SE = .180$, $p = .379$. Since we also found no significant main effect, this result indicates that there is no effect of viewing positive posts on negative affect for individuals at any level of social comparison orientation.

To check potential influences of viewing neutral posts, we conducted two analyses that were almost identical to the moderation analyses above but exchanged the dummy variable for the dummy variable that distinguished between neutral posts and the other two conditions. In this way, we tested if potential effects of viewing neutral posts (relative to viewing no or positive posts) were moderated by social comparison orientation. The results, presented as Model 3 in Table 1 (positive affect) and Table 2 (negative affect), show no significant interactions between viewing neutral posts and social comparison orientation. The differences in positive affect between the positive posts condition and the neutral and no posts conditions among participants who reported high and low social comparison orientation are, thus, attributable to effects of viewing positive posts and not to effects of the neutral posts.

Discussion

The current study investigated the emotional consequences of viewing strangers' positive Instagram posts among people with varying tendencies to compare themselves to others. The results of this experiment show that, depending on how much the viewer tends to engage in social comparison, viewing positive Instagram posts from strangers can reduce or increase positive affect. Viewing strangers' positive Instagram posts decreased positive affect among individuals with high levels of social comparison orientation, but increased positive affect among individuals with low levels of social comparison orientation. We did not find differences in negative affect between participants who had viewed positive, neutral, or no Instagram posts at any level of social comparison orientation. These findings have a number of theoretical and practical implications.

The individual differences we found in the effects of exposure to positive social media posts are in line with current views of media effects (e.g., Fikkers et al., 2016; Oliver, 2002; Valkenburg & Peter, 2013; van Oosten et al., 2015). These views posit that the effects of media messages depend on how a certain

individual processes these messages (Fikkers et al., 2016; Oliver, 2002; Valkenburg & Peter, 2013; van Oosten et al., 2015). As a result, scholars have called for more research into individual differences in media effects (e.g., Oliver, 2002; Valkenburg & Peter, 2013). The current study responds to and reinforces this call. The finding that the effects of viewing positive social media posts on mood depend on an individual's tendency to engage in social comparison furthers our understanding of how individuals differ in their processing of these messages and the consequences of this differential processing. Individuals who tend to compare themselves to others across more situations likely respond to the positive Instagram posts of strangers with social comparison as well. The finding that strangers' positive posts diminish positive affect among these individuals high in social comparison orientation, thus, indicates that social comparison in response to strangers' positive posts can decrease positive affect. In line with previous research and theorizing about social media effects, the current study, thus, offers support for the notion that browsing social media has negative consequences when individuals compare themselves to others and conclude they are worse off (Chou & Edge, 2012; de Vries & Kühne, 2015; Fardouly et al., 2015; Haferkamp & Krämer, 2011).

The current study also points to an alternative way of processing positive posts from strangers on social media in addition to negative social comparison, namely emotional contagion. Among individuals who do not tend to compare themselves to others viewing strangers' positive Instagram posts resulted in increased positive affect. These results are in line with the idea that individuals adopt emotions expressed by others (Hatfield et al., 1993) and add to the evidence that emotional contagion can occur through viewing others' social media posts (Johnson & Knobloch-Westerwick, 2016; Kramer et al., 2014; Lin & Utz, 2015).

In contrast to our expectations, viewing strangers' positive posts only impacted positive affect but not negative affect. This finding is in line with a previous experiment in which viewing profiles of successful and attractive strangers also influenced positive affect but not negative affect (Haferkamp & Krämer, 2011). These studies together indicate that social comparison on social media can be the "thief of joy" but is not the catalyst of negative emotions. With regard to emotional contagion, it is not surprising that positive or neutral posts from others did not impact negative affect as participants in neither of the conditions viewed negative posts. The posts, thus, did not convey much negative emotion for the viewer to adopt.

The current study, thus, offers support for both social comparison and emotional contagion as processes underlying affective consequences of viewing social media posts by others. In addition, the results of the current study show that individuals differ in the degree to which these two processes and their opposing effects on positive emotions are triggered. These individual

differences and contrasting effects can help explain the mixed research findings regarding the emotional consequences of social media use (Datu et al., 2012; Jelenchick et al., 2013; Pantic et al., 2012; Thorsteinsson & Davey, 2014; Tsitsika et al., 2014).

The current study adds to our knowledge about the affective consequences of specifically viewing positive posts from strangers relative to viewing neutral or no posts. By making the posting of a selfie the main activity, rather than directing participants' attention to the posts of others, our methodological approach limited demand biases and made viewing posts of others a relatively natural occurrence. By using Instagram, instead of a platform built specifically for research purposes, we further maximized external validity as much as possible within this controlled lab setting. In this experiment, we manipulated the positivity of the posts through a text and a filter while keeping other characteristics of the posts constant (e.g., person portrayed, topic of the post) and used two control conditions: viewing neutral posts and not viewing any posts. As a result, we could specifically test the affective consequences of being exposed to the "positivity bias" in strangers' posts on social media. However, because both were manipulated at the same time, we do not know if the differences in positive affect were caused by the positive captions or by the filters. More research is needed to tease these effects apart.

Although the current study specifically examines the effects of viewing positive posts from strangers, future research could make use of our methodological approach to also investigate the effects of viewing other types of social media posts. For example, it would be interesting to investigate the affective consequences of viewing negative posts and examining how these effects may differ depending on one's tendency to engage in social comparison. Furthermore, the current study only investigated the effects of viewing posts from strangers. Previous research suggests that exposure to strangers' posts has different effects than exposure to posts from people closer to the viewer, such as their friends (Chou & Edge, 2012; Lup et al., 2015). The results of the current study can, therefore, not be generalized to viewing posts from persons with whom the viewer is acquainted. Future research could combine the theoretical and methodological approaches from this study and other studies (e.g., Lup et al., 2015) to investigate the effects of viewing, for example, posts from friends, acquaintances, or celebrities and differences depending on the individual's relationship with the poster.

The results of this experimental study have implications for individuals who view social media posts from strangers in daily life. The differences in positive affect between participants who had viewed positive posts and participants who had seen neutral or no posts were only statistically significant in the minority of individuals scoring at the low and high ends of social comparison orientation. However, the manipulation in the current study was

subtle. There were only three posts and these posts were not overly positive in comparison with the neutral posts (less than one point difference on a 5-point scale). Furthermore, as we did not direct participants' attention to the confederate posts, the processing of the social information in the posts may have been limited and potentially restricted to certain individuals who pay more attention to social information. It would be interesting to see what happens when individuals are actively looking at hundreds of positive posts from strangers across multiple days, weeks, or months.

Overall, the current study provides important insights into how social media posts are processed in different ways, among different individuals, and result in different affective consequences. Namely, our findings suggest that seeing strangers' positive posts can make social media users experience more positive affect but only if they do not compare themselves with these posts as this leads to less positive affect. Our recommendation regarding social media use is, therefore, both simple and difficult at the same time: Do not let social comparison be the thief of joy.

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