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**#COMPARISON: AN EXAMINATION OF SOCIAL COMPARISON ORIENTATION
ON INSTAGRAM AS IT RELATES TO SELF-ESTEEM AND STATE ANXIETY**

by

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**SUBMITTED TO SCRIPPS COLLEGE IN PARTIAL FULFILLMENT OF THE
DEGREE OF BACHELOR OF ARTS**

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PROFESSOR JENNIFER GROSCUP**

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Abstract

The purpose of this study was to examine social comparison orientation on Instagram as it relates to self-esteem and state anxiety. One hundred and ninety-six young adults (ages 18-30) who use Instagram at least once a week completed scales measuring social comparison orientation, self-esteem, and state anxiety before being randomly assigned to one of two Instagram feed conditions—one that displayed non-celebrity photos and the other that displayed celebrity photos. Participants were then post-tested using the same self-esteem and state anxiety scales. Information about Instagram use, information about participants' feelings toward the feeds, and demographic characteristics were also collected. It was expected that participants with high social comparison orientations (SCOs) would experience greater decreases in self-esteem and greater increases in state anxiety than participants with low SCOs across both conditions. Additionally, it was expected that all participants, regardless of SCO, would experience a greater decrease in self-esteem and a greater increase in state anxiety after looking at photos of non-celebrities in comparison to looking at photos of celebrities. Findings were insignificant, indicating that using Instagram may not be detrimental to mental wellbeing. A second follow-up experiment found a relationship between SCO and state anxiety, with higher SCO being related to a greater decrease in anxiety.

Keywords: social comparison, self-esteem, state anxiety, Instagram

#Comparison: An Examination of Social Comparison Orientation on Instagram as It Relates to Self-Esteem and State Anxiety

Technology is an ever-expanding phenomenon that has worked wonders to connect users with one another. One of the easiest ways for people to communicate in this technological age is through social media and social networking sites (SNSs). Social media has numerous benefits. For instance, it allows people to connect with one another on a global scale in a way that no previous technology has ever accomplished; websites like Facebook and Twitter have even been used to bring about political change, such as during the Egyptian revolution of 2011. It is no question that the rise of social media platforms has greatly improved communication between individuals of all ages and backgrounds.

In an attempt to further understand the impacts of social media on society, this study investigated the following questions regarding social media use, social comparison, and well-being: first, does the individual characteristic of social comparison orientation (SCO) relate to how individuals relate to social media? In particular, this project investigated if people with higher social comparison orientation—who are therefore more prone to compare themselves to others—experienced lower levels of self-esteem and greater levels of anxiety after using Instagram. Second, do the types of photos that users see on social networking sites interact with how individuals react to social media? Specifically, this project investigated if the source of the image (non-celebrity versus celebrity) related to social comparison and self-esteem differently.

Social Networking Sites: A Summary

Social networking sites are constantly growing and expanding entities. Popular examples of these sites include Facebook and Instagram. These two SNSs have quite a bit in common. Both sites allow users to interact with family, friends, and strangers. The premise of each site is

simple: a user creates an online profile and then connects with others via their profiles. Both platforms allow users to communicate publicly and privately via direct messaging. Additionally, SNSs like Facebook and Instagram are used more by younger people. Though Facebook has a high percentage of older adult users, it is still utilized more by younger people ages 13 to 34 than by older people ages 35 and over (Jetscram, 2014; McAndrew & Jeong, 2012; Ozimek & Bierhoff, 2016).

One of the biggest differences between these sites is the content of each SNS. Facebook allows users to post photos, videos, statuses, relationship updates, and a vast amount of other personal information on their pages. Instagram, on the other hand, deals almost exclusively with photos and short videos. Another large difference between the two is the number and age range of the users. Facebook has roughly 1.6 billion users, while Instagram clocks in at about 400 million users (Clark, 2016). This is hardly surprising, given that Instagram started in 2010, a whole six years after Facebook. Additionally, more younger people (under the age of 30) use Instagram than older people (ages 50 to 64; Parker, 2016), while almost half of Facebook users are over the age of 35 (Appuzo, 2014). However, despite their differences, both platforms (like most SNSs) are rife with opportunities to engage in social comparison, a theory developed by Leon Festinger that will be discussed in future sections of this paper.

Social Networking Sites: Are They All Bad for Well-Being and Mental Health?

As social networking sites have become more widespread, researchers have begun to evaluate how people interact with them and how they might be beneficial or harmful to their users' mental health. Some studies have found that SNSs are sometimes related to negative outcomes (Mabe, Forney, & Keel, 2014; Nesi & Prinstein, 2015; Rosen, Whaling, Rab, Carrier, & Cheever, 2013). For instance, a large number of Facebook friends can predict mental illnesses

such as bipolar disorder, narcissism, and histrionic disorder (Rosen et al., 2013). SNSs have also been found to be related to negative mental health in their users (Mabe, Forney, & Keel, 2014; Nesi & Prinstein, 2015). Facebook use has been found to be associated with depression in adolescents, with a greater association present when the children are less popular or female (Nesi & Prinstein, 2015). Additionally, Mabe, Forney, and Keel (2014) examined the relationship between disordered eating patterns and Facebook use and found that more frequent Facebook use is associated with greater levels of disordered eating.

However, certain studies have found SNSs to be harmless or even beneficial to their users (Cramer, Song, & Drent, 2016; Jang, Park, & Song, 2016; Jelenchick, Eickhoff, & Moreno, 2013; Steinfield, Ellison, & Lampe, 2008). Steinfield, Ellison, and Lampe (2008) found that Facebook can actually be beneficial to young people. Specifically, the researchers discovered that social capital was linked to self-esteem, while the use of Facebook influences social capital and thus interacts with self-esteem in a positive manner (Steinfield, Ellison, & Lampe, 2008). Similarly, Facebook has been found to be positively associated with social support and unrelated to mental health (Jang, Park, & Song, 2016), and Jelenchick, Eickhoff, and Moreno (2013) found no indications that Facebook use is related to depression. There is also some debate as to whether or not social comparison interacts with self-esteem; Cramer, Song, and Drent (2016) did not find that people with low self-esteem were more likely to engage in social comparison on social media. Clearly, the field is divided regarding the role of SNS use and mental health, and there is a lot that still needs to be investigated and settled before any definitive claims about social networking sites can be made. Currently, a lot of research is being done around the topic of social comparison theory and its relationship to social networking sites, self-esteem, and anxiety.

Social Comparison Theory

In 1954, Leon Festinger published his paper “A Theory of Social Comparison Processes.” This paper presents a theory explaining how people compare themselves with one another. According to Festinger, “There exists, in the human organism, a drive to evaluate his opinions and his abilities” (p. 117). Generally, people like to objectively evaluate their opinions and abilities to get a more accurate assessment of themselves in comparison to others. However, it is not always the case that one will be able to get an accurate and objective comparison, and in this case, Festinger hypothesizes, “To the extent that objective, non-social means are not available, people evaluate their opinions and abilities by comparison respectively with the opinions and abilities of others” (p. 118). That is, when an objective measure does not exist, one will resort to subjective comparison with other people.

However, people do not compare themselves to everyone they come across. Rather, they try to compare themselves to those who are most like them; as Festinger hypothesized, “The tendency to compare oneself with some other specific person decreases as the difference between his opinion or ability and one's own increases” (p. 120). This means that one will not compare oneself to someone whose abilities are too far above or below one's own abilities because it is impossible to get an accurate comparison in those cases. When others are deemed incomparable, a “status stratification” occurs whereby some people's abilities are seen as inferior while others are seen as superior (Festinger, 1954).

Additionally, not all social comparison is equal. There are three ways in which people engage in social comparison: upward comparison, horizontal comparison, and downward comparison (Vogel, Rose, Roberts, & Eckles, 2014; Wills, 1981). Upward comparison means that one compares oneself to those who are considered to be superior to oneself in some way

(Vogel et al., 2014), while downward comparison means that one compares oneself to those who are considered inferior (Wills, 1981). Horizontal comparison means one is comparing oneself to others whom one considers to be equal (Festinger, 1954). These types of social comparison can have different impacts on those who are engaging in the comparisons. Specifically, upward comparison may be more harmful, while downward comparison will likely make someone feel better about oneself in comparison (Wills, 1981). Horizontal comparison, on the other hand, may simply be a neutral way to gather information about oneself.

There are multiple reasons why someone might consciously or unconsciously engage in social comparison. In some instances, people purposefully engage in downward comparison—that is, they compare themselves to those of lesser ability—to protect and maintain their self-image (Wills, 1981). In contrast, when one wants to improve oneself, one might purposefully engage in upward social comparison (Corcoran, Crusius, & Mussweiler, 2011). In these instances, social comparison is a calculated choice on the part of the person engaging in it. However, Corcoran, Crusius, and Mussweiler (2011) present the idea that social comparison is not always purposeful. Through looking at past literature, these researchers presented the idea that social comparison happens for three possible reasons: first, people might do it for “self-evaluation, self-enhancement, [or] self-improvement” (p. 123). Second, it may be used to communicate with others. Third, it “might be an efficient cognitive tool to gain self-knowledge” (p. 123) that does not require overexertion of cognitive resources (Corcoran, Crusius, & Mussweiler, 2011). While some instances of social comparison—such as downward comparison and purposeful comparison—may be beneficial, social comparison is not always a positive experience for those who engage in it. This can be seen in studies that have been done on social media and social comparison theory.

Social Comparison Theory in a Social Media Context

Obviously, Festinger could not have conceived of social media applications as they exist today when he first presented his theory of social comparison in 1954. However, his theory can be readily applied to the social media context. Social networking sites are a great place to watch social comparison in action, because the layout of these sites breeds comparison, even if users do not realize it. SNSs like Facebook and Instagram make users create profiles and, in turn, interact with the profiles of other users. Comparison between profiles is an integral part of SNSs, which means that they are rife with opportunities to engage in social comparison. According to Lee (2014), SNSs are “one of the places where many people visit to interact with others and to see what and how others do” (p. 253). Thus, SNSs can act as breeding grounds for social comparison when people use them to evaluate themselves (Lee, 2014).

There are a number of reasons why social comparison in general is so prominent on SNSs. First, comparison information is made quantifiable in terms of friend count, number of likes, and number of comments, which makes the information more salient than it is in real life (Appel, Gerlach, & Crusius, 2016). Additionally, SNS users are constantly in the process of seeing personal information about others in the form of photos, statuses, etc., which, as Ozimek and Bierhoff (2016) point out, is likely to result in some level of social comparison. Another aspect of social media that is different from real life is that users are able to receive comparison information very quickly and easily (Tiggemann & Miller, 2010 as cited in Tiggemann & Zaccardo, 2015).

More specifically, SNSs are a breeding ground for upward social comparison (Vogel et al., 2014). The nature of social media revolves around putting one’s best foot forward, which easily leads users to engage in slightly upward social comparison (Vogel et al., 2014). Users on

SNSs have the resources to create profiles and personas that depict themselves in their best lights, with emphases on their positive traits (Gonzales & Hancock, 2011 as cited in Vogel et al., 2014). Generally, people post photos in which they look their best and are doing interesting things. Some of these photos may even be posted with filters or altered in some way to make the poster look better than they may be in real life (Tiggemann & Zaccardo, 2015). Thus, users are not comparing themselves to realistic versions of the people they follow, but rather idealized versions (Tiggemann & Zaccardo, 2015). Therefore, when users compare themselves to other users, they are engaging in upward comparison—comparing themselves to a fabricated persona that another person has carefully crafted.

This online social comparison can be detrimental to those who use SNSs. For instance, research has shown that social comparison orientation is related to negative feelings after Facebook use. Lee (2014) examined the relationships between self-esteem, anxiety, depression, and social comparison orientation. One hundred and ninety-nine college students in the United States completed an online survey about frequency of social comparison on Facebook, frequency of having negative feelings from comparison on Facebook, number of Facebook friends, Facebook use frequency, and social comparison orientation, among other things. Results showed that a person's social comparison orientation is positively related to the frequency of having negative feelings from comparison on Facebook (Lee, 2014).

It has also been found that user content and social network content impact how people feel about themselves (de Vries & Kühne, 2015; Vogel et al., 2014; Vogel, Rose, Okdie, Eckles, & Franz, 2015). For instance, Vogel, et al. (2014) conducted a study in which 128 undergraduates looked at social media profiles and found that participants rated themselves more poorly when engaging in upward social comparison. Additionally, de Vries and Kühne (2015)

examined the relationship between Facebook use and self-perceptions in relation to social comparison. After surveying 231 young adults (18-25 years old), they found that negative social comparison via SNS use was related to more negative self-perception in adolescents, especially among those who are already unhappy (de Vries & Kühne, 2015). Finally, Vogel et al. (2015) examined the relationship between Facebook use, social comparison orientation, and negative psychological outcomes. One hundred and twenty undergraduates were randomly assigned into three conditions—one in which they looked at a Facebook friend's profile, one in which they looked at their own profile, and one in which they performed a non-Facebook related online task. Results showed that on Facebook, people who have higher social comparison orientation—that is, who engaged in higher levels of social comparison—experienced more negative affect, lower state self-esteem, and lower trait self-perception than people with lower SCOs (Vogel et al., 2015).

Self-Esteem

Merriam-Webster defines self-esteem as “a confidence and satisfaction in oneself,” and that is the definition under which this study will operate. There is a growing body of research related to self-esteem and social media. In some instances, self-esteem is seen as a predictor for certain social media actions. For instance, Lee, Moore, Park, and Park (2012) found that people with different levels of self-esteem interact with Facebook differently. After 234 college students completed an online cross-sectional survey, a negative association between self-esteem and number of Facebook friends was found, but this negative association was only significant for people who are high in public self-consciousness (Lee et al., 2012).

A few studies have examined social comparison and self-esteem in terms of social networking sites other than Facebook, such as Instagram. Tiggemann and Zaccardo (2015)

examined the relationship between certain Instagram posts—namely, “fitspiration” posts—and women’s body image and self-esteem. One hundred and thirty female undergraduate students in Australia between the ages of 17 and 30 were divided into two groups, one of which looked at travel Instagram photos and the other of which looked at “fitspiration” Instagram photos. Then, they were asked to fill out scales measuring various things such as inspirational goals, state appearance comparison, and self-esteem. There was a significant difference of appearance self-esteem between the control travel group and the fitspiration group (Tiggemann & Zaccardo, 2015)

Clearly, a great deal of research has been done on the topic of self-esteem, social comparison theory, and social media. In certain instances, research has shown that self-esteem itself is related to how people use social networking sites (Lee et al., 2012). In other circumstances, self-esteem levels are not a predictor of social networking site use, but rather something that is intertwined with and related to social comparison (Lee, 2014; Tiggeman & Zaccardo, 2015). However, there seems to be a gap in this research. Specifically, while social comparison is examined, these studies do not take into account that fact that perhaps one’s reaction to social networking sites and one’s self-esteem could be impacted by one’s level of social comparison. This gap will be discussed in more detail later in the paper.

Anxiety

Anxiety is defined by Merriam-Webster as “painful or apprehensive uneasiness of mind.” There are many types of anxiety, ranging from Generalized Anxiety Disorder to specific anxieties about things such as weight. A few studies have been done relating to anxiety and social comparison theory. Social comparison can occur in many situations, which means that anxiety can occur for numerous reasons. For instance, social comparison is related to body

anxiety; Lin and Kulik (2002) found that women without boyfriends who compare themselves to images of skinny women had significantly more anxiety after looking at the photos than women with boyfriends. Additionally, the more women engage in social comparison, the greater their state weight anxiety (Tiggemann & McGill, 2004). Beyond body image anxiety, Salovey and Rodin (1984) also found that when individuals compare themselves to others who have done better than them on a self-relevant task, the jealousy they feel is often hand in hand with anxiety.

Moreover, anxiety has also been shown to interact with technology and social networking sites. This anxiety rears its head in multiple ways. For instance, people can become anxious by simply being away from their ringing phones (Clayton, Leshner, & Almond, 2015). Additionally, anxiety often interacts with SNSs directly. First, anxiety interacts with the way that people utilize SNSs; Fernandez, Levinson, and Rodebaugh (2012) found that people with social anxiety do not use Facebook more frequently than those who do not have social anxiety. However, it is possible to predict who has social anxiety because they are more likely to share a greater amount of information than those who do not have social anxiety (Fernandez, Levinson, & Rodebaugh, 2012). Additionally, social anxiety and the need for social assurance are both associated with problematic Facebook use, including difficulty focusing on academic work and interferences with social activities (Lee-Won, Herzog, & Park, 2015).

Clearly, a lot of research related to anxiety and social comparison has been done, particularly in the realm of body image and body anxiety. Other studies have looked at anxiety online, but not many studies have examined the relationship between anxiety, social comparison, and SNSs as they all interact together. The current study will focus on the relationship between all three, specifically focusing on state anxiety, which is a more temporary form of anxiety in

comparison to trait anxiety. State anxiety will be the focus because trait anxiety is a more fixed characteristic that would not change in the short span of time that it takes to complete the study.

What Is Left to Examine?

Though the research is relatively new, there is already a large body of work revolving around how social networking sites are related to self-esteem and anxiety, among other things. However, there are still certain gaps in the literature, which this study attempted to fill. First, many studies of SNSs utilize Facebook as their networking platform. This is likely because Facebook is widely used by people of many ages and is a well-established SNS. However, social media is a changing and growing entity, and there are now many other SNSs with which young people engage. Instagram, for example, is one such newer social networking site. Founded in 2010, Instagram is now used by over 400 million people, and that number is continuing to grow (Instagram, 2016). Instagram is a social networking platform based predominantly around photo sharing. There is also a private messaging system through which users can communicate, and in August 2016 a “story” feature was added. However, unlike Facebook, there are no statuses, public relationships, events, etc. It is strictly for image sharing.

Additionally, Instagram has a far greater capacity to interact with celebrity culture. On Facebook, one person “friends” another person, and that person must accept in order for both people to have access to one another’s profiles. Celebrities do sometimes have Facebook pages that people can “like,” but there is not as much room for communication. Instagram, on the other hand, functions with a “follow” system rather than a “friend” system. That is, a user can follow a second user’s account (assuming it is public) and can see that second user’s profile and photos without the second user having to follow the first user back. Because of this, it is very easy to

interact with celebrities. One can like and comment on the celebrity's posts, and many celebrities utilize this SNS. In these ways, Instagram differs greatly from Facebook.

In addition, a rift is forming between the target audiences of Instagram and Facebook. While the latter used to be the SNS of choice for young people, many are instead turning more toward the former. While Facebook is used by both younger and older adults, the percentage of young people who use Instagram is far greater than the percentage of older adults who use it; 55% of 18 to 29 year olds use it, compared to 11% of adults ages 50 to 64. (Parker, 2016). Older adults do not engage in as much social comparison as younger adults (Callan, Kim, & Matthews, 2015), so a study population of younger people may be more relevant to the field. Facebook is no longer the ideal SNS for finding out information about young adults and their engagement with social comparison. Thus, to examine how SNSs relate to young people's social comparison orientations, as well as their self-esteem and anxiety levels, it is time to turn to the newer forms of social networking, such as Instagram.

An additional gap in the current literature revolves around the general approach that most studies take. Specifically, many studies look at how social comparison as a whole interacts with other factors across all the participants. However, not all people experience the same level of social comparison (de Vries & Kühne, 2015). As was demonstrated by the research done by de Vries and Kühne (2015), unhappy participants demonstrated greater levels of social comparison that was stimulated by social media use. Therefore, it is fair to suppose that one's social comparison orientation would result in different interactions with social media, and in turn different changes to self-esteem and anxiety levels. However, with the exception of Vogel et al. (2015), few studies have sought to isolate social comparison orientation as an individual

characteristic and predictor of self-esteem and anxiety. Thus, this study sought to fill this gap, as well as the gap in research about Instagram use.

Finally, to the researcher's knowledge, most social media studies do not take into account Festinger's concept of status stratification—that people do not compare themselves to those whose abilities are too high above or below one's own. This is an interesting concept that should be tested further, especially in the realm of SNSs. Celebrities, for example, are common on Instagram because it allows fans to follow celebrities and see their photos and posts. In fact, a celebrity Instagram profile functions in exactly the same way that all Instagram profiles function. Celebrities generally have more money, resources, and free time than the average person. They are also almost always conventionally attractive and talented in some way, and so it can be assumed that they are often considered to be of a different status than non-celebrities when it comes to social comparison. Because of this, Instagram is a great platform to examine Festinger's theory because it provides the opportunity for examination of status stratification with its high concentration of celebrity profiles.

The Current Study

The current study utilized a quasi-experimental methodology wherein the participants' social comparison orientation scores served as one independent variable. A second independent variable was the type of Instagram feed participants looked at within this simulation, either celebrity or non-celebrity, peer photos. The study used a simulated Instagram feed in order to gain more knowledge about this fairly new social media platform. The target population of this study was all young adults (ages 18 to 30) in the United States, as it is entirely possible that a sample of American young adults would not generalize to other cultures. Young adults were chosen because they engage in more social comparison (Callan, Kim, & Matthews, 2015) and

because they use social media more frequently than older adults (McAndrew & Jeong, 2012; Ozimek & Bierhoff, 2016). This study examined the relationships between social comparison orientation, self-esteem, and anxiety in the context of social media use; more specifically, it sought to find whether higher social comparison orientation predicted a decrease in self-esteem and an increase in state anxiety after looking at Instagram.

The literature described above indicates that there is a relationship between social comparison orientation, self-esteem, and anxiety. Studies such as Lee (2014) and de Vries and Kühne (2015) have found that a person's social comparison orientation is positively related to the frequency of having negative feelings from comparison on Facebook. Studies have also shown that there is an interaction between social comparison on Facebook and lower levels of self-esteem (Vogel et al., 2015). The researcher believed that Instagram is another form of social media that was likely to yield similar results. Due to all previous research mentioned, it was hypothesized that:

H1: The effect of SCO would be dependent on the Instagram feed as they related to decreases in self-esteem such that in the non-celebrity "peer" condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs. This effect would be greater in the non-celebrity condition. There would be a main effect of SCO on decreases in self-esteem such that in general, individuals with high SCO would have a greater decrease in self-esteem than individuals with low SCO. There would be a main effect of Instagram feed on decreases in self-esteem such that in general, all individuals would

have a greater decrease in self-esteem after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed.

H2: The effect of SCO would be dependent on the Instagram feed as they related to increases in state anxiety such that in the non-celebrity “peer” condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs. This effect would be greater in the non-celebrity condition. There would be a main effect of SCO on increases in state anxiety such that in general, individuals with high SCO would have a greater increase in state anxiety than individuals with low SCO. There would be a main effect of Instagram feed on increases in state anxiety such that in general, all individuals would have a greater increase in state anxiety after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed.

General Method

Materials

This study utilized a 2 (social comparison orientation) by 2 (Instagram feed) between groups factorial design. The website surveymonkey.com housed the study’s survey.

SurveyMonkey is an online resource which allows people to create and participate in surveys.

The current study included previously established scales and two conditions that simulated Instagram feeds of either young (18-30 years old) non-celebrities or celebrities.

Measures

Social Comparison Orientation. The first scale utilized was the Iowa Netherlands Comparison Orientation Measure. This scale, created by Gibbons and Buunk (1999), was used to

measure each participant's social comparison orientation. The scale consists of 11 statements about social comparison orientation, including: "I often compare myself with others with respect to what I have accomplished in life," and "If I want to find out how well I have done something, I compare what I have done with how others have done." All statements are measured on a 5-point Likert-type scale ("I disagree strongly" to "I agree strongly"). The items together are reliable, with an internal consistency of 0.83 (Gibbons & Buunk, 1999). Items were averaged together, with two questions being reverse coded. A higher score indicates greater social comparison behaviors (Gibbons & Buunk, 1999). Please see Appendix A for the complete scale.

Self-esteem. The second scale utilized was the Rosenberg Self-Esteem Scale (Rosenberg, 1965). This scale was used to measure each participant's self-esteem level, both before and after interacting with the Instagram feed. This scale was created by Rosenberg (1965) and consists of 10 statements that include: "On the whole, I am satisfied with myself," and "I feel that I have a number of good qualities." Each statement is rated on a 4-point Likert-type scale ("Strongly Agree" to "Strongly Disagree"). "Strongly Agree" equals 4 points and "Strongly Disagree" equals 1 points, except when the statements are reverse-coded. The scale was scored by averaging the items together. The items together are reliable, with an internal consistency range from 0.77 to 0.88 (Rosenberg, 1965). Higher scores equate to higher self-esteem (Rosenberg, 1965). Please see Appendix B for the complete scale.

State anxiety. The third scale utilized was the short-form version of the state anxiety sub-scale of the Spielberger State-Trait Anxiety Inventory (STAI; Marteau & Bekker, 1992). This scale was used to measure each participant's state-anxiety level, both before and after interacting with the Instagram feed. This short-form scale was created by Marteau and Bekker (1992) and consists of 6 statements that include: "I am tense," and "I am worried." Each

statement is rated on a 4-point Likert-type scale (“Not at all” to “Very much”). Items will be averaged together with a higher score indicating more anxiety except in the instance of reverse coded items. The items together are reliable, $\alpha = .82$ (Marteau & Bekker, 1992). The higher the score, the more anxious the person (Marteau & Bekker, 1992). Please see Appendix C for the complete scale.

Other questions. The survey also included questions about participants’ feelings toward the feeds’ photos. These include: “The photos made me feel jealous,” and “The photos made me feel badly about myself.” Answers were given on a 5-point Likert-type scale (“Strongly disagree” to “Strongly agree”). Additionally, participants were asked “How do you think your life compares to the lives of the people in the photos?” Answers were given on a 5-point Likert-type scale (“Much less exciting” to “Much more exciting”). The survey also included manipulation checks to ensure that the participants perceived the subjects of the feeds to either be peers or celebrities depending on the feed to which they are assigned. These questions were phrased as follows: “Did you recognize the people in these photos?” and “Would you consider the people in these photos to be celebrities?” Participants were also asked how often they use Instagram and for how long, as well as how often they post photos. These questions were phrased as follows: “Roughly how many days a week do you go on Instagram?” (answers ranging from 0 to 7), “Roughly how many times a day do you go on Instagram?” (answers including 0-1 times a day, 2-3 times a day, 3-5 times a day, 5 to 7 times a day, more than 7 times a day), “Roughly how many minutes a day do you spend on Instagram? (answers including 0 to 30, minutes a day, 31 to 60 minutes a day, and more than 60 minutes a day), and “Roughly how many photos do you post a week?” (answers including 0 photos a week, 1-7 photos a week, and

more than 7 photos a week). Finally, open-ended demographic questions about age, gender, and ethnicity were asked. Please see Appendix D for the complete list of questions.

Stimulus Materials

Instagram feeds. The Instagram feeds were created by the researcher. Both feeds included 26 photos and portrayed 12 men and 14 women. The feeds featured one, two, or three posts per user so that each feed had a multitude of posters, simulating a real Instagram feed. The photographs of the non-celebrities were matched to the photos of celebrities in terms of content to the best of the researcher's ability. For example, a photo of singer Selena Gomez sitting on a car was matched by a photo of another young woman sitting on a car. Most celebrities were chosen because they are in the top 100 most followed Instagram accounts ("Top 100 Instagram Users," 2016), and thus were more likely to be recognizable to the participants as celebrities. In some instances, celebrities not in the top 100 were chosen because they posted photos that were easily matched by non-celebrity photos or had content that the researcher wanted to include (for example, singer Nick Jonas was chosen because he posts travel photos, something that is easy to recreate in non-celebrity photos). However, all celebrities that were used have millions of Instagram followers, and thus were likely recognizable to the participants. If not, the manipulation check alerted the researcher to any participants who did not realize the photos were posted by celebrities. The comments on the posts were removed to preserve the privacy of the commenters, but the number of likes, celebrity usernames, captions, and the photos themselves were not removed.

The non-celebrity photos were selected based on how adequately they matched their celebrity photo counterparts. These photos were found on Instagram through the use of hashtags. For instance, when finding a match to Selena Gomez's car photo, the researcher used the hashtag

“car” and scrolled through posts to find a match. All subjects in these photos appeared to be within the “young person” age range of 18 to 30 years old, and thus would theoretically be considered peers to the participants. The manipulation checks alerted the researcher to any participants who did not consider the subjects of the photos to be non-celebrities. All Instagram names and comments were removed to preserve the privacy of the posters and commenters. Only the photo, number of likes, and caption remained. Thus, the only difference between the peer group and the celebrity group in this area was that the celebrity names were not removed in order to help the participants identify the celebrities. For a sample of these Instagram photos, please see Appendix E.

Procedure

This quasi experiment was conducted on SurveyMonkey. First, participants were asked to read the informed consent form on the first page of the survey and click “agree” to participate in and begin the study. Participants next completed the social comparison orientation, state-anxiety, and self-esteem scales. After completing the scales, participants were randomly assigned to two conditions. Each condition explained to the participants that they were to scroll through a simulated Instagram feed all the way to the bottom, looking at each photo for at least five seconds. The study used a 2 (social comparison orientation) x 2 (Instagram feed) between-groups factorial design. Social comparison orientation was either high or low orientation, as divided by the median orientation score of all participants following survey participation. The Instagram feed was comprised of either non-celebrity photos or celebrity photos. These between-groups, quasi-experimental manipulations were fully crossed, resulting in four possible conditions. All other aspects of the survey were held constant across conditions.

After scrolling through the Instagram feed, participants were asked to fill out the self-esteem and state anxiety scales again. Two new variables—the change in self-esteem and the change in state anxiety from pre- to post-test—were calculated and used as dependent variables. The scales were followed by questions about the feeds. Subsequently, manipulation checks were asked. Finally, participants were asked a few questions about the frequency of their Instagram use as well as open-ended demographic questions. At no time were the participants' names gathered or associated with the responses. The responses to closed-ended questions were entered in an SPSS file for statistical analyses and responses to open-ended demographic questions were interpreted by a coder.

After completing the research tasks, participants were sent to a final debriefing page that explained the nature of the study and thanked them for their time and participation. This page also gave participants the information about how to enter their survey code into Mechanical Turk for compensation.

Ethics

This study did not involve a protected population, nor was there deception of any kind. No sensitive information was discussed or collected. The questions revolving around state anxiety were not used for diagnostic purposes. Additionally, all data collected was anonymous. SurveyMonkey was set not to collect IP addresses so that there is no way to trace the answers back to an individual. The data was stored on a password protected computer. The only questions participants were asked were scales used to assess social comparison orientation, state-anxiety, and self-esteem as well as demographic information and a few other questions about Instagram frequency and their opinions of the conditions, none of which were enough to identify any individual person. It is not likely that any of these questions caused a great deal of discomfort—

the anxiety questions may have been a bit uncomfortable for certain participants, but there were not many of them—and certainly none of the questions involved divulging sensitive information. Finally, this study was completely voluntary and all questions were also voluntary with the exception of the consent question and condition randomization question. Additionally, the consent page explained that all other questions were voluntary and that the participants could quit the study at any time without penalty if they wanted to do so.

The one minimal risk to participants was that they could leave the study more anxious and with lower self-esteem if the hypotheses are confirmed. However, participants were all Instagram users, which means that they voluntarily subject themselves to the possible side effects of Instagram use on a regular basis. Therefore, the study—which merely simulates an Instagram feed—was no more likely to harm a participant than their own weekly Instagram use. Given its potential findings and minimal risk, the benefits outweigh the risk to participants.

The first benefit of the study was its scholarly merit. This study added breadth and depth to the literature by filling certain gaps and extending the discussion to Instagram. The second benefit of this study was the monetary benefit for participants. All participants were paid \$0.50. Finally, the third major benefit was the real world implication of the study. SNSs are popular and widely-used and thus it is becoming increasingly important to know about the potential benefits and side effects of using them.

EXPERIMENT 1

Method

Participants

Three hundred and seventy-six people consented to participate in the study. Of these people, 25 people did not complete half or more of the study and were thus excluded from

further data analysis. Furthermore, another 46 people failed the manipulation checks. Finally, an additional 109 participants did not fit the target population, either because they did not use Instagram at least once a week or because they were over 30 years old. All these people were excluded from the sample, leaving 196 participants ranging in age from 18 to 30 ($M = 25.91$ years old). The sample consisted of 103 women, 92 men, and one gender non-conforming person. One-hundred and forty (71.4%) participants identified as White, 18 (9.2%) identified as Asian or Asian American, 13 (6.6%) identified as Latinx or Hispanic, 11 (5.6%) identified as Black, 4 (2%) identified as Mixed Race, 2 (1%) identified as Native American, and 8 (4.1%) failed to respond. Individuals who did not report ethnicity were retained in the study sample. Recruitment for this sample took place on Amazon's Mechanical Turk. Each participant was paid \$0.50 USD for their participation.

Results

Reliability Analyses

Cronbach's Alpha was used as a reliability test for the various scales. All scales were found to be reliable with α ranging from 0.819 to 0.904. The Iowa-Netherlands Comparison Orientation Scale had an internal consistency of $\alpha = 0.887$. Rosenberg's Self-Esteem Scale had an internal consistency of $\alpha = 0.902$ pre-Instagram feed and an internal consistency of $\alpha = 0.904$ post-Instagram feed. The six-item short-form of the State Scale of the Spielberger State-Trait Anxiety Inventory had an internal consistency of $\alpha = 0.837$ pre-Instagram feed and an internal consistency of $\alpha = 0.819$ post-Instagram feed.

Changes in Self-Esteem

A two-way analysis of variance (ANOVA) was used to test the first primary hypothesis: that the effect of SCO would be dependent on the Instagram feed as they related to decreases in

self-esteem such that in the non-celebrity “peer” condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs, and in the celebrity condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs. It was hypothesized that this effect would be greater in the non-celebrity condition. It was also hypothesized that there would be a main effect of SCO on decreases in self-esteem such that in general, individuals with high SCO would have a greater decrease in self-esteem than individuals with low SCO. Finally, it was hypothesized that there would be a main effect of Instagram feed on decreases in self-esteem such that in general, all individuals would have a greater decrease in self-esteem after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed.

A cutoff of $p < .05$ was used for concluding that a relationship was statistically significant. In the following analyses, change in self-esteem was operationalized as the difference between post- and pre-test self-esteem scores. There was not a significant main effect of SCO score on decrease in self-esteem, $F(1,192)=0.010$, $MSe=0.068$, $p=0.919$. Inconsistent with the hypothesis, decrease in self-esteem was no greater in people with high SCO scores ($M=0.0127$, $SD=0.25636$) than in people with low SCO scores ($M=0.0163$, $SD=0.26268$). There was not a significant main effect of Instagram feed on decrease in self-esteem, $F(1,192)=0.048$, $MSe=0.068$, $p=0.827$. Inconsistent with the hypothesis, decreases in self-esteem were no greater in participants who looked at photos of non-celebrities ($M=0.0186$, $SD=0.25840$) than in participants who looked at photos of celebrities ($M=0.0107$, $SD=0.26055$). There was not a significant interaction between SCO score and Instagram feed as they related to changes in self-esteem, $F(1,192)=0.106$, $MSe=0.068$, $p=0.745$. Inconsistent with the hypothesis, participants in the non-celebrity condition did not have greater decreases in self-esteem when they had high

SCO scores ($M=0.0225$, $SD=0.28547$) compared to low SCO scores ($M=0.0141$, $SD=0.22618$). Also inconsistent with the hypothesis, participants in the celebrity condition did not have greater decreases in self-esteem when they had high SCO scores ($M=0.0021$, $SD=0.22311$) than when they had low SCO scores ($M=0.0181$, $SD=0.29115$).

Changes in State Anxiety

Another two-way ANOVA was used to test the significance of the second primary hypothesis: that the effect of SCO would be dependent on the Instagram feed as they related to increases in state anxiety such that in the non-celebrity “peer” condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs. It was hypothesized that this effect would be greater in the non-celebrity condition. It was also hypothesized that there would be a main effect of SCO on increases in state anxiety such that in general, individuals with high SCO would have a greater increase in state anxiety than individuals with low SCO. Finally, it was hypothesized that there would be a main effect of Instagram feed on increases in state anxiety such that in general, all individuals would have a greater increase in state anxiety after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed.

A cutoff of $p < .05$ was used for concluding that a relationship was statistically significant. In the following analyses, change in state anxiety was operationalized as the difference between post- and pre-test state anxiety scores. There was not a significant main effect of SCO score on increase in state anxiety, $F(1,192)=0.083$, $MSe=0.107$, $p=0.774$. Inconsistent with the hypothesis, increase in state anxiety was no greater in people with high SCO scores ($M=0.0051$, $SD=0.40292$) than in people with low SCO scores ($M=0.0201$, $SD=0.22490$). There

was not a significant main effect of Instagram feed on increase in state anxiety, $F(1,192)=0.080$, $MSe=0.107$, $p=0.778$. Inconsistent with the hypothesis, increases in state anxiety were no greater in participants who looked at photos of non-celebrities ($M=0.0053$, $SD=0.30984$) than in participants who looked at photos of celebrities ($M=0.0195$, $SD=0.28317$). There was not a significant interaction between SCO score and Instagram feed as they related to increases in state anxiety $F(1,192)=0.120$, $MSe=0.107$, $p=0.729$. Inconsistent with the hypothesis, participants in the non-celebrity condition did not have greater increases in state anxiety when they had high SCO scores ($M=0.0065$, $SD=0.47605$) compared to low SCO scores ($M=0.0038$, $SD=0.17420$). Also inconsistent with the hypothesis, participants in the celebrity condition did not have greater increases in state anxiety when they had high SCO scores ($M=0.0035$, $SD=0.30984$) than when they had low SCO scores ($M=0.0333$, $SD=0.25990$).

Exploratory Tests

In addition to testing the primary hypotheses, several exploratory tests revolving around SCO and Instagram were conducted. The researcher was interested in seeing if there were any relationships between SCO and reactions to the photos. Specifically, it was investigated whether there was a difference between high and low SCO scores and responses to the question “How do you think your life compares to the lives of the people in the photos?” and the statements “The photos made me feel badly about myself,” and “The photos made me feel jealous.” Additional exploratory tests were run to see if there was a correlation between SCO score and frequency of Instagram use.

First, a two-way ANOVA was conducted to investigate the relationship between SCO score and Instagram feed on ratings of how exciting participants found their lives in comparison to the lives of the people in the photos. A cutoff of $p < .05$ was used for concluding that a

relationship was statistically significant. There was a significant main effect of SCO on answers to the question “How do you think your life compares to the people in the photos,” $F(1,191)=12.442$, $MSe=0.741$, $p=0.001$, with participants in the high SCO group rating their own lives as being less exciting ($M=2.0714$, $SD=0.864654$) than participants in the low SCO group ($M=2.4948$, $SD=0.85542$) in comparison to the lives of the people in the photos. There was not a significant main effect of Instagram feed on answers to the question “How do you think your life compares to the people in the photos,” $F(1,191)=1.407$, $MSe=0.741$, $p=0.237$. There was no difference in ratings between those in the non-celebrity condition ($M=2.3404$, $SD=0.82375$) and those in the celebrity condition ($M=2.2277$, $SD=0.93682$). There was not a significant interaction between SCO and Instagram feed on ratings of agreement with the question “How do you think your life compare to the lives of the people in the photos,” $F(1,191)=0.166$, $MSe=0.741$, $p=0.684$. For participants in the non-celebrity condition, there was no difference in ratings between those with high SCOs ($M=2.1176$, $SD=0.82375$) and those with low SCOs ($M=2.6047$, $SD=0.69486$). For the participants in the celebrity condition, there was no difference in ratings between those with high SCOs ($M=2.0213$, $SD=0.87201$) and those with low SCOs ($M=2.4074$, $SD=0.96189$).

However, this is not to say that these results mean that participants with low SCO scores rated their lives as more exciting; in reality, the majority of participants, regardless of SCO score, rated their lives as comparatively less exciting than the lives of the people in the photos; the mean score of all participants was 2.2821 ($SD=0.88366$). To reiterate, a score of 1 equated to “My life is much less exciting” and a score of 5 equated to “My life is much more exciting.” However, SCO did come into play in these ratings. Thus, this significant finding implies that

participants who had high SCOs thought that their lives were even less exciting in comparison to the people in the photos than participants who had low SCOs.

Additional two-way ANOVAs were conducted to investigate the relationship between SCO and Instagram feed as they related to participants' ratings of feeling badly and ratings of jealousy. A cutoff of $p < .05$ was used for concluding that a relationship was statistically significant. As mentioned in the methods section, participants were also asked to rate how much they agreed with the statements "The photos made me feel badly about myself" and "The photos made me feel jealous."

There was not a significant main effect of Instagram feed on ratings of the statement "These photos made me feel badly about myself," $F(1,192)=0.134$, $MSe=1.244$, $p=0.812$. There was no difference in scores between the participants in the non-celebrity condition ($M=2.1368$, $SD=1.03770$) and the celebrity condition ($M=2.0792$, $SD=1.18898$). There was also not a significant main effect between SCO score and ratings of the statement "The photos made me feel badly about myself," $F(1,192)=2.875$, $MSe=1.244$, $p=0.092$. There was no difference in scores between participants with high SCO scores ($M=2.2449$, $SD=1.23573$) and participants with low SCO scores ($M=1.9694$, $SD=0.96809$). There was no significant interaction between SCO and Instagram feed as they related to ratings of the statement "The photos made me feel badly about myself," $F(1,192)=0.134$, $MSe=1.244$, $p=0.715$. In the non-celebrity condition, there was no difference in scores between those with high SCO scores ($M=2.2353$, $SD=1.12407$) and those with low SCO scores ($M=2.0227$, $SD=0.92733$). Additionally, in the celebrity condition, there was no difference in scores between those with high SCO scores ($M=2.2535$, $SD=1.9259$) and those with low SCO scores ($M=1.9259$, $SD=1.00662$).

A two-way ANOVA was conducted to investigate the relationship between SCO and Instagram feed as they related to participants' ratings of agreement with the statement "These photos made me feel jealous." There was a significant main effect of SCO score on ratings of the statement "The photos made me feel jealous," $F(1,191)=11.686$, $MSe=1.318$, $p=0.001$. Participants in the high SCO group said they felt more jealous ($M=2.7755$, $SD=1.24793$) than participants in the low SCO group ($M=2.2165$, $SD=1.03307$). To reiterate, a score of 1 equated to "Strongly disagree," and a score of 5 equated to "Strongly agree." It is important to note that the mean score for all participants was 2.4974 ($SD=1.17699$), meaning that on the whole, participants did not report that the photos made them feel jealous; rather, this significant finding indicates that people with low SCO scores reported feeling even less jealous than their counterparts with high SCO scores. There was not a significant main effect of Instagram feed on ratings of the statement "These photos made me feel jealous," $F(1,191)=0.566$, $MSe=1.318$, $p=0.453$. There was no difference in scores between participants in the non-celebrity condition ($M=2.4526$, $SD=1.07948$) and participants in the celebrity condition ($M=2.54$, $SD=1.26667$). There was not a significant interaction between SCO and Instagram feed as they related to ratings of the statement "These photos made me feel jealous," $F(1,191)=0.761$, $MSe=1.318$, $p=0.384$. In the non-celebrity condition, there was no difference in scores between participants with high SCO scores ($M=2.6471$, $SD=1.16316$) and participants with low SCO scores ($M=2.2273$, $SD=0.93668$). Additionally, in the celebrity condition, there was no difference in scores between participants with high SCO scores ($M=2.9149$, $SD=1.33237$) and low SCO scores ($M=2.2075$, $SD=1.11560$).

Additional exploratory tests were run to examine if there was any relationship between SCO and the frequency with which people go on Instagram and/or post photos. A Pearson

Correlation was computed to assess the relationship between SCO score and how many times a day participants go on Instagram, how many minutes a day they spend on Instagram, how many days a week they go on Instagram, and how many photos they post a week. Almost all of these relationships were non-significant. There was no correlation between SCO score and how many times a day people go on Instagram, $r=0.138$, $N=196$, $p=0.054$. There was also no correlation between SCO score and how many days a week participants spend on Instagram, $r=0.071$, $N=196$, $p=0.323$. Finally, there was no correlation between SCO score and how many photos people post a week, $r=0.054$, $N=196$, $p=0.451$. There was a significant correlation between SCO score and how many minutes a day people go on Instagram, $r=0.162$, $N=193$, $p=0.025$.

Discussion

The purpose of this quasi-experiment was to examine the effects of social comparison orientation on self-esteem and state anxiety as a result of Instagram viewing. It was hypothesized that the results of this study would support the hypothesis that higher social comparison orientation, as well as looking at photos of one's peers, would be related to lower self-esteem and higher state anxiety. However, the insignificant findings of this study tell a different, more positive story about social networking sites and their place in users' lives.

This initial study demonstrated that there is no relationship between Instagram use and social comparison orientation as they relate to self-esteem and state anxiety. These findings suggest that high social comparison orientations are not related to lower levels of self-esteem or to higher levels of state anxiety after looking at Instagram. There was also no relationship observed for type of Instagram feed. Overall, there was very little change at all between pre- and post-Instagram scores of self-esteem and state anxiety, which indicates that the simulated Instagram viewing in this study had no relationship to self-esteem or state anxiety levels.

Several exploratory tests were significant and illuminated certain tendencies of people with high SCOs. First, it was found that participants who had higher social comparison orientations were more likely than those who had low social comparison orientations to feel that their lives were less exciting than those in the Instagram photos and to feel jealous of the people in the photos across Instagram feed type. However, the mean score for all participants when asked if the photos made them feel jealous indicated that they did not feel jealous of the people in the photos. There was no relationship between Instagram feed type or SCO score on ratings of feeling badly about oneself. When this data is all looked at together, it indicates that, while the participants did feel their lives were less exciting than the people in the photos (with those with high SCOs rating their lives as even less exciting), these feelings did not lead to jealousy, a decrease in self-esteem, or an increase in state anxiety.

Finally, exploratory tests found that there was a relationship between SCO and how often people utilize Instagram. It was found that a higher SCO score was correlated with more minutes a day spent on Instagram. This finding indicates that SCO is related to a higher usage of Instagram; though, as mentioned previously, this higher usage is not related to a drop in self-esteem or an increase in state anxiety.

A methodological limitation of this experiment was the fact that the Instagram feed participants looked at was not very long, containing only 26 photos. This was to keep the study relatively short to avoid participant burnout or fatigue, but in turn this means that participants were not exposed to the Instagram feed for very long. The survey instructed participants to look at each photo for at least five seconds, but as this study was conducted online there was no way to ensure that the participants actually did look at the feed for the requested period of time. Thus, it is entirely possible that there were not changes in self-esteem or state anxiety because

participants were simply scrolling to the bottom of the page without really looking at the photos, and/or not looking at the feeds for long enough to be impacted by them and their content.

Therefore, a second experiment was designed to better control for this potential confound.

EXPERIMENT 2

As noted above, a potential limitation of Experiment 1 was the lack of control for stimulus exposure. Thus, a second study was conducted to try to mitigate this issue. The goal of Experiment 2 was to try to make participants pay more attention to the photos and ensure that they were really looking at each one rather than scrolling through quickly. To try to address this methodological issue, two questions about the feed were added after each photo in the hopes of encouraging participants to take their time to more deeply process the information contained in the images.

Method

Participants

Three hundred and sixty-eight people consented to participate in the study. Of these people, 40 did not complete half or more of the study and were thus excluded from further data analysis. Furthermore, another 31 people failed the manipulation checks. Finally, an additional 106 participants did not fit the target population, either because they did not use Instagram at least once a week or because they were over 30 years old. All these people were excluded from the sample, leaving 191 participants ranging in age from 18 to 30 ($M=25.45$ years old). The sample consisted of 134 women and 67 men. One-hundred and twenty-nine (67.5%) participants identified as White, 18 (9.4%) identified as Asian or Asian American, 16 (8.4%) identified as Black, 16 (8.4%) identified as Latinx or Hispanic, 3 (1.6%) identified as Mixed Race, 1 (0.5%) identified as Native American, 1 (0.5%) identified as Middle Eastern, and 7 (3.7%) failed to

respond. Those who did not respond were nevertheless included. Recruitment for this sample took place on Amazon's Mechanical Turk. Each participant was paid \$0.50 USD for their participation.

Materials

The materials for Experiment 2 were nearly identical to the materials for Experiment 1, which was described in the General Method section. The only difference was the addition of two questions that were inserted after each photo in the Instagram feeds. After each photo, participants were asked "Do you like the photo above?" which was a yes or no question, followed by the question "How many likes did the photo above get?" This was a free response question.

Procedure

The procedure of Experiment 2 was the same as that of Experiment 1, which was described in the General Methods section. Participants completed the consent form and then proceeded with the survey. The only difference in the procedure was that the participants answered the two additional questions described in the Materials section which were intended to improve their processing of the images.

Results

Reliability Analyses

Cronbach's Alpha was again used as a reliability test for the various scales. All scales were found to be adequately reliable, with α ranging from 0.843 to 0.945. The Iowa-Netherlands Comparison Orientation Scale had an internal consistency of $\alpha=0.843$. Rosenberg's Self-Esteem Scale had an internal consistency of $\alpha=0.909$ pre-Instagram feed and an internal consistency of $\alpha=0.945$ post-Instagram feed. The six-item short-form of the State Scale of the Spielberger State-

Trait Anxiety Inventory had an internal consistency of $\alpha=0.868$ pre-Instagram feed and an internal consistency of $\alpha=0.872$ post-Instagram feed.

Changes in Self-Esteem

A two-way ANOVA was used to test the first primary hypothesis that: the effect of SCO would be dependent on the Instagram feed as they related to decreases in self-esteem such that in the non-celebrity “peer” condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs. It was hypothesized that this effect would be greater in the non-celebrity condition. It was also hypothesized that there would be a main effect of SCO on decreases in self-esteem such that in general, individuals with high SCO would have a greater decrease in self-esteem than individuals with low SCO. Finally, it was hypothesized that there would be a main effect of Instagram feed on decreases in self-esteem such that in general, all individuals would have a greater decrease in self-esteem after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed.

A cutoff of $p < .05$ was used for concluding that a relationship was statistically significant. In the following analyses, change in self-esteem was operationalized as the difference between post- and pre-test self-esteem scores. As in Experiment 1, there was no significant main effect of SCO on decrease in self-esteem, $F(1,187)=0.088$, $MSe=0.045$, $p=0.767$. Inconsistent with the hypothesis and consistent with Experiment 1, the decrease in self-esteem was no greater in people with high SCO scores ($M=0.0307$, $SD=0.15710$) than in people with low SCO scores ($M=0.0400$, $SD=0.25237$). Consistent with Experiment 1, there was no significant main effect of Instagram feed, $F(1,187)=2.951$, $MSe=0.045$, $p=0.087$. Inconsistent

with the hypothesis, decreases in self-esteem were no greater in participants who looked at photos of non-celebrities ($M=0.0590$, $SD=0.20053$) than in participants who looked at photos of celebrities ($M=0.0041$, $SD=0.22704$). Finally, consistent with Experiment 1, there was not a significant interaction between SCO and Instagram feed on decreases in self-esteem, $F(1,187)=0.300$, $MSe=0.045$, $p=0.585$. Inconsistent with the hypothesis, and consistent with Experiment 1, participants in the non-celebrity condition did not have greater decreases in self-esteem when they had high SCO scores ($M=0.0453$, $SD=0.16935$) than when they had low SCO scores ($M=0.0718$, $SD=0.22648$). Also inconsistent with the hypothesis, participants in the celebrity condition did not have greater decreases in self-esteem when they had high SCO scores ($M=0.0086$, $SD=0.13584$) than when they had low SCO scores ($M=0.0007$, $SD=0.27869$).

Changes in State Anxiety

Another two-way ANOVA was used to test the second primary hypothesis that: the effect of SCO would be dependent on the Instagram feed as they related to increases in state anxiety such that in the non-celebrity “peer” condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs. It was hypothesized that this effect would be greater in the non-celebrity condition. It was also hypothesized that there would be a main effect of SCO on increases in state anxiety such that in general, individuals with high SCO would have a greater increase in state anxiety than individuals with low SCO. Finally, it was hypothesized that there would be a main effect of Instagram feed on increases in state anxiety such that in general, all individuals would have a greater increase in state anxiety after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed.

A cutoff of $p < .05$ was used for concluding that a relationship was statistically significant. In the following analyses, change in self-esteem was operationalized as the difference between post- and pre-test state anxiety scores. Inconsistent with Experiment 1, there was a significant main effect of SCO on changes in state anxiety, $F(1,186)=4.059$, $MSe=0.080$, $p=0.045$. The main effect was in the opposite direction of the hypothesis; participants in the high SCO group had a greater *decrease* in state anxiety ($M=-0.0905$, $SD=0.27254$) than participants in the low SCO group ($M=0.0007$, $SD=0.29074$). Consistent with Experiment 1, there was not a significant main effect of Instagram feed on increases in state anxiety, $F(1,186)=0.203$, $MSe=0.080$, $p=0.653$. Inconsistent with the hypothesis, increases in state anxiety were no greater in participants who looked at photos of non-celebrities ($M=-0.0502$, $SD=0.27260$) than in participants who looked at photos of celebrities ($M=-0.0300$, $SD=0.30307$). Consistent with Experiment 1, there was not a significant interaction between SCO score and Instagram feed as they related to increases in state anxiety $F(1,186)=0.907$, $MSe=0.080$, $p=0.342$. Inconsistent with the hypothesis, participants in the non-celebrity condition did not have greater increases in state anxiety when they had high SCO scores ($M=-0.1138$, $SD=0.28655$) compared to when they had low SCO scores ($M=0.0101$, $SD=0.24634$). Also inconsistent with the hypothesis, participants in the celebrity condition did not have greater increases in state anxiety when they had high SCO scores ($M=-0.0552$, $SD=0.24970$) compared to when they had low SCO scores ($M=-0.0109$, $SD=0.33958$).

Exploratory Tests

As in Experiment 1, two-way ANOVAs were conducted to investigate the relationship between SCO score and Instagram feed on ratings of how exciting participants found their lives

to be in comparison to the lives of the people in the photos. A cutoff of $p < .05$ was used for concluding that a relationship was statistically significant.

Inconsistent with Experiment 1, there was not a significant main effect of SCO on answers to the question “How do you think your life compares to the people in the photos,” $F(1,187)=3.282$, $MSe=0.909$, $p=0.072$. There was no difference in ratings between those with high SCOs ($M=2.1932$, $SD=0.980894$) and those with low SCOs ($M=2.4175$, $SD=1.00513$). Inconsistent with Experiment 1, there was a significant main effect of Instagram feed on answers to the question “How do you think your life compares to the people in the photos,” $F(1,187)=18.350$, $MSe=0.909$, $p<0.001$. Participants in the non-celebrity condition rated their own lives as being more exciting ($M=2.5636$, $SD=0.97234$) than participants in the celebrity condition ($M=1.9753$, $SD=0.93508$) in comparison to the lives of the people in the photos. As in Experiment 1, it is worth noting that this difference is only in relation to the groups themselves; the majority of all participants responded that their lives were less exciting than the lives of the people in the photos ($M=2.3141$, $SD=0.99777$). Consistent with Experiment 1, there was not a significant interaction between SCO and Instagram feed on ratings of agreement with the question “How do you think your life compare to the lives of the people in the photos,” $F(1,187)=0.001$, $MSe=0.909$, $p=0.977$. For participants in the non-celebrity condition, there was no difference in ratings between those with high SCOs ($M=2.4340$, $SD=0.93046$) and those with low SCOs ($M=2.6842$, $SD=1.00282$). For the participants in the celebrity condition, there was no difference in ratings between those with high SCOs ($M=1.8286$, $SD=2.0870$) and those with low SCOs ($M=2.0870$, $SD=0.91472$).

Experiment 1 found no significant results relating to SCO and Instagram feed as they related to ratings of the phrase “The photos made me feel badly about myself.” Inconsistent with

Experiment 1, there was a significant main effect of SCO on ratings of the statement “These photos made me feel badly about myself,” $F(1,187)=4.834$, $MSe=0.991$, $p=0.029$. People with high SCO scores rated themselves as feeling more badly about themselves ($M=2.0909$, $SD=1.02426$) than people with low SCO scores ($M=1.8039$, $SD=0.97533$). It is worth mentioning that this significant difference does not mean that participants in the high SCO group rated that the photos made them feel badly about themselves (which would have been a score of 4 or 5), but rather that those in the low SCO group were more emphatic about not feeling badly due to the photos. Consistent with Experiment 1, there was not a significant main effect of Instagram feed on ratings of the statement “These photos made me feel badly about myself,” $F(1,187)=1.960$, $MSe=0.991$, $p=0.163$. There was no difference in ratings between those in the non-celebrity condition ($M=1.8624$, $SD=0.90746$) and those in the celebrity condition ($M=2.0370$, $SD=1.12299$). Also consistent with Experiment 1, there was no significant interaction between SCO and Instagram feed as they related to ratings of the statement “The photos made me feel badly about myself,” $F(1,186)=1.266$, $MSe=0.991$, $p=0.262$. For participants in the non-celebrity condition, there was no difference in ratings between those with high SCOs ($M=1.9434$, $SD=0.90756$) and those with low SCOs ($M=1.7857$, $SD=0.90883$). For the participants in the celebrity condition, there was no difference in ratings between those with high SCOs ($M=2.3243$, $SD=1.15737$) and those with low SCOs ($M=1.8261$, $SD=1.06049$).

All findings about the relationship between SCO and Instagram feed as they related to ratings of the statement “The photos made me feel jealous” were replicated. Consistent with Experiment 1, there was a significant main effect of SCO score on ratings of the statement “The photos made me feel jealous,” $F(1,187)=6.159$, $MSe=1.287$, $p=0.014$. People with high SCO scores rated themselves as feeling more jealous ($M=2.4545$, $SD=1.14379$) than people with low

SCO scores ($M=2.0777$, $SD=1.12624$). Also consistent with Experiment 1, there was not a significant main effect of Instagram feed on ratings of the statement “These photos made me feel jealous,” $F(1,187)=0.675$, $MSe=1.287$, $p=0.412$. There was no difference in ratings between those in the non-celebrity condition ($M=2.2091$, $SD=1.07597$) and those in the celebrity condition ($M=2.3086$, $SD=1.24139$). Consistent with Experiment 1, there was no significant interaction between SCO and Instagram feed as they related to ratings of the statement “The photos made me feel jealous,” $F(1,187)=1.1420$, $MSe=1.287$, $p=0.235$. For participants in the non-celebrity condition, there was no difference in ratings between those with high SCOs ($M=2.3208$, $SD=1.12273$) and those with low SCOs ($M=2.1053$, $SD=1.02964$). For the participants in the celebrity condition, there was no difference in ratings between those with high SCOs ($M=2.6561$, $SD=1.16171$) and those with low SCOs ($M=2.0435$, $SD=1.24644$).

Finally, in an attempt to replicate findings from Experiment 1, a Pearson Correlation was computed to assess the relationship between SCO score and how many minutes a day participants spend on Instagram. The significant result could not be replicated; there was no correlation between SCO score and how many minutes a day people go on Instagram, $r=-0.016$, $N=191$, $p=0.823$.

Discussion

The purpose of Experiment 2 was to attempt to address a possible methodological limitation in Experiment 1. Specifically, the researcher thought that perhaps participants were not taking enough time processing each photo or were simply scrolling through the page quickly to the bottom. Adding the two questions after each photo attempted to slow the participants down and make it more likely that they would process the images. The insignificant results of Experiment 2 indicate that perhaps there was not a methodological issue in Experiment 1, but

rather that SCO and Instagram feed type really are not related to a decrease in self-esteem. One interaction did become significant in this study which is contrary to the hypothesis and admittedly puzzling: it was found that those with high SCO scores experienced a greater decrease in state anxiety than their counterparts with low SCO scores after completing the task.

Many of the findings from the exploratory tests in Experiment 1 were replicated by Experiment 2. Additionally, some effects that were insignificant in the first experiment became significant in the second one: there was a significant relationship between Instagram feed and answers to the question “How do you think your life compares to the people in the photos?” whereby participants in the non-celebrity condition rated their lives as more exciting than people in the celebrity condition. There was also a significant relationship between SCO and ratings of the statement “These photos made me feel badly about myself,” whereby people with high SCO scores rated themselves as feeling more badly about themselves than people with low SCO scores. Finally, two of the significant findings from the first experiment were not replicated in the second one: there was not a significant relationship between SCO and answers to the question “How do you think your life compares to the people in the photos?” There was also no correlation between SCO and minutes spent on Instagram each day.

General Discussion

As described in the introduction, many studies have examined the relationship between social networking sites—particularly Facebook—and social comparison orientation. The results of these past studies have found that social comparison on SNSs can often be detrimental to the users. While these studies have been very important in beginning the conversation about SNSs and mental health, they leave some gaps, which this study attempted to fill. First, this study looked at Instagram rather than Facebook, which is a worthwhile addition to the literature

because Instagram is a relatively new and very popular SNS that attracts a lot of young people, a population more drawn to social comparison (Callan, Kim, & Matthews, 2015). Second, many studies revolving around social comparison theory use it as a measurement with which individual participants can be made to engage (Tiggemann & Zaccardo, 2015), rather than a personality characteristic that varies in severity from person to person. The current study examined SCO as the latter, a personality characteristic.

In terms of the study's first primary hypothesis—that the effect of SCO would be dependent on the Instagram feed as they related to decreases in self-esteem such that in the non-celebrity “peer” condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there would be a greater decrease in self-esteem when the participants had high SCOs than when they had low SCOs; that this effect would be greater in the non-celebrity condition; that there would be a main effect of SCO on decreases in self-esteem such that in general, individuals with high SCO would have greater a decrease in self-esteem than individuals with low SCO; and that there would be a main effect of Instagram feed on decreases in self-esteem such that in general, all individuals would have a greater decrease in self-esteem after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed—the findings of both experiments were insignificant. There was no significant main effect of SCO or Instagram feed, nor was there a significant interaction between SCO and Instagram feed.

In terms of the study's second primary hypothesis—that the effect of SCO would be dependent on the Instagram feed as they related to increases in state anxiety such that in the non-celebrity “peer” condition, there would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs and in the celebrity condition, there

would be a greater increase in state anxiety when the participants had high SCOs than when they had low SCOs; that this effect would be greater in the non-celebrity condition; that there would be a main effect of SCO on increases in state anxiety such that in general, individuals with high SCO would have a greater increase in state anxiety than individuals with low SCO; and that there would be a main effect of Instagram feed on increases in state anxiety such that in general, all individuals would have a greater increase in state anxiety after looking at a non-celebrity Instagram feed than after looking at a celebrity Instagram feed—the findings of both experiments were mostly insignificant. There was no significant main effect of Instagram feed, nor was there a significant interaction of SCO and Instagram feed. Experiment 1 also did not yield a significant main effect of SCO.

However, there were some interesting findings. Experiment 2 did show that SCO was related to a difference in changes of state anxiety, with those who have high SCOs experiencing a decrease in state anxiety. Additionally, exploratory research that was done in Experiment 1 and both replicated and furthered in Experiment 2 indicated that SCO is related to different feelings about the Instagram feeds.

While this study does broaden the scope of the literature, it has several limitations upon which future studies can try to improve. One limitation relating to the participants and population is the lack of children and adolescents. Both experiments in this study focused on the age group of young adults, but it is no doubt that children—adolescents in particular—use SNSs all the time and in high quantities (Parker, 2016). Additionally, the majority of teenagers consider Instagram to be a more important website than Facebook (Statista, 2016). It would therefore be beneficial to future research on SNSs and social comparison to examine this population in particular by looking at children's levels of social comparison orientation and how that relates to

mental wellbeing. It is possible that the findings of this study do not reflect how SNSs relate to children's and adolescents' mental health and wellbeing, seeing as the mean ages for Experiment 1 and Experiment 2 were 25.91 years old and 25.45 years old, respectively.

Another limitation comes from the methodology. Specifically, the simulated Instagram feeds created for the study do not function exactly like a real Instagram feed. First, the photos follow the layout of the computer Instagram display, with the photo on the left and the username, caption, and likes on the right. This is not how photos appear on the Instagram phone application, which has the username on the top, the photo in the middle, and the caption and likes on the bottom. The computer display was chosen for technical reasons; some Instagram posts cannot be seen all on one screen when on the phone app and require scrolling, while the posts on the computer can be easily captured in their entirety. Additionally, the comments on all posts were removed to maintain privacy of those who commented on the photos. Perhaps another study could procure the consent of commenters to make a more realistic Instagram feed. Furthermore, the questions added to Experiment 2 made the feed even less realistic, though it had methodological merit.

Finally, the Instagram feeds do not function entirely like real Instagram feeds because they are fabricated. The participants were not looking at photos of people they follow and know, but rather celebrities and people who are in their age bracket but whom they do not know. The researcher opted to control for any lurking variables associated with participants looking at their own Instagram feeds, but in turn this led to a lack of real-world authenticity. Additionally, while the "peers" in the non-celebrity condition were peers in that they were age matched with participants—all appearing to be between 18 and 30 years old—this does not necessarily mean they elicited the same responses and emotions from participants as photos of participants' actual

peers would have. Seeing a photo of a twenty-something woman at a tropical beach is not quite the same as seeing *your* twenty-something friend on a tropical beach. The latter is perhaps more likely to encourage social comparison and might enhance jealousy and other negative emotions. A future study in which participants look at more authentic Instagram feeds filled with their own peers on their phones would be beneficial.

There are many future directions in which this research can go. First, there are the improvements that can be made to this study which have just been discussed: a broader and more diverse sampling size including children, more realistic Instagram conditions, and an in-person, longer study including more Instagram photos. Additionally, more information about social comparison and other popular SNSs would be beneficial because they would add breadth to the research. For instance, there is much to be studied about Snapchat and its rapidly disappearing photos and 24 hour Snapchat stories.

Finally, this research would greatly benefit from some sort of longitudinal study. This study—and many like it—looked more at the immediate, short term impact of social media. In both experiments, participants were only exposed to Instagram photos for a few minutes. In reality, social media users are on SNSs for a lot longer than a few minutes; Experiment 1 showed that the majority of participants reported going on Instagram between one and five times a day, five days a week. Perhaps there is a relationship between SCO, self-esteem, and state anxiety that only comes about with prolonged Instagram use. A longitudinal study that followed Instagram users would be enlightening in this area.

The findings in this study have real world implications which help to expand the knowledge of Instagram use and potentially SNS use in general. SNSs such as Instagram are growing more popular every day, with hundreds of millions of users logging on. There is no

indication that their popularity will wane any time soon, and so it is imperative that more knowledge is gained about their impact on society. Children and young adults alike flock to these SNSs, and these are the same people who engage in the most social comparison. Thus, it is crucial that the field of Psychology becomes aware of the potential outcomes that can occur with Instagram and SNS use. It is in the users' best interests to know in what ways SNSs like Instagram can interact with their daily lives. It is no doubt that SNSs are critically important in this day in age in terms of communication. Luckily, in some instances they can be very beneficial to users (Jang, Park, & Song, 2016; Steinfield, Ellison, & Lampe, 2008), and this study's overall lack of significant findings suggests that there are not necessarily downsides to SNS use when it comes to mental wellbeing. Additionally, the finding that Instagram may be related to decreases in state anxiety is heartening.

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Appendix A

INCOM—Iowa-Netherlands Comparison Orientation Scale (Gibbons & Buunk, 1999)

Most people compare themselves from time to time with others. For example, they may compare the way they feel, their opinions, their abilities, and/or their situation with those of other people. There is nothing particularly “good” or “bad” about this type of comparison, and some people do it more than others. I would like to find out how often you compare yourself with other people. To do that I would like to ask you to indicate how much you agree with each statement below.

Scale of 1 to 5: I disagree strongly (1), I disagree (2), I neither agree nor disagree (3), I agree (4), I agree strongly (5).

1. I often compare myself with others in respect to what I have accomplished in life.
2. If I want to learn more about something, I try to find out what others think about it.
3. I always pay a lot of attention to how I do things compared with how others do things.
4. I often compare how my loved ones (boy or girlfriend, family members, etc.) are doing with how others are doing.
5. I always like to know what others in a similar situation would do.
- 6.* I am not the type of person who compares often with others.
7. If I want to find out how well I have done something, I compare what I have done with how others have done.
8. I often try to find out what others think who face similar problems as I face.
9. I often like to talk with others about mutual opinions and experiences.
- 10.* I never consider my situation in life relative to that of other people.
11. I often compare how I am doing socially (e.g., social skills, popularity with other people).

*Reverse coded

Appendix B

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

Scale of 0 to 3: Strongly disagree (0), disagree (1), agree (2), strongly agree (3)

1. On the whole, I am satisfied with myself.
- 2.* At times, I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
- 5.* I feel I do not have much to be proud of.
- 6.* I certainly feel useless at times.
7. I feel that I'm a person of worth, at least on an equal plane with others.
- 8.* I wish I could have more respect for myself.
- 9.* All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude toward myself.

*Reverse coded

Appendix C

Six-Item Short-Form of the State Scale of the Spielberger State-Trait Anxiety Inventory (STAI;

Marteau & Bekker, 1992)

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the most appropriate number to the right of the statement to indicate how you feel *right now, at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Scale of 1 to 4: Not at all (1), Somewhat (2), Moderately (3), Very much (4)

- 1.* I feel calm.
2. I am tense.
3. I feel upset.
- 4.* I am relaxed.
- 5.* I feel content.
6. I am worried.

*Reverse coded

Appendix D

Additional Questions*

Post-Instagram Condition Questions

1. The photos made me feel jealous. *Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree*
2. The photos made me feel badly about myself. *Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree*
3. How do you think your life compares to the lives of the people in the photos? *My life is much less exciting, My life is less exciting, My life is equally exciting, My life is more exciting, My life is much more exciting*

Manipulation Checks

1. Did you recognize the people in these photos? *Yes, no*
2. Would you consider the people in these photos to be celebrities? *Yes, no*

Instagram Use Questions

1. Roughly how many days a week do you go on Instagram? *0, 1, 2, 3, 4, 5, 6, 7*
2. Roughly how many times a day do you go on Instagram? *0-2 times, 3-5 times, 6-7 times, more than 7 times*
3. Roughly how many minutes a day do you spend on Instagram? *0-30, 31-60, more than 60*
4. Roughly how many photos do you post a week? *0, 1-7, more than 7*

Demographic Questions

1. Please list your gender. *Open ended*
2. Please list your ethnicity. *Open ended*
3. Please list your age. *Open ended*

Experiment 2 Added Questions

1. Do you like the photo above? *Yes, no.*
2. How many likes did the photo above get? *Open ended*

*Answer options for each question are written in italics.

Appendix E

Instagram Feed Examples

Photos have been deleted for the privacy of those in the photos. For exact stimuli, please email Alice Mullin at alice.c.mullin@gmail.com.