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Examining the Relationship Between Social Anxiety and Social Media Engagement

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Abstract

The relationship between social anxiety and social media has been studied looking at social networking sites as a whole, or looking at problematic use of social networking sites. However, to the authors knowledge, no research study has been conducted comparing different social media sites. This study intended to look specifically at the relationship between social anxiety and Facebook, Instagram, and Snapchat in college students. Furthermore, this study assessed fear of negative evaluation, fear of positive evaluation, fear of missing out, and social comparison as potential mediators of this relationship. It was hypothesized that there would be a relationship between social anxiety and Facebook, Instagram, and Snapchat, and that fear of negative evaluation, fear of positive evaluation, fear of missing out, and social comparison would mediate this relationship. Baron and Kenny tests of mediation results found that fear of missing out and fear of negative evaluation both partially mediated the relationship between social anxiety and Facebook connection. Additionally, results demonstrated that fear of missing out, fear of negative evaluation, and social comparison partially mediated the relationship between social anxiety and Snapchat use. This research provided more information on how individuals with social anxiety interact with social media sites. The information gathered from this study could be useful in treating individuals with social anxiety.

Examining the Relationship Between Social Anxiety and Social Media Engagement

Social media has been gaining popularity in college students, and research has been conducted to assess the effects social media engagement may have on individuals. In particular, an emerging area of research has examined the possible link between social anxiety and social media use (e.g. Dobrea & Păsăreanu, 2016; Casale & Fioravanti, 2015). The research on this area is limited and has mostly examined social media use in general and more specifically problematic social media use. However, social media sites differ in the ways people can interact with them. Therefore, this study aims to be one of the first studies to examine the link between social anxiety and how individuals engage with multiple social media sites (i.e., Instagram, Snapchat, and Facebook). Additionally, this study aims to examine possible cognitive mediators of this relationship, focusing on the fear of missing out (FoMO), fear of evaluation, and social comparison. This paper will begin by discussing the link between social anxiety and social media engagement, and then the potential cognitive mediators (e.g., fear of missing out, fear of evaluation, social comparison).

Social Anxiety

The DSM-5 (American Psychiatric Association [APA], 2013) describes social anxiety (or social phobia) as “marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others” (p. 118). Social situations that may cause anxiety and distress can include social interactions between people, being observed by other people, and performing in front of others. Additionally, individuals with social anxiety fear their anxiety symptoms may be visible to others, or that they will be negatively evaluated during social interactions (APA, 2013; Rapee & Heimberg, 1997). Rapee and Heimberg (1997) further propose that these negative mental representations people with social anxiety hold about their

behavior and appearance during social situations may lead to heightened anxiety and, consequently, help to maintain their social anxiety.

Hirsch and Clark (2004) conducted a review of studies on information-processing biases present in persons with social phobia and found that people with social anxiety estimate negative evaluations from other people in different social situations whether they are positive or very negative in nature. Additionally, they reported individuals with social anxiety are more critical of how they performed (i.e. giving a speech) as compared to interpretations received by individuals who observed their performance, and individuals without social anxiety. Before or during a social interaction, people with social phobia may imagine themselves performing poorly (i.e. showing anxiety symptoms) during that social interaction, which may, in turn, contribute to their social phobia (Hirsch & Clark, 2004).

Campbell and colleagues (2016) examined social anxiety in college freshman, which will be the primary population used in this study, and found that during daily social interactions fear of negative evaluation was linked to social withdrawal, with anticipatory worry likely playing a part in this interaction. They explained the more participants worried about how they may be evaluated during a social interaction, the more likely participants would engage in behaviors to minimize their engagement in the social interaction, such as avoiding eye contact.

Therefore, individuals with social anxiety experience physical and cognitive symptoms, of which are present in a number of different social settings, and these symptoms may help maintain their social anxiety. One possible social setting in which individuals with social anxiety may experience symptoms involves the use of social media, which will be discussed next.

Social Media Engagement

Carr and Hayes (2015) conceptualize social media as “Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others” (p. 50). Social media contains a subdomain referred to as social networking sites (Alhabash & Ma, 2017). Boyd and Ellison (2008) describe social networks sites as:

...web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (p. 211).

Social networking sites usually include a visible profile that may also include a list of friends or followers, that can either be bi-directional (i.e. both individuals must approve each other to be friends; e.g. Facebook) or not (i.e. one individual can follow another individual without them having to follow back; e.g. Instagram) (Boyd and Ellison, 2008). Additionally, social networking site profiles may include descriptors, such as age, interests, an “about me” section, and a profile photo (Boyd and Ellison, 2008). Social networking sites allow individuals to update their own preference on who can view their profile and typically allow their users to comment on people’s posts and message people privately (Boyd and Ellison, 2008).

Whiting and Williams (2013) identified ten themes of gratifications and uses acquired through social media: social interaction, information seeking, passing time, entertainment, relaxation, expression of opinions, communicatory utility, convenience utility, information sharing, and surveillance/knowledge of others. These uses and gratifications acquired through

social media may differ by sex. Kircaburun and colleagues (2018) found that females use social media for managing tasks, maintaining relationships, gathering information and self-educating, and are more likely than men to use social media problematically. However, males use social media primarily to socialize and meet new people.

Problematic use of social media, the internet, Facebook, and of smartphones have been examined and defined in previous studies (i.e. Kircaburun et al., 2018; Casale & Fioravanti, 2015; Lee & Stapinski, 2012; Stead & Bibby, 2017; Dempsey et al., 2019; Elhai et al., 2016, 2018, 2020; Wolniewicz, 2018). Each study has differing definitions for these different variables. The overarching thought of problematic use of the internet, smartphones, social media, and Facebook is similar to an addiction to these platforms, or a pre-existing psychopathology related to the rewards people get from using these platforms (Lee & Stapinski, 2012; Dempsey et al., 2019; Elhai et al., 2018). Problematic use of these platforms can also be view as excessive use of these platforms leading to impairment in functioning (Elhai et al., 2020; Wolniewicz, 2018). Research on problematic use of these platforms is still ongoing (Elhai et al., 2016). However, while this paper examines studies of problematic use of these platforms to support reasoning for conducting this current study, this study does not specifically examine problematic use of social media.

This study focused on three social media sites: Facebook, Instagram, and Snapchat. Facebook allows users to post, share, and engage with content like photos and status updates, and allows users to connect with people anywhere, such as friends and family (Stec, 2018). Instagram, a photo sharing application, allows users to take photos, add filters to photos, and share photos on their profile and to other social networks such as Facebook (Stec, 2018; Kircaburun et al., 2018). Additionally, Instagram users can share stories of a photo or video that

can contain added text, stickers, and so forth (Instagram, n.d.). Instagram also allows users to share messages, photos, and videos privately to others (See Instagram, n.d. for more features). Finally, Instagram allows users to create a live broadcast to share with their followers (Kircaburun et al., 2018). Snapchat allows users to send and receive “snaps”, or photos and videos that are time-limited, and these “snaps” can contain text, drawings, or filters (Stec, 2018). Snapchat also allows users to create and watch stories, as well as discover public and popular stories (Snapchat, n.d.). Snapchat allows more private communication, whereas sites like Facebook allow more public communication and interaction (Utz et al., 2015). Based on the description of social network sites provided by Boyd and Ellison (2008), only Instagram and Facebook fit the description of a social network site. Therefore, we will refer to all three social media sites with the broad term of “social media” or “social media sites” in this paper.

Social media sites are gaining popularity in college students. According to Perrin and Anderson (2019), 76% of people ages 18-24 in the United States have used Facebook, 75% have used Instagram, and 73% have used Snapchat. Additionally, Kircaburun and colleagues (2018) found that students between ages 17 and 32 years rated Instagram as the second and Snapchat as the fifth most commonly used social media sites. Alhabash and Ma (2017) found that college students spent the most time on Instagram and Snapchat followed by Facebook and Twitter, and students indicated they used all social media sites equally to share information.

Multiple studies have assessed different uses and effects of social media, but only a few will be discussed here. Makki and colleagues (2018) found that individuals report using Snapchat to maintain current relationships and to develop and maintain new relationships. Furthermore, individuals may perceive less social risk when using Snapchat because messages are deleted in a short period of time after viewing. Utz and colleagues (2015) compared Snapchat and Facebook

and found young adults tend to use Facebook more than Snapchat and that young adults tend to use both sites differently; for example, young adults tended to post more sensitive information on Snapchat (e.g., drunk photos, sexting, and possible illegal activities) which is most likely because Snapchat is more private (Utz et al., 2015). Snapchat is more private because it utilizes private photo and chat messages that are not available to the public whereas Facebook includes a public profile that the public or friends can view. Having and using Instagram has been showed to be associated with positive psychological outcomes, such as greater self-esteem and lower levels of anxiety and loneliness, and these variables can protect against social comparison (Mackson et al., 2019).

To summarize, it has been shown that social interactions can occur on social media sites in different ways (i.e. commenting on posts, direct messaging, and so forth), and with the growing number of college students using social media, it is important to examine the possible effects social media has on college students' well-being. More specifically, it is important to examine the relationship between social anxiety and social media use. Other researchers have recognized the importance of assessing this relationship and this research will be discussed next.

Social Anxiety and Social Media Engagement

Several potential reasons have been proposed for why social anxiety and social media use are related. First, the Social Compensation Hypothesis (Fernandez et al., 2012) suggests that individuals with social anxiety may socialize online to cope with or work around their symptoms. Additionally, it has been proposed by Caplan (2007) that individuals with social anxiety prefer online over face-to-face interactions because of they may have more control over their online presentation versus in person. Erwin and colleagues (2004) further hypothesize that this may help individuals with social anxiety avoid showing perceived physical symptoms (e.g.,

blushing, misspeaking). They also found that individuals with social anxiety report that having online interactions make avoiding in person interactions easier. Also, individuals who report spending more time on the internet feel more comfortable interacting online than in person. Additionally, more time spent online was also positively associated with perceived social support online that led to more confidence during in person interactions, but individuals with social anxiety still slightly believe they received this social support from interactions online.

Similarly, McKenna and Bargh (2000) propose that because many factors related to social anxiety (e.g., immediate responses, physical appearance, nonverbal cues) are absent online, individuals may turn online to communicate and make social connections. Furthermore, individuals with social anxiety may find forming relationships easier online than in person. During online interaction, individuals can take as much time as need to respond and can select how they want to say something and edit messages before sending, which is not possible during face-to-face interactions. Therefore, individuals may perceive more control over online communication versus face to face interaction (McKenna & Bargh, 2000), which was confirmed in the study conducted by Lee and Stapinski (2012).

Likewise, Yen and colleagues (2012) found that individuals with high social anxiety were shown to have lower social anxiety during online interaction compared to face-to-face interaction. They proposed that this finding is likely due to the easy escape of online interactions, limited negative interpretations of social cues, and facial expressions. However, individuals with high social anxiety revealed more social anxiety while interacting online compared to control participants, and thus they may still be vulnerable to social anxiety online.

However, the hypotheses made above may not hold true for Facebook use, at least as found in one study. Carruthers and colleagues (2019) found that individuals with social anxiety

approached online interactions similarly to face-to-face interactions. While using Facebook, individuals with high social anxiety experienced negative thoughts, used safety behaviors, reported anxiety, and interpreted ambiguous situations more negatively than individuals with low social anxiety. Therefore, social interaction through Facebook may not be perceived as safer than face-to-face interactions for those with social anxiety because Facebook interaction produced similar thoughts and behaviors as face to face interaction. However, Facebook communication with acquaintances over in person interaction was still preferred by those with high social anxiety as compared to those with lower social anxiety.

This finding relating to social anxiety and Facebook use may be mediated by the type of communication used on Facebook. In private communication through Facebook, individuals have more control over who they are communicating with, which may add a degree of comfort for those with social anxiety, but in public Facebook communication individuals have less control over who they are communicating with, which may cause more concern for those with social anxiety (Green et al., 2016). Likewise, permanent messages sent through Facebook can be positively rewarding if the conversation went well or be concerning if the conversation did not go well but is permanently available to the other parties (Green et al., 2016). Perhaps having control over the permanence of messages will bring some relief to those with social anxiety (Green et al., 2016). This hypothesis can be further tested by examining Snapchat, where “snaps” are available for viewing for a limited time before being deleted automatically.

These studies demonstrate how social anxiety and social media may be related. Social anxiety is likely to be lower or not present when individuals use social media sites and during interactions on social media. This lower social anxiety may be related to the limit of physical symptoms present on social media viewed by others, the ease and comfort associated with

interacting on social media, and the available control and escape of interactions on social media sites. Next, this section outlines more specifically research on the relation between these two variables, as well as the evidence for these proposed theories.

Dobrea and Păsăreanu (2016) conducted a systematic review of research assessing the relationship between social anxiety and social networking, and found that 16 out of 20 available studies found a significant association between social anxiety and social networking. The significant association had mixed results, but a majority of the associations were positive. However, a majority of the studies assessed Facebook specifically, so findings cannot be generalized to all forms of social networking sites. Additionally, Prizant-Passal and colleagues (2016) conducted a meta-analysis on 23 studies and found a positive association, at a medium effect size, between social anxiety and feelings of comfort online. Additionally, they found an association between social anxiety and perceived importance of reduced non-verbal cues online (e.g., anonymity online, hidden appearance of physical social anxiety symptoms). They also found a positive association between social anxiety and problematic internet use; however, social anxiety was not related to time spent online.

Likewise, Casale and Fioravanti (2015) found a positive relation between social anxiety and problematic internet use relating to social networking sites. In males and females, the need to avoid displaying imperfection mediated the relation between social anxiety and problematic internet use of social networking sites; this may be associated with individuals with socially anxiety concerns about being judged unfavorably (Casale & Fioravanti, 2015). Furthermore, this need of self-presentation being satisfied online might motivate individuals with social anxiety to satisfy their need for communication online rather than in person (Casale & Fioravanti, 2015). In

females, the need for assertiveness also mediated the relation between social anxiety and problematic internet use (Casale & Fioravanti, 2015).

Lee and Stapinski (2012) found that social anxiety was a predictor of problematic internet use, and speculated this relationship is likely due to individuals with social anxiety being more vulnerable to problematic internet use given the greater dependence and predictability obtained online and poorer quality relationships held in person. Individuals with high social anxiety have reported communicating with more people online rather than in person. Also, Lee-Won and colleagues (2015) found that social anxiety predicted problematic use of Facebook specifically. Furthermore, the relationship between social anxiety and problematic use of Facebook was significant for those with high and medium levels of need for social assurance but not for those with low levels.

Caplan (2007) found that the relationship between social anxiety and negative outcomes of Internet use are mediated by an individuals' thoughts about face-to-face and online interaction. Fernandez et al. (2012) found that those higher in social anxiety did not interact with Facebook or use Facebook more than those lower in social anxiety. Individuals with high social anxiety have been found to post more information on their Facebook profile and have fewer Facebook friends, and therefore, it may be possible to discern who has social anxiety from viewing Facebook profiles but this finding should be proceeded with caution (Fernandez et al., 2012).

Several studies have investigated the association of social anxiety and social media use and the effect on well-being. Indian and Grieve (2014) found that social support received through Facebook predicted well-being above and beyond social support received offline in individuals with high social anxiety. Further analyses concluded that Facebook social support

barely mediated the relationship between offline, or in person, social support and well-being in these individuals. For individuals with low social anxiety, only offline social support significantly predicted well-being. Indian and Grieve (2014) theorized that in individuals with social anxiety, Facebook social support may lead to improved well-being, but avoiding in person interactions may lead to more social anxiety which may maintain their social anxiety. Weidman and colleagues (2012) found individuals with high social anxiety are more comfortable self-disclosing online as compared to offline, but this may be associated with lower well-being (e.g., lower depression and self-esteem).

Studies also have examined anxiety specifically related to the use of Facebook and Instagram. These concepts are coined as “Facebook anxiety” and “Instagram anxiety” and they are described as the experience of social anxiety related to use of these social media sites (McCord et al., 2014; Mackson et al., 2019). For example, an individual may experience anxiety while trying to come up with a caption for their photo on Instagram, or an individual may experience anxiety from coming up with a message to post on their friend’s Facebook wall (McCord et al., 2014; Mackson et al., 2019). McCord and colleagues (2014) found a positive relationship between social anxiety and Facebook anxiety but not between social anxiety and Facebook use. Additionally, they found that those with high social anxiety and high Facebook anxiety used Facebook socially more frequently than those with low social anxiety. Finally, they found that the interaction between social anxiety and Facebook anxiety predicted Facebook social use, and both Facebook anxiety and Facebook social use predicted social anxiety. Mackson and colleagues (2019) found that Instagram anxiety is positively associated with anxiety and speculated that this relationship may occur because those who experience Instagram anxiety may also tend to feel more anxious outside of using Instagram. They found that

individuals who have and use Instagram experience lower levels of anxiety than those who do not have and use Instagram.

In sum, there are mixed results on the relationship between social anxiety and social media, but most studies have found a positive correlation. However, the majority of these studies examine social networking sites, internet use, or online communication in general, and a couple assess Facebook specifically. To the authors' knowledge, no study has been conducted comparing social media sites across multiple sites. Thus, this study will include Facebook, Instagram, and Snapchat. This paper will now consider several possible cognitive mediators of these relationships.

Fear of Missing Out

Fear of missing out (FoMO) is another concept that will be examined in relation to social anxiety and social media engagement. FoMO has been conceptualized as “a pervasive apprehension that others might be having rewarding experiences from which one is absent” (Przybylski et al., 2013, p. 1841). People who experience FoMO desire to constantly know what others are doing. Przybylski and colleagues (2013) found that younger adults tend to report higher levels of FoMO than older adults, and that those who report higher levels of FoMO report lower levels of life satisfaction and lower levels of general mood. FoMO may be related to social media use in college students, which will be discussed next.

Social Media Engagement and Fear of Missing Out

Those who experience fear of missing out (FoMO) may be particularly drawn to social media, such as Facebook, Instagram, and Snapchat, because of the wealth of information these sites provide (Przybylski et al., 2013). Social media applications, easily accessible on peoples' mobile phones, allow individuals to be in contact constantly with others and increases the

likelihood of seeing current activities and experiences in which people are involved, of which they are missing out on, which can lead to higher FoMO (Milyavskaya et al., 2018; Salehan & Negahban, 2013; Reer et al., 2019). Furthermore, people who experience FoMO through social media may try to then elicit FoMO in others (Milyavskaya et al., 2018). For example, someone who experiences FoMO after seeing a photo of their friend hiking might feel compelled to post a photo of themselves doing something to make others feel like they are missing out too. It has been suggested that FoMO likely supports the use of social media to gain information and connect and in turn, social media use likely increases an individuals' level of FoMO after viewing this information they are missing out on (Roberts & David, 2019; Buglass et al., 2017; Przybylski et al., 2013). This hypothesis represents a bi-directional relationship of FoMO causing increased social media use and social media use in turn causing increased FoMO.

FoMO has been connected to social media use in numerous research studies, which will be discussed next. Abel and colleagues (2016) found that individuals with higher levels of FoMO were more likely to experience an urge to check their social media, such as Facebook and Instagram, across situations that included when individuals are with others, unable to log into their account, in class, and alone. Additionally, those with higher levels of FoMO tend to check and engage with social media, such as Facebook, more often during key times of the day (e.g., after waking, before going to sleep, and during meal times) (Chambers, 2017; Przybylski et al., 2013). Additionally, there is a positive connection between FoMO and social media engagement in the classroom environment (Alt, 2017; Przybylski et al., 2013). Przybylski and colleagues (2013) also found that young adults high in FoMO are more likely to check their texts and email while driving.

FoMO has been positively associated with daily amount of time spent using social media (Cargill, 2019) and with social media intensity (Roberts & David, 2019). FoMO also predicts social media usage (Reyes et al., 2018) and addiction more than personality traits and attachment styles (Blackwell et al., 2017). Increased Facebook use and problematic Facebook use have been positively associated with higher levels of FoMO (Buglass et al., 2017; Dempsey et al., 2019). Buglass and colleagues (2017) also found positive relations between Facebook use and FoMO, and between Facebook use and online vulnerability. FoMO has been positively related to problematic internet use (Stead & Bibby, 2017), problematic smartphone use (Elhai et al., 2016; Elhai et al., 2018; Wolniewicz et al., 2018), problematic smartphone use severity (Elhai et al., 2020), and social smartphone use (Elhai et al., 2018; Wolniewicz et al., 2018). Fuster et al. (2017) found that FoMO was positively associated with social media engagement, social network intensity, and mobile phone social network access.

Finally, Reer and colleagues (2019) found that FoMO is correlated positively with social media engagement, social comparison orientation is a predictor of FoMO, and FoMO partially mediates the relationship between social comparison orientation and social media engagement. Therefore, those with higher tendencies to compare themselves with others may experience more FoMO and may use social media to seek information to compare themselves with others. These findings are important as social comparison orientation will also be examined in the present study.

Thus, there is accumulating evidence for a relationship between FoMO and social media use in general. This relationship most likely occurs because there is an ample amount of information available on social media sites used by young adults, who also typically report higher levels of FoMO and might take advantage of this information available to them.

Social Anxiety and Fear of Missing Out

The relationship between FoMO and social media use has been strongly supported, but, to the author's knowledge, Dempsey and colleagues (2019) is the only study that has examined FoMO, social anxiety, and social media use. They found that FoMO mediates the relationship between social anxiety and problematic Facebook use. Additionally, Chambers (2017) conducted research on participants' current and overall anxiety, FoMO, and social media use and found that those who reported feeling more anxious in the moment and more anxious generally, also reported higher scores of FoMO. Therefore, individuals with higher levels of anxiety tend to also report more FoMO. Additionally, Chambers (2017) also found that both FoMO and anxiety independently were predictors of social media use. The link between social media and FoMO has been assessed in research, which has been discussed, and it is why the researcher included FoMO in the current study.

There is ample evidence that FoMO is related to social media and there is emerging evidence that social anxiety and FoMO may be related, and therefore, FoMO may be a mediator between social anxiety and social media use. Based on previous research (Chambers, 2017; Dempsey et al., 2019) high social anxiety might be related to high FoMO, which might be related to higher social media engagement. As young adults tend to report high levels of FoMO and high social media use, they are particularly susceptible to effects of FoMO, and are a relevant population to study. Another concept that might be related to social anxiety and social media use is fear of evaluation.

Fear of Evaluation

Fear of evaluation is another concept that will be examined in relation to social anxiety and social media engagement. Fear of negative evaluation (FNE) is described as a "sense of

dread associated with being evaluated unfavorably while anticipating or participating in a social situation” (Weeks et al., 2010, p. 69). Fear of negative evaluation also has been conceptualized as an “apprehension about others' evaluations, distress over their negative evaluations, avoidance of evaluative situations, and the expectation that others would evaluate oneself negatively” (Watson & Friend, 1969, p. 449). Those with high levels of fear of negative evaluation show preference for no negative feedback (Weeks et al., 2010). The cues that indicate the social threat of negative evaluation include signs of boredom, negative facial expressions like frowning, and so forth (Rapee & Heimberg, 1997). As reviewed in the next section, there is a plethora of research documenting the link between social anxiety and FNE.

More recently, researchers have examined another type of evaluation fear: fear of positive evaluation (FPE). Fear of positive evaluation is described as, “the sense of dread associated with being evaluated favorably and publicly” and can cause an individual to feel “in the spotlight” (Weeks et al., 2010, p. 69; See Weeks & Howell (2014) for review). Gilbert (2001) proposes a theory that explains the fear of positive evaluation (or has he terms it “fear of doing well” or “fear of social success”); he suggests that when a social interaction goes well for someone with social anxiety, they may worry that others expect more from them leading to them to feel stressed. A positive social interaction can lead to an upward shift in social ranking that the individual will now have to defend and compete with others to keep, and people with social anxiety may fear they conflict with others and may fear they cannot keep the new social rank (Gilbert, 2001). Those with high levels of fear of positive evaluation show preference for no feedback or evaluation, regardless if it is positive or negative (Weeks et al., 2010). Fear of positive evaluation and fear of negative evaluation have been confirmed to be distinct constructs (Weeks et al., 2010; Weeks & Howell 2012).

Social Anxiety and Fear of Evaluation

People with social anxiety have been shown to react to negative and positive evaluation or feedback differently. Bautista and Hope (2016) conducted a study to assess how individuals with and without social anxiety respond to various levels of positive and negative feedback given through online interaction. When individuals with high and low levels of social anxiety were given negative feedback, both reported negative thoughts but those with high social anxiety had thoughts directed at themselves while those with low social anxiety had thoughts directed outside of themselves (Bautista & Hope, 2016). When individuals with high levels of social anxiety were given mixed positive feedback, they attended more to negative cues and discounted positive cues, similar to research conducted by Hirsch and Clark (2004). Furthermore, individuals with high levels of social anxiety reported fewer positive thoughts compared to individuals with no social anxiety, which further demonstrates their attention to negative cues over positive ones. Additionally, contrary to the negative feedback condition, individuals with high levels of social anxiety attributed the positive feedback they received as directed outside of themselves whereas the individuals with no social anxiety attributed the positive feedback they received as directed inward. Dryman and colleagues (2016) found that for individuals with social anxiety disorder, high fear of negative and positive evaluation were associated with lower quality of life, and lower life satisfaction in areas where successes and failures may be public (e.g., at work) or private.

Research has confirmed that both fear of positive and negative evaluation plays a role in social anxiety (Weeks, Heimberg, & Rodebaugh, 2008; Weeks, Heimberg, Rodebaugh, et al., 2008; Rodebaugh et al., 2012; Rapee & Heimberg, 1997). First, fear of negative and positive evaluation are characteristic of those with social anxiety (Weeks, 2015), and fear of negative and

positive evaluation have been shown to be positively associated with social anxiety (Dryman & Heimberg, 2015; Reichenberger et al., 2019). Additionally, it has been confirmed that fear of negative and positive evaluation are associated with cognitions associated with social anxiety (Weeks et al., 2010; Weeks & Howell, 2012; Weeks, Heimberg, Rodebaugh, et al., 2008; Weeks, Heimberg, and Rodebaugh, 2008). Additionally, it has been confirmed that fear of negative and positive evaluation may contribute to or predict social interaction anxiety (Weeks, Heimberg, and Rodebaugh, 2008; Kocijan & Harris, 2016; Weeks, Heimberg, Rodebaugh, et al., 2008) and may be related to anxiety about being observed by others (Weeks, Heimberg, Rodebaugh, et al., 2008).

Also, tendencies to disqualify positive social outcomes were associated with both social anxiety and fear of positive and negative evaluation (Weeks, 2010), and fear of negative and positive evaluation accounted for the greatest amount of variance in social anxiety as compared to anxiety sensitivity and intolerance of uncertainty (Teale Sapach et al., 2015). Social anxiety may lead to increased fear of positive evaluation (Weeks, Heimberg, Rodebaugh, et al., 2008); however, fear of positive evaluation does not predict performance anxiety (Kocijan & Harris, 2016). In summary, there is a great deal of evidence providing the connection between social anxiety and fear of evaluation.

Social Media Engagement and Fear of Evaluation

Additionally, researchers have speculated why fear of evaluation and social media use may be related. First, those with high social anxiety attest that online interactions are less threatening, in terms of the probability of negative evaluation, as compared to face-to-face interactions, which may encourage individuals with social anxiety to engage in online conversations (Lee, 2014). Therefore, individuals with social anxiety may prefer online

interactions to help feel safe against perceived negative evaluation (Lee, 2014). However, individuals with high social anxiety attest that, regardless of the interaction taking place in person or online, the consequences of receiving negative evaluation are the same for both mediums (Lee, 2014). Therefore, the probability of negative evaluation occurring online is perceived as lower, but the consequences of receiving negative evaluation are the same online as face-to-face (Lee, 2014). Furthermore, Erwin and colleagues (2004) posit that individuals with social anxiety are drawn to online communication because it hides physical symptoms of anxiety individuals typically think they display during face-to-face interaction that can lead to negative evaluations from other individuals. Individuals with social anxiety attest they prefer online communication because it allows the individual to conceal their physical appearance and visible signs of anxiety, as well as pauses in conversations and time to fix mistakes during conversation (Erwin et al., 2004).

However, limited research has been conducted on the relationship of fear of evaluation and social media, and the extant research is mixed. Casale and colleagues (2018) found that fear of negative evaluation was positively associated with problematic use of social networking sites, but this association was not found in females. Wolniewicz and colleagues (2018) found that fear of negative evaluation was positively associated with problematic smartphone use, but neither fear of negative evaluation nor positive evaluation were associated with social smartphone use. They also found that fear of negative and positive evaluation predicted problematic and social smartphone use when FoMO mediated the relationship. Lee (2014) found that having a preference for online communication mediates the relationship between face-to-face interaction avoidance and fear of negative evaluation.

There is mixed evidence available on the relationship between fear of evaluation and social media use. However, given the research linking fear of positive evaluation and negative evaluation to social anxiety, and the proposed hypotheses (Lee, 2014; Erwin et al., 2004) linking of fear of negative and positive evaluation to social media engagement, fear of evaluation may mediate the relationship between social anxiety and social media engagement. Another concept that might mediate the relationship between social anxiety and social media use is social comparison.

Social Comparison

Social comparison is another concept that will be examined in relation to social anxiety and social media engagement. Festinger (1954) developed the theory of social comparison processes; he posited that “there exists, in the human organism, a drive to evaluate his opinions and his abilities” (p. 117). Individuals evaluate their opinions and abilities by comparing their own with the opinions and abilities of others when objective, non-social basis’s for evaluation are not accessible. Additionally, individuals will only evaluate their own opinions and abilities by comparison with others who are similar to themselves (i.e. peers) (Festinger, 1954). However, if the only person to compare one’s self to is different from the individual, then they will not be able to make an accurate evaluation of their own opinions and abilities and this may lead the individual to desire to change their evaluation of their opinions and abilities (Festinger, 1954). Additionally, when an individual is attracted to a group, they will feel pressured to meet the abilities and opinions of that group, but there are non-social restraints that make change very difficult or even impossible to accomplish (Festinger, 1954). Everyone engages in social comparison occasionally with the primary goal of increasing their learning and own understanding of their self (Gibbons & Buunk, 1999).

Additionally, different types of social comparisons exist. Upward comparisons are "comparisons where the individual assesses him- or herself as not measuring up to others" (Antony et al., 2005, p. 65). Likewise, downward comparisons are "comparisons where the individual assesses him- or herself as superior to others" (Antony et al., 2005, p. 65). Therefore, it can be inferred that same-level comparisons are comparisons where the individuals assess themselves at the same level as others.

Social Media Engagement and Social Comparison

Social media use exposes individuals to a wealth of information about other people's lives and provides a place for users to engage in social comparison with those who they follow or with whom they are friends (Hanna et al., 2017). Social media sites allow individuals to showcase themselves, as well as receive feedback from and interaction with others (Shin et al., 2017) and provides information on what others are doing and how others are feeling (Lee, 2014). Therefore, these social media sites allow people to evaluate themselves by comparing themselves with others (Lee, 2014; Shin et al., 2017), and this comparison can lead to feelings of satisfaction or dissatisfaction in their evaluation of themselves (Lee, 2014). The connection between social media and social comparison has been assessed in a few studies that will be outlined below.

Lee (2014) found that individuals who typically engage in social comparison are more likely to compare themselves with other people on Facebook. Additionally, those who engage in more social comparisons on Facebook are more likely to experience a negative feeling from their comparisons. Therefore, Lee (2014) hypothesizes that either people with high social comparison are more likely to interact with Facebook or that higher Facebook use leads to more social comparisons. Vogel and colleagues (2014) found that Facebook use frequency was associated with both increased upward and downward social comparisons on Facebook, but upward

comparisons were reported more so than downward social comparisons. However, Mackson and colleagues (2019) found no difference between the social comparison tendencies of those who had an Instagram account and those who did not. Likewise, Lup and colleagues (2015) found that social comparison was not associated with more frequent Instagram use. Additionally, they found that the association between Instagram use and social comparison was mediated by the number of strangers an individual followed on Instagram; showing that viewing strangers' profiles might lead to negative social comparisons.

Therefore, it appears that Facebook use is related positively to social comparison (Lee, 2014; Vogel et al., 2014) and that Instagram use is not associated with social comparison (Mackson et al., 2019; Lup et al., 2015).

Social Anxiety and Social Comparison

To the authors' knowledge, only one study (Antony et al., 2005) has examined the relationship between social anxiety and social comparison. Antony and colleagues (2005) used the Rochester Social Comparison Diary (Wheeler & Miyake, 1992) to address how individuals with and without social anxiety disorder tend to social compare themselves with others. They found that although both individuals with and without social anxiety experience similar numbers of social comparisons, individuals with social anxiety experienced social comparisons relating to signs of anxiety and social skills. Both individuals with and without social anxiety also focus on comparing their appearance to others. Additionally, individuals with social anxiety made downward and upward comparisons with others but made upward comparisons more often than downward comparisons. Across those with and without social anxiety, downward comparisons led to a reduction in anxiety, with the opposite effect for upward comparisons, and no effect for same-level comparisons. Therefore, it is hypothesized that these frequent upward comparisons

may be harmful to individuals with social anxiety by adding to the maintenance of this disorder and the harm of seeking information to confirm the individuals' negative assumptions about their appearance (Antony et al., 2005).

Additionally, there have been a couple studies that examined the relationship between social comparison, anxiety, and social media use. Hanna et al. (2017) conducted a study that found social comparison mediated the relationship between Facebook use and self-esteem, body shame, anxiety, and depression in young adults. Therefore, it was suggested that individuals with anxiety should limit their Facebook use or learn ways to limit social comparison tendencies (Hanna et al., 2017). On the contrary, Mackson et al. (2019) found that social comparison tendencies were not associated with trait anxiety. Thus, it was posited that users of Instagram are possibly gaining social benefits from the application, such as lower anxiety, that is protecting them from having increase social comparison tendencies (Mackson et al., 2019). This research also runs contrary to the research conducted by Antony et al. (2005).

Therefore, while there is limited research on the topic, it appears there may be a relationship between social anxiety and social comparison (Antony et al., 2005) even though this may or may not be the case for anxiety in general and social comparison (Hanna et al.; Mackson et al, 2019).

Aim of Current Study

The current study explored the relationship between social anxiety and social media engagement (i.e. Facebook, Instagram, and Snapchat use and connection) in college students and added to the literature by including three possible mediating variables that are cognitive in nature: fear of missing out (FoMO), fear of evaluation (both negative and positive), and social comparison. Social media was examined in two different ways discussed in the measures section:

use of social media sites and connection to social media. This author decided to refer to the use and connection to social media, being measured, as social media engagement throughout the remainder of the study. Engagement in three social media sites were assessed in this study: Facebook, Instagram, and Snapchat. These sites were chosen given that the population we are assessing, college students, tend to use these sites (Perrin & Anderson, 2019; Kircaburun et al., 2018; Alhabash & Ma, 2017). Most research has been conducted on problematic internet use and social networking site use, in general, and the present author examined different variables across social media sites rather than one broad measure. It is important to note again, this study did not examine problematic use of social media; this study utilized and examined a neutral measure of social media. Additionally, there have been multiple studies assessing Facebook with mixed results, which were discussed previously, and the current study added to this growing literature.

Although the focus of the present study was on the link between social anxiety and social media engagement, this study also included depression as a control variable. A large body of research (c.f., Chou, 2009) has documented that social anxiety is related to depression symptoms. Thus, including depression as a control variable in this study helped clarify the relationship of social media engagement to emotional symptoms (i.e., anxiety and depression). Therefore, results were related to social anxiety alone or tested how much variance was accounted for by depression compared to social anxiety. This was one of the first studies to analyze this relationship while controlling for depression.

Hypotheses

The first research question asks if there is a relationship between social anxiety (independent variable) and social media engagement (dependent variable). There are multiple studies presenting a hypothesized link between social anxiety and social media engagement

given the perceived physical symptoms are hidden online and the higher control held online versus in person (Erwin et al., 2004; McKenna & Bargh, 2000). Additionally, most of the research discussed (e.g., Dobrea & Păsăreanu, 2016; Prizant-Passal et al., 2016) found a positive relationship between social anxiety and social media, but they were assessing social networking sites in general, and therefore, we cannot predict which direction this relationship will hold. Thus, the first hypothesis is that there will be a relationship between social anxiety and social media engagement.

The second research question asks if the influence of social anxiety (causal variable) on social media engagement (outcome variable) is mediated by fear of missing out (FoMO) (potential mediator). The second hypothesis is that FoMO will mediate the relationship between social anxiety and social media engagement. As people experience more social anxiety they may have higher levels of FoMO, and as they have higher levels of FoMO they may experience increased engagement in social media. This hypothesis is based on previous research that found a relationship between FoMO and social media use (Buglass et al., 2017; Dempsey et al., 2019; Reyes et al., 2018) and between social anxiety and FoMO (Dempsey et al., 2019).

The third research question asks if the influence of social anxiety (causal variable) on social media engagement (outcome variable) is mediated by fear of negative evaluation (potential mediator). As previously discussed, numerous studies have found a positive relationship between fear of negative evaluation and social anxiety (Dryman & Heimberg, 2015; Reichenberger et al., 2019). Additionally, while it hasn't been extensively researched yet, it is hypothesized that fear of negative evaluation and social media engagement may be related given the protective factor social media serves by hiding physical manifestations of social anxiety, and so forth (Lee, 2014; Erwin et al., 2004). Therefore, the third hypothesis is that fear of negative

evaluation will mediate the relationship between social anxiety and social media engagement. As people experience more social anxiety they may have increased fear of negative evaluation, and as they have increased fear of negative evaluation they may experience increased engagement in social media.

The fourth research question asks if the influence of social anxiety (causal variable) on social media engagement (outcome variable) is mediated by fear of positive evaluation (potential mediator). The fourth hypothesis is that fear of positive evaluation will mediate the relationship between social anxiety and social media engagement. As people experience more social anxiety they may have increased fear of positive evaluation, and as they have increased fear of positive evaluation, they may experience increased engagement in social media. This mediation may occur given the extensive research (Weeks et al., 2010; Weeks & Howell, 2012; Weeks, Heimberg, Rodebaugh, et al., 2008; Weeks, Heimberg, and Rodebaugh, 2008) conducted linking social anxiety and fear of positive evaluation. However, it is not clear whether fear of positive evaluation is related to social media. It is possible that fear of positive evaluation can occur on social media with the numerous ways to obtain positive feedback (e.g. likes on photos, comments on posts/photos, and so forth) and the result of the dread of living up to peoples' positive expectations of them (Gilbert, 2001). However, one study has results that suggest there may not be a relation between social media and fear of positive evaluation (Wolniewicz et al., 2018). The author chose this hypothesis based on the extensive research linking social anxiety and fear of positive evaluation, but it is possible our hypothesis will not be confirmed given the limited research linking fear of positive evaluation and social media engagement.

The fifth research question asks if the influence of social anxiety (causal variable) on social media engagement (outcome variable) is mediated by social comparison (potential

mediator). Previous research has indicated mixed findings on the relationship between social comparison and social media engagement. For instance, it was found that Facebook use is related positively to social comparison (Lee, 2014; Vogel et al., 2014) and that Instagram use is not associated with social comparison (Mackson et al., 2019; Lup et al., 2015). However, researchers have hypothesized social comparison may be related to social media given social media provides easily available information for comparisons to be made (Hanna et al., 2017; Lee, 2014; Shin et al., 2017). Although the relationship between social anxiety and social comparison hasn't been researched extensively yet, there is a promising study (Antony et al., 2005) that suggests a possible link. Therefore, the fifth hypothesis is that social comparison will mediate the relationship between social anxiety and social media engagement. As people experience more social anxiety they may have higher levels of social comparison, and as they have higher levels of social comparison they may experience increased engagement in social media.

Method

Participants

Participants (N = 161) included undergraduate students at Eastern Illinois University enrolled in the Psychology courses who received course credit for their participation. Six of those participants were excluded from data analysis due to missing data and three were excluded for not using any of the sites examined (Facebook, Snapchat, and Instagram). Therefore, the total number of participants analyzed was 152. These participants ranged from ages 17-43 with the majority being ages 18-20 (87.5%). These participants were mostly female (68.4%) and white (74.3%). In terms of social media sites used, 60% reported using Facebook, Instagram, and Snapchat, 23% reported using Instagram and Snapchat, 6% reported using Facebook and

Snapchat, 5% reported using Facebook and Instagram, 5% reported using Snapchat only, and 1% reported using Instagram only.

Measures

Demographics. Demographic information was assessed by asking participants for their sex, age, major, race/ethnicity, what social networking sites they use (i.e., Facebook, Instagram, Snapchat, Twitter, TikTok, LinkedIn, and WhatsApp).

Facebook Use. Facebook use was assessed by using the Facebook Questionnaire (FBQ; McCord et al., 2014). The FBQ is a 7-item scale that measured how frequently participants use Facebook's social interaction features (e.g., "I send messages to friends" and "I update my status"). The FBQ used a 7-item Likert scale of 1 (*about a month or less*) to 7 (*many times per day*). McCord et al. (2014) showed the measure has good internal consistency ($\alpha = .86$). Additionally, McCord et al. (2014) found that the Social Interaction Anxiety Scale and Social Phobia Scale-12 was not correlated with the FBQ ($r = .01$, $p = .84$). (See Appendix A to view scale).

Instagram Use. Instagram use was assessed by using the Instagram Questionnaire (IGQ) which the author based on the FBQ (McCord et al., 2014) and Instagram features discussed previously (Stec, 2018; Kircaburun et al., 2018; Instagram, n.d.). The IGQ is a 7-item scale that measured how frequently participants use Instagram's social interaction features (e.g., "I post photos on my profile" and "I send follow requests"). The IGQ used a 7-item Likert scale of 1 (*about a month or less*) to 7 (*many times per day*). (See Appendix B to view scale).

Snapchat Use. Snapchat use was assessed by using the Snapchat Questionnaire (SCQ) which the author based on the FBQ (McCord et al., 2014) and Snapchat features discussed previously (Stec, 2018; Snapchat, n.d.). The SCQ is a 7-item scale that measured how

frequently participants use Snapchat's social interaction features (e.g., "I send photo messages to friends" and "I send friend requests"). The SCQ used a 7-item Likert scale of 1 (*about a month or less*) to 7 (*many times per day*). (See Appendix C to view scale).

Facebook Connection. The Social Media Use Integration Scale (SMUIS - Facebook; Jenkins-Guarnieri et al., 2013) was used to measure Facebook connection. The SMUIS is a 10-item scale that measured the emotional connection to social behavior and daily routines of Facebook users. This scale included items such as "I enjoy checking my Facebook account" and "Using Facebook is part of my everyday routine." The SMUIS used a 6-item Likert scale from 1 (*Strongly disagree*) to 6 (*Strongly agree*). Jenkins-Quarnieri et al. (2013) found that the scale had good internal consistency for the total scale score ($\alpha = .91$), and that the scale held convergent and discriminant validity (See Appendix D to view scale).

Instagram Connection. The Social Media Use Integration Scale (SMUIS) (Instagram) was adapted from the original Jenkins-Guarnieri et al. (2013) SMUIS for Facebook and was used to measure Instagram connection. The SMUIS is a 10-item scale that measured the emotional connection to social behavior and daily routines of Instagram users. Jenkins-Quarnieri et al. (2013) designed the scale to be adapted to other social media sites, and therefore, the researcher adapted the scale to measure Instagram users by replacing "Facebook" with "Instagram" in the scale. (See Appendix E to view scale).

Snapchat Connection. The Social Media Use Integration Scale (SMUIS) (Snapchat) was adapted from the original Jenkins-Guarnieri et al. (2013) SMUIS for Facebook and was used to measure Snapchat connection. The SMUIS is a 10-item scale that measured the emotional connection to social behavior and daily routines of Snapchat users. The researcher adapted the

scale to measure Snapchat users by replacing “Facebook” with “Snapchat” in the scale. (See Appendix F to view scale).

Social Anxiety. Social anxiety was assessed by the Social Interaction Anxiety Scale (SIAS) (Mattick & Clark, 1998). The SIAS is a 20-item scale used to measure participants’ anxiety when interacting with other persons and includes items such as “I have difficulty making eye-contact with others” and “When mixing socially, I am uncomfortable.” The SIAS used a 5-item Likert scale from 0 (*Not at all*) to 4 (*Extremely*). The SIAS has good psychometric properties such as high internal consistency, diagnostic sensitivity to SAD, and discriminant validity (Carleton et al., 2014). (See Appendix G to view scale).

Depression. Depression was assessed by the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) (Andresen et al., 1994). The CES-D-R 10 is 10-item scale that measures major depression and it includes items such as “I felt depressed” and “I felt lonely.” The CES-D-R 10 uses a 4-point scale ranging from “*Rarely or none of the time*” to “*All of the time*.” Mohebbi et al. (2018) report that the CES-D-R 10 has good internal consistency ($\alpha = .70$) and construct validity. (See Appendix H to view scale).

Fear of Positive Evaluation. The Fear of Positive Evaluation Scale (FPES) (Weeks, Heimberg, & Rodebaugh, 2008) is a 10-item scale that was used to assess participants’ fear of positive evaluation. It includes items such as “I feel uneasy when I receive praise from authority figures” and “I generally feel uncomfortable when people give me compliments.” The FPES used a 10-item Likert scale from 0 (*not at all true*) to 9 (*very true*). Weeks et al. (2008) found the scale is internally consistent ($\alpha = .80$), demonstrates 5-week test-retest reliability, and discriminant validity. (See Appendix I to view scale).

Fear of Negative Evaluation. Brief Fear of Negative Evaluation Scale-II (BFNE-II) (Leary, 1983) was used to assess participants' fear of negative evaluation. The BFNE-II is a 12-item scale and it includes items such as "I am afraid others will not approve of me" and "I often worry that I will say or do the wrong things." The BFNE-II used a 5-item Likert scale from 1 (*Not at all characteristic of me*) to 5 (*Extremely characteristic of me*). Carleton et al. (2007) found moderate convergent and discriminant validity with the SIAS and SPS scales. (See Appendix J to view scale).

The Fear of Missing Out (FoMO). FoMO was measured using The Fear of Missing Out (FoMO) Scale (Przybylski et al., 2013), which is a 10-item scale that measures the anxiety participants' experience when they miss out on social events. It includes items such as "I get worried when I find out my friends are having fun without me" and "When I have a good time it is important for me to share the details online (e.g. updating status)." The FoMO Scale used a 5-item Likert scale from 1 (*Not at all true of me*) to 5 (*Extremely true of me*). Przybylski et al. (2013) found that the scale demonstrated good internal consistency ($\alpha = .90$). (See Appendix K to view scale).

Social Comparison. The Iowa–Netherlands Comparison Orientation Scale (INCOM; Gibbons & Buunk, 1999) was used to measure social comparison. The INCOM is an 11-item scale that measures participants' tendency to engage in social comparison (e.g. "I always pay a lot of attention to how I do things compared with how others do things" and "I often compare how I am doing socially (e.g., social skills, popularity) with other people"). The INCOM used a 5-item Likert scale from 1 (*disagree strongly*) to 5 (*agree strongly*). Gibbons and Buunk (1999) found the scale demonstrates good internal consistency ($\alpha = .83$), criterion-related validity, and convergent validity (See Appendix L to view scale).

Procedure

Participants were recruited at Eastern Illinois University through the Psychology Department's SONA website, an online research study manager. After signing up for the study on SONA, participants were taken to a link to the survey hosted by Eastern Illinois University's Qualtrics server. Participants were provided an informed consent statement to read and had to select whether or not they consent to the study. If participants did not consent, then they were immediately taken to the end of the survey and received course credit. If participants consented, then they went through the measures described above, which were randomized through Qualtrics. After completing the measures, participants were provided with a debrief informing the nature of the study, the ability to contact the researcher for any questions, and numbers to local mental health agencies. Upon completion of the measures, participants received course credit for their time.

Data Analysis Plan

First, a preliminary analysis was conducted to assess the internal consistency of the social media use and connection measures using Cronbach's alpha. Before obtaining the next two subsequent analyses, the data was divided by social media sites used to ensure that each social media engagement measure was only examined for those that reported using that site. For example, the Facebook measures were examined by participants who reported using Facebook ($N = 108$). This method held the same for Snapchat ($N = 142$) and Instagram ($N = 136$). Likewise, these participants scores for the remaining measures (i.e. SAIS, FPES, BFNE-II, FOMO, and INCOM) were the only ones examine instead of the whole pool of 152 participants. Next, to examine the first hypothesis that there would be a relationship between social media engagement and social anxiety a Pearson's r test was conducted. Social media engagement was

assessed in multiple ways: use of social media sites and connection to social media. Therefore, multiple tests were done analyzing each concept of social media engagement. This held true for the next set of analyses as well. To examine the next four hypotheses, A Baron and Kenny test of mediation was conducted to assess each hypothesis. Finally, a first-order partial correlation was conducted assessing the relationship of social anxiety and social media engagement with depression controlled. Therefore, depression was introduced in the first step and social anxiety was introduced in the second step. Likewise, a hierarchical multiple regression was conducted assessing the relationship of the mediating variables, social media engagement, social anxiety, and depression. Therefore, depression was introduced in the first step, social anxiety was introduced in the second step, and fear of missing out, fear of negative evaluation, fear of positive evaluation, and social comparison were introduced in the third step.

Results

Internal Consistency

First, the internal consistency of each measure used for the study was obtained. All measures but the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) had a Cronbach's alpha greater than 0.70. Therefore, most measures had appropriate internal consistency (see Table 1).

Pearson *r* Correlations

Next, to examine the first hypothesis that there would be a relationship between social anxiety and social media engagement a Pearson's *r* test was conducted. At an alpha level of .01, social anxiety was correlated negatively with Facebook use, $r(108) = -0.27, p = .002$ (one-tailed). Social anxiety accounted for 7% of the variance in Facebook use. Additionally, people with more social anxiety tended to feel more connected to Snapchat or those with less social anxiety tended

to feel less connected to Snapchat, $r(142) = 0.23, p = .003$ (one-tailed). Social anxiety accounted for 5% of the variance in Snapchat connection.

However, there was no significant relationship between social anxiety and Snapchat use, $r(142) = -0.12, p = .07$ (one-tailed). Social anxiety accounted for only 1% of the variance in Snapchat use. There was no significant relationship between social anxiety and Instagram use, $r(136) = -0.08, p = .18$ (one-tailed). Social anxiety accounted for only 0.6% of the variance in Instagram use. There was no significant relationship between social anxiety and Facebook connection, $r(108) = 0.07, p = .24$ (one-tailed). Social anxiety accounted for only 0.5% of the variance in Facebook connection. Finally, there was no significant relationship between social anxiety and Instagram connection, $r(136) = 0.09, p = .15$ (one-tailed). Social anxiety accounted for only 0.8% of the variance in Instagram connection.

Mediation Analyses

To examine the next four hypotheses, A Baron and Kenny test of mediation was conducted to assess each hypothesis. For ease of reading, these tests of mediations will be divided by social media site.

Social Anxiety and Facebook Mediators

First, A Baron and Kenny test of mediation (2016) was conducted to examine if fear of missing out (FoMO), fear of positive evaluation (FPE), fear of negative evaluation (FNE), and social comparison mediated the relationship between social anxiety and Facebook use. Step 1 results indicated that social anxiety negatively predicted Facebook use $\beta = -.16, p = .005$. Step 2 examined the relationships between each potential mediator and social anxiety. Results showed that social anxiety positively predicted FoMO ($\beta = 0.012, p = .002$), FPE ($\beta = 0.63, p < .001$), FNE ($\beta = 0.29, p < .001$), and social comparison ($\beta = 0.02, p < .001$).

Step 3 results show that the relationship between FoMO and Facebook use was approaching statistical significance while controlling social anxiety, $\beta = 2.69, p = .018$. Thus, FoMO was positively correlated with Facebook use (See Table 2). Step 3 results also show that the relationship between FNE and Facebook use was approaching statistical significance while controlling social anxiety, $\beta = .32, p = .018$. Thus, FNE was positively correlated with Facebook use (See Table 3). However, Step 3 results show that the relationship between FPE and Facebook use was not statistically significant while controlling social anxiety, $\beta = .01, p = .87$. Step 3 results also show that the relationship between social comparison and Facebook use was not statistically significant while controlling social anxiety, $\beta = 1.35, p = .30$. Therefore, FPE and social comparison did not mediate the relationship between social anxiety and Facebook use contrary to hypotheses 4 and 5.

Finally, Step 4 results indicate the relationship between social anxiety and Facebook use while controlling FoMO was not zero, $\beta = -.20, p = .001$. Thus, FoMO partially mediated the relationship between social anxiety and Facebook use (See Figure 1). The amount of mediation is $\beta_{Indirect\ Effect} = 0.04$. According to a Sobel's test, this partially mediate effect was approaching statistical significance ($Z = 1.88, p = .03$ (one-tailed)). Step 4 results also indicate the relationship between social anxiety and Facebook use while controlling FNE was not zero, $\beta = -.26, p < .001$. Thus, FNE partially mediated the relationship between social anxiety and Facebook use (See Figure 2). The amount of mediation is $\beta_{Indirect\ Effect} = 0.1$. According to a Sobel's test, this partially mediate effect was statistically significant ($Z = 2.28, p = .01$ (one-tailed)).

Next, A Baron and Kenny test of mediation (2016) was conducted to examine if FoMO, FPE, FNE, and social comparison mediated the relationship between social anxiety and Facebook connection. Step 1 results indicated that the relationship between social anxiety and

Facebook connection were not significant, $\beta = .003, p = .49$. Therefore, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Facebook connection. This result in contrary to hypotheses 2-5.

In summary, FoMO and FNE partially mediated the relationship between social anxiety and Facebook use in line with hypotheses 2 and 3. However, FPE and social comparison did not mediated the relationship between social anxiety and Facebook use contrary to hypotheses 4 and 5. Additionally, contrary to hypotheses 2-5, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Facebook connection.

Social Anxiety and Snapchat Mediators

First, A Baron and Kenny test of mediation (2016) was conducted to examine if FoMO, FPE, FNE, and social comparison mediated the relationship between social anxiety and Snapchat use. Step 1 results indicated that the relationship between social anxiety and Snapchat use was not significant, $\beta = -.07, p = .14$. Therefore, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Snapchat use. This result in contrary to hypotheses 2-5.

Next A Baron and Kenny test of mediation (2016) was conducted to examine if FoMO, FPE, FNE, and social comparison mediated the relationship between social anxiety and Snapchat connection. Step 1 results indicated that social anxiety positively predicted Snapchat connection, $\beta = .01, p = .007$. Step 2 examined the relationships between each potential mediator and social anxiety. Results showed that social anxiety positively predicted FoMO ($\beta = 0.02, p < .001$), FPE ($\beta = 0.55, p < .001$), FNE ($\beta = 0.30, p < .001$), and social comparison ($\beta = 0.02, p < .001$).

Step 3 results show that the relationship between FoMO and Snapchat connection was statistically significant while controlling social anxiety, $\beta = .50, p < .001$. Thus, FoMO

positively predicted Snapchat connection (See Table 4). Step 3 results also show that the relationship between FNE and Snapchat connection was statistically significant while controlling social anxiety, $\beta = .04, p = .001$. Thus, FNE positively predicted Snapchat connection (See Table 5). Step 3 results also show that the relationship between social comparison and Snapchat connection was statistically significant while controlling social anxiety, $\beta = .39, p < .001$. Thus, social comparison positively predicted Snapchat connection (See Table 6). However, Step 3 results show that the relationship between FPE and Snapchat connection was not statistically significant while controlling social anxiety, $\beta = .01, p = .04$. Therefore, FPE did not mediate the relationship between social anxiety and Snapchat connection contrary to hypothesis 4.

Finally, Step 4 results indicate the relationship between social anxiety and Snapchat connection while controlling FoMO was not zero, $\beta = .004, p = .37$. Thus, FoMO partially mediated the relationship between social anxiety and Snapchat connection (See Figure 3). The amount of mediation is $\beta_{Indirect\ Effect} = .006$. According to a Sobel's test, this partially mediate effect was statistically significant ($Z = 3.51, p < .001$ (one-tailed)). Step 4 results also indicate the relationship between social anxiety and Snapchat connection while controlling FNE was not zero, $\beta = .002, p = .73$. Thus, FNE partially mediated the relationship between social anxiety and Snapchat connection (See Figure 4). The amount of mediation is $\beta_{Indirect\ Effect} = .008$. According to a Sobel's test, this partially mediate effect was statistically significant ($Z = 3.19, p = .001$ (one-tailed)). Step 4 results also indicate the relationship between social anxiety and Snapchat connection while controlling social comparison was not zero, $\beta = .007, p = .16$. Thus, social comparison partially mediated the relationship between social anxiety and Snapchat connection (See Figure 5). The amount of mediation is $\beta_{Indirect\ Effect} = .003$. According to a Sobel's test, this partially mediate effect was statistically significant ($Z = 2.66, p = .004$ (one-tailed)).

In summary, contrary to hypotheses 2-5, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Snapchat use. Additionally, FoMO, FNE, and social comparison partially mediated the relationship between social anxiety and Snapchat connection in line with hypotheses 2, 3, and 5. However, FPE did not mediate the relationship between social anxiety and Snapchat connection contrary to hypotheses 4.

Social Anxiety and Instagram Mediators

First, A Baron and Kenny test of mediation (2016) was conducted to examine if FoMO, FPE, FNE, and social comparison mediated the relationship between social anxiety and Instagram use. Step 1 results indicated that the relationship between social anxiety and Instagram use were not significant, $\beta = -.05, p = .35$. Therefore, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Instagram use. This result in contrary to hypotheses 2-5.

Next, A Baron and Kenny test of mediation (2016) was conducted to examine if FoMO, FPE, FNE, and social comparison mediated the relationship between social anxiety and Instagram connection. Step 1 results indicated that the relationship between social anxiety and Instagram connection were not significant, $\beta = .004, p = .30$. Therefore, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Instagram connection. This result in contrary to hypotheses 2-5.

In summary, contrary to hypotheses 2-5, FoMO, FPE, FNE, and social comparison did not mediate the relationship between social anxiety and Instagram use nor the relationship between social anxiety and Instagram connection.

Depression Control

A partial correlation was conducted on social anxiety and each of the social media engagement variables with depression controlled. At an alpha level of .01, results indicate that social anxiety was correlated negatively with Facebook use, $r(105) = -.29, p = .002$ (two-tailed). The depression variable accounted for 8% of the variance in Facebook use. Results indicate that social anxiety was not correlated with Facebook connection, $r(105) = -.02, p = .87$ (two-tailed). The depression variable accounted for only .04% of the variance in Facebook connection.

Results indicate that social anxiety was not negatively correlated with Snapchat use, $r(139) = -.15, p = .07$ (two-tailed). The depression variable accounted for only 2% of the variance in Snapchat use. Results indicate that social anxiety was not negatively correlated with Snapchat connection, $r(105) = .15, p = .08$ (two-tailed). The depression variable accounted for only 2% of the variance in Snapchat connection.

Results indicate that social anxiety was not negatively correlated with Instagram use, $r(133) = -.11, p = .22$ (two-tailed). The depression variable accounted for only 1% of the variance in Instagram use. Results indicate that social anxiety was not negatively correlated with Instagram connection, $r(133) = .05, p = .57$ (two-tailed). The depression variable accounted for only 2% of the variance in Instagram connection. In summary, the only significant result was that social anxiety was negatively correlated with Facebook use with depression controlled.

Hierarchical Multiple Regression

A hierarchical multiple regression analysis was conducted to predict social anxiety. In the first step, depression was used as the predictor. At an alpha level of .01, the relationship between depression and social anxiety was found to be statistically significant, $R^2 = .20, F(1, 150) = 36.27, p < .001$. Depression was positively correlated with social anxiety. This accounted for 19% of the variance in social anxiety, $p < .001$.

In the second step, the mediating variables used earlier (i.e., FoMO, FNE, FPE, and social comparison) were added to determine if they can predict social anxiety over and above depression. The results indicate that these mediating variables do provide added predictive value, $\Delta R^2 = .27$, $F(4, 146) = 18.71$, $p < .001$. Among the mediating variables, FNE and FPE were most strongly related to social anxiety. FNE accounted for 13% of the variance in social anxiety, $p < .001$ and FPE also accounted for 13% of the variance in social anxiety, $p < .001$. FNE and FPE positively predicted social anxiety.

In the third step, the social media engagement variables used earlier were added to determine if they can predict social anxiety over and above depression and the mediating variables. The results indicate that these social media engagement variables do not quite provide added predictive value, $\Delta R^2 = .05$, $F(6, 140) = 2.57$, $p < .02$. However, if the variables were significant, Facebook use would have been the most strongly related to social anxiety accounting for 3% of variance in social anxiety, $p = .02$ (See Table 7 for more data)

Discussion

This study sought to further explore the relationship between social anxiety and social media engagement (i.e. Facebook, Instagram, and Snapchat use and connection) in college students to add to the literature by including three possible mediating variables: fear of missing out (FoMO), fear of positive evaluation (FPE), fear of negative evaluation (FNE), and social comparison. Fear of missing out and fear of negative evaluation both partially mediated the relationship between social anxiety and Facebook connection. Additionally, fear of missing out, fear of negative evaluation, and social comparison partially mediated the relationship between social anxiety and Snapchat use. This study also sought to further explore the relationship between social anxiety and social media engagement with the mediating variables by the

inclusion of depression. There was a relationship between social anxiety and depression, and the mediating variables did add value to this relationship.

Summary and Discussion of Findings

Social Anxiety and Social Media Engagement

The first hypothesis was that there would be a relationship between social anxiety and social media engagement. In support of hypothesis 1, social anxiety was negatively associated with Facebook use and positively associated with Snapchat connection. However, contrary to this hypothesis, there were no relationships between social anxiety and Snapchat use, Facebook connection, Instagram use, or Instagram connection. Therefore, no variables mediated these relationships.

These findings may have been related to the nature of the different social media sites as well as the constructs the measures assessed. Facebook allows users to post, share, and engage with content like photos and status updates (Stec, 2018). Instagram allows users to take photos, add filters to photos, and share photos on their profile and story as well as to other social networks such as Facebook (Stec, 2018; Kircaburun et al., 2018). Instagram also allows users to share messages, photos, and videos privately to others (See Instagram, n.d. for more features). Snapchat allows users to send and receive “snaps,” or photos and videos that are time limited (Stec, 2018). Thus, sites like Facebook allow more public communication and interaction, while Snapchat allows more private communication. (Utz et al., 2015). Also, Instagram primarily focuses on photo sharing rather than communication like Snapchat and Facebook.

Thus, the lack of focus on communication with Instagram may have contributed to the lack of relationships between social anxiety and the Instagram measures. Next, the measure of Facebook connection included measures such as Facebook as a method communication,

Facebook being a part of one's routine, and being disappointed when Facebook is unavailable. It may be likely that people could use Facebook but not to the extent to feel a connection to it (i.e., not using it routinely, not being disappointed when it's unavailable, etc.) This is based on the result finding Facebook use as significant but not Facebook connection. Additionally, the public communication may lead individuals with social anxiety to avoid using Facebook.

Finally, there was no link between social anxiety and Snapchat use although there was a link between social anxiety and Snapchat connection. This finding is surprising as most participants reported using Snapchat ($N = 140$) compared to Instagram ($N = 134$) and Facebook ($N = 106$). However, it may have been likely that individuals may only interact with one feature of Snapchat (e.g., photo messages) which may have lowered their Snapchat use score. Likewise, as Snapchat is a social media site primarily used for communication, it is not surprising that the Snapchat connection measure, relating to using Snapchat as a method communication and being disappointed when Snapchat is unavailable, was significant. These inferences related to social media engagement should be kept in mind during the discussion of the related remaining hypotheses and analyses.

Fear of Missing Out Mediation

The second hypothesis was that FoMO would mediate the relationship between social anxiety and social media engagement. In support of hypothesis 2, fear of missing out (FoMO) partially mediated the relationship between social anxiety and Facebook use as well as the relationship between social anxiety and Snapchat connection. However, contrary to this hypothesis, FoMO did not mediate the relationships between social anxiety and Facebook connection, Snapchat use, Instagram use, and Instagram connection. These findings are related to

the lack of a significant relationship between social anxiety and these individual variables discussed earlier.

Thus, it is suggested that as social anxiety increases, FoMO increases which leads to an increase in Facebook use. This finding is supported by research on the linkage between social anxiety and Facebook (Carruthers et al., 2019; Dempsey et al., 2019; Chambers, 2017). This finding may have occurred because individuals with social anxiety may experience increased levels of FoMO (Chambers, 2017), which may lead to these individuals increasing Facebook use to avoid missing out, which has multiple sources of information about friends. Additionally, this finding of FoMO as a mediator may better explain the relationship between social anxiety and Facebook use as social anxiety was negatively correlated with Facebook use. Although, increased social anxiety may directly lead to decreased use of Facebook, if FoMO is present then this presence may lead to an increased use of Facebook.

It is also suggested that as social anxiety increases, FoMO also increases, which leads to an increase in Snapchat connection. This finding supports the theory described by Green and colleagues (2016) which suggests that message permanence may contribute to social anxiety with Facebook, as “snaps” are deleted after a limited time. However, this finding may have occurred because individuals with social anxiety may experience increased levels of FoMO (Chambers, 2017), which may lead to these individuals increasing their connection to Snapchat to avoid missing out. Snapchat is a communication platform so individuals may feel they are missing out on an aspect of communication to others which may increase their connection to the site to avoid missing out on conversations with and connections to others.

Fear of Negative Evaluation Mediation

The third hypothesis was that fear of negative evaluation (FNE) will mediate the relationship between social anxiety and social media engagement. In support of hypothesis 3, FNE partially mediated the relationship between social anxiety and Facebook use as well as the relationship between social anxiety and Snapchat connection. However, contrary to this hypothesis, FNE did not mediate the relationships between social anxiety and Facebook connection, Snapchat use, Instagram use, and Instagram connection. This finding is related to the lack of a significant relationship between social anxiety and these individual variables discussed earlier.

Additionally, it is suggested that as social anxiety increases, FNE increases which leads to an increase in Facebook use. This finding may have occurred because individuals with social anxiety experience increased levels of fear of negative evaluation (Weeks, Heimberg, & Rodebaugh, 2008; Weeks, Heimberg, Rodebaugh, et al., 2008; Rodebaugh et al., 2012; Rapee & Heimberg, 1997), which may lead to these individuals increasing Facebook use. Therefore, individuals may turn to Facebook for social interactions to help feel safe against perceived negative evaluations in person, which is supported by Lee's (2014) theory. As explained earlier, this finding of FNE as a mediator may better explain the relationship between social anxiety and Facebook use as social anxiety was negatively correlated with Facebook use.

It is also suggested that as social anxiety increases, FNE increases which leads to an increase in Snapchat connection. This finding may have occurred because individuals with social anxiety experience increased levels of fear of negative evaluation (Weeks, Heimberg, & Rodebaugh, 2008; Weeks, Heimberg, Rodebaugh, et al., 2008; Rodebaugh et al., 2012; Rapee & Heimberg, 1997), which may lead to these individuals increasing Snapchat Connection. Individuals may feel safe against perceived negative evaluations in person and therefore, may

turn to Snapchat as a form of communication, which is supported by the theory by Lee (2014). This in turn may lead to an increase in connection to Snapchat as a form of communication.

Fear of Positive Evaluation Mediation

The fourth hypothesis was that fear of positive evaluation (FPE) would mediate the relationship between social anxiety and social media engagement. Contrary to this hypothesis, FPE did not mediate the relationships between social anxiety and Facebook use, Facebook connection, Snapchat use, Snapchat connection, Instagram use, and Instagram connection. There was no link in the relationships between FPE and Facebook use as well as FPE and Snapchat connection while controlling social anxiety.

It is suggested that social anxiety may have a significant contribution to the relationships between FPE and Facebook use and Snapchat connection, because there was no longer a link in the relationships between these variables when social anxiety was controlled. These findings may have occurred because of the strong research support between social anxiety and fear of positive evaluation (Weeks, Heimberg, & Rodebaugh, 2008; Weeks, Heimberg, Rodebaugh, et al., 2008; Rodebaugh et al., 2012; Rapee & Heimberg, 1997). Additionally, although there is not much research support between fear of positive evaluation and social media engagement, it could be inferred that individuals receive positive feedback through likes and comments that may increase social anxiety and the need to live up to positive expectations.

Social Comparison Mediation

The fifth hypothesis was that social comparison would mediate the relationship between social anxiety and social media engagement. In support of hypothesis 5, social comparison partially mediated the relationship between social anxiety and Snapchat connection. It is suggested that as social anxiety increases, social comparison increases which leads to an increase

in Snapchat connection. However, contrary to this hypothesis, social comparison did not mediate the relationships between social anxiety and Facebook use, Facebook connection, Snapchat use, Snapchat connection, Instagram use, and Instagram connection. There was no relationship between social comparison and Facebook use as well as social comparison and Snapchat connection when social anxiety was controlled.

Thus, it is suggested that as social anxiety increases, social comparison increases which leads to an increase in Snapchat connection. This finding may have occurred because individuals with social anxiety may experience increased levels of social comparison (Antony et al., 2005), which may lead to these individuals increasing Snapchat Connection. Snapchat allows people to evaluate themselves by comparing themselves with others (Lee, 2014; Shin et al., 2017), which can lead to feelings of satisfaction or dissatisfaction in their evaluation of themselves (Lee, 2014). This may lead to a greater connection to Snapchat in the individual evaluating and comparing themselves against others if they become attached to that comparison.

Depression Inclusion

Furthermore, the relationships between social anxiety and social media engagement were examined with depression controlled. Social anxiety was not negatively correlated with Facebook connection, Snapchat use, Snapchat connection, Instagram use, and Instagram connection with depression controlled. Also, there was no relationship between social anxiety and Snapchat connection once depression was controlled. However, social anxiety was negatively associated with Facebook use with depression controlled.

These findings suggest that depression may play a role in the relationship between social anxiety and Snapchat connection. A large body of research (c.f., Chou, 2009) has documented that social anxiety is related to depression symptoms. Additionally, a large body of research (c.f.,

Ceyhan & Ceyhan, 2008) has documented that depression is related to social media. Therefore, this body of research may explain how depression could be related to social anxiety as well as Snapchat connection. Furthermore, as Snapchat is a form of communication, individuals could experience symptoms of depression without access to this form of communication. Likewise, this lack of social interaction could contribute to an individual's depression cycle through social isolation.

The relationships between social anxiety, depression, the mediating variables (FoMO, FNE, FPE, and social comparison), and social media engagement were further examined. Depression was positively associated with social anxiety. Additionally, the mediating variables added predictive value to this relationship, with FNE and FPE being the most strongly related to social anxiety. However, the social media engagement variables did not supply added predictive value to the relationship between social anxiety and depression.

These findings suggest that FoMO, FNE, FPE, and social comparison add value to the relationship between social anxiety and depression. This finding could be related to the negative aspects of FoMO, FNE, FPE, and social comparison that may contribute to or worsen social anxiety and/or depression. However, social media engagement did not add any value to the relationship between social anxiety and depression. This finding was surprising given the large body of research (c.f., Ceyhan & Ceyhan, 2008) documenting that depression is related to social media and documenting that social anxiety is related to social media (c.f., Dobrean & Pășărelu, 2016). However, these mediating variables may contribute to both the relationship between depression and social media engagement as well as the relationship between social anxiety and social media engagement. Therefore, these variables could add more predictive value with their relationship to these variables than social media engagement could.

Clinical Implications

This research supports that FoMO and FNE partially mediates the relationship between social anxiety and Facebook use. This research also supports that FoMO, FNE, and social comparison all partially mediate the relationship between social anxiety and Snapchat connection. Additionally, this research supports the relationship between social anxiety and Facebook use as well as social anxiety and Snapchat connection. Given the growing importance of social media engagement in the lives of college students, clinicians should consider FoMO, FNE, and social comparison while treating college students with social anxiety who interact with Facebook and Snapchat. FoMO, FNE, and social comparison may be involved in the negative thought processes of individuals with social anxiety which could be addressed by Cognitive Behavioral Therapy.

Study Limitations

This study came with a few limitations which merit discussion. First, a limitation of this study includes the social media engagement measures used. The Facebook Questionnaire (FBQ) was published 7 years ago, and the Social Media Use Integration Scale (SMUIS) was published 8 years ago. Additionally, this writer created scales based on these questionnaires to measure Instagram and Snapchat, which were not supported by research. Therefore, these scales may be outdated, as social media sites are constantly changing. For example, Instagram added Instagram Reels shortly after data was collected, so this feature was not assessed in the scales. Likewise, these newer scales have not had much validity and reliability testing done outside the creator's study. The author assessed this lack of research by testing the internal reliability of these scales, which were found to be adequate for this study. However, as the results are related to these measures, the results should be interpreted with caution.

Another limitation of this study was the participant population assessed. These participants were not particularly diverse as the participants were mostly ages 18-20 (87.5%), female (68.4%), and white (74.3%). This population is not representative of Eastern Illinois University's latest demographic information from 2017. Eastern Illinois University's 2017 demographic information reports that the undergraduate student population consisted of 58.7% students aged 18-21, 59.6% female students, and 62.6% white students. Likewise, this population consisted solely of individuals enrolled in Psychology courses at Eastern Illinois University. Therefore, these research results would not be generalizable to all college students in the United States.

Another limitation is the exclusive use of self-report measures for this study, specifically with social media use. A disadvantage of self-report measures are that they are open to participant bias (i.e., overreporting or underreporting), and may not be accurate measures of a construct. This author elected not to use more objective data, such as phone data for time spent on these apps, as participants may have difficulty accessing this data or may not have access to this data on their specific phone.

A final limitation concerns the collection of data during the COVID-19 pandemic; data were collected from October 2020 to January 2021. Although research is still being conducted on the effects of the pandemic, there are some emerging results examining social media use during the pandemic. According to Sathish and colleagues (2021), Facebook and Instagram use rose 40% during the Covid-19 pandemic amongst adults aged 18 to 34 years. This increased use of these social media sites may have impacted the social media engagement results of this study.

Future Directions

This author suggests that a similar study assessing different social media sites be conducted with a more representative population of a general population so results may be more generalizable. Additionally, this author suggests that a more reliable, valid, and objective measure be used to assess different social media sites. Finally, this author would suggest that another study be conducted with a clinical population diagnosed with social anxiety disorder to gain a better idea of individuals with this disorder rather than those experiencing social anxiety in general.

Conclusion

In conclusion, this research adds to the literature by examining the relationship between social anxiety and social media engagement in depth. This research examined this relationship through three possible mediating variables that are cognitive in nature: fear of missing out (FoMO), fear of evaluation (both negative and positive), and social comparison. Additionally, this research examined the relationship with these variables along with depression. Therefore, this research added to the ongoing research related to these topics and may aid in treatment of individuals with social anxiety.

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Table 1*Internal Consistency for each measure*

Measure	Cronbach's Alpha
Facebook Questionnaire (FBQ)	0.85
Instagram Questionnaire (IGQ)	0.87
Snapchat Questionnaire (SCQ)	0.83
Social Media Use Integration Scale – Facebook (SMUIS-F)	0.91
Social Media Use Integration Scale – Instagram (SMUIS-I)	0.91
Social Media Use Integration Scale – Snapchat (SMUIS-S)	0.94
Social Interaction Anxiety Scale (SIAS)	0.93
Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10)	0.64
Fear of Positive Evaluation Scale (FPES)	0.83
Brief Fear of Negative Evaluation Scale-II (BFNE-II)	0.76
Fear of Missing Out (FoMO) Scale	0.86
Iowa–Netherlands Comparison Orientation Scale (INCOM)	0.83

Table 2

Summary of the Multiple Regression Analysis for Variables Predicting Facebook Use (N = 106)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Social Anxiety	-.20	.06	-.34	-3.54	.001
FoMO	2.69	1.12	.23	2.41	.018

Note. $R^2 = .12$; adjusted $R^2 = .11$

Table 3

Summary of the Multiple Regression Analysis for Variables Predicting Facebook Use (N = 106)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Social Anxiety	-.26	.07	-.43	-3.81	< .001
FNE	.32	.13	.27	2.41	.018

Note. $R^2 = .12$; adjusted $R^2 = .11$

Table 4

Summary of the Multiple Regression Analysis for Variables Predicting Snapchat Connection (N = 140)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Social Anxiety	.004	.005	.07	.90	.37
FoMO	.50	.09	.45	5.60	< .001

Note. $R^2 = .23$; adjusted $R^2 = .21$

Table 5

Summary of the Multiple Regression Analysis for Variables Predicting Snapchat Connection (N = 140)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Social Anxiety	.002	.006	.03	.35	.73
FNE	.04	.01	.33	3.43	.001

Note. $R^2 = .13$; adjusted $R^2 = .11$

Table 6

Summary of the Multiple Regression Analysis for Variables Predicting Snapchat Connection (N = 140)

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Social Anxiety	.007	.005	.12	1.42	.16
Social Comparison	.39	.11	.30	3.57	< .001

Note. $R^2 = .13$; adjusted $R^2 = .12$

Table 7*Hierarchical Regression Analysis for Variables Predicting Social Anxiety (N = 152)*

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Step 1					
Depression	1.19	.20	.44	6.02	< .001
Step 2					
Depression	.29	.20	.11	1.43	.15
FPE	.36	.08	.36	4.73	<.001
FNE	.73	.19	.37	3.95	<.001
FoMO	-.32	1.60	-.02	-.20	.84
Social Comparison	-.08	1.79	-.003	-.04	.95
Step 3					
Depression	.25	.20	.09	1.28	.20
FPE	.33	.08	.33	4.41	<.001
FNE	.69	.18	.35	3.81	<.001
FoMO	1.65	1.74	.08	.95	.34
Social Comparison	-.64	1.75	-.03	-.37	.71
Facebook Use	-.29	.13	-.17	-2.30	.02
Instagram Use	-.01	.15	-.005	-.06	.96
Snapchat Use	-.26	.15	-.14	-1.75	.08
Facebook Connection	-.07	1.71	-.002	-.04	.97
Instagram Connection	.32	1.78	.02	.18	.86
Snapchat Connection	.52	1.23	.03	.42	.68

Note. $R^2 = .20$ for Step 1 ($p < .001$); $\Delta R^2 = .27$ for Step 2 ($p < .001$); $\Delta R^2 = .05$ for Step 3 ($p = .02$)

Figure 1

Relationship between Social Anxiety and Facebook Use as Partially Mediated by FoMO

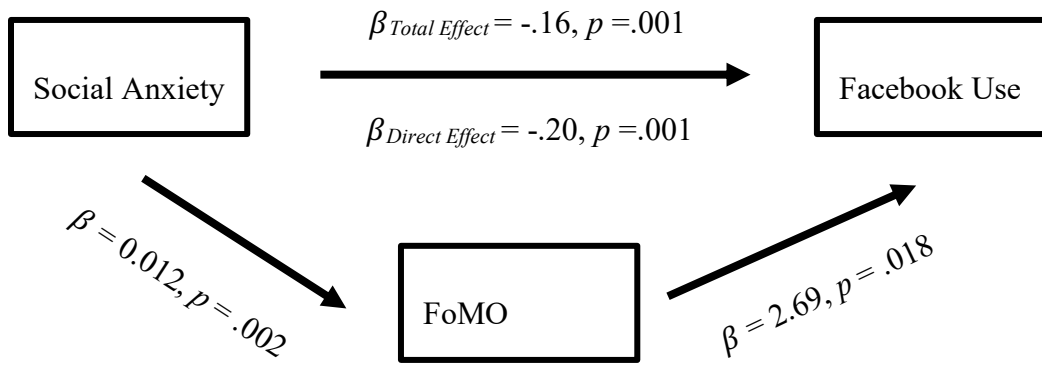


Figure 2

Relationship between Social Anxiety and Facebook Use as Partially Mediated by FNE

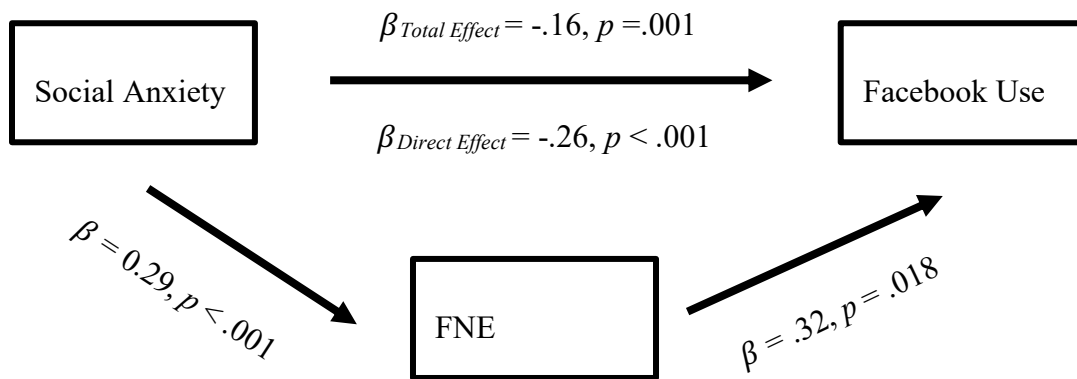


Figure 3

Relationship between Social Anxiety and Snapchat Connection as Partially Mediated by FoMO

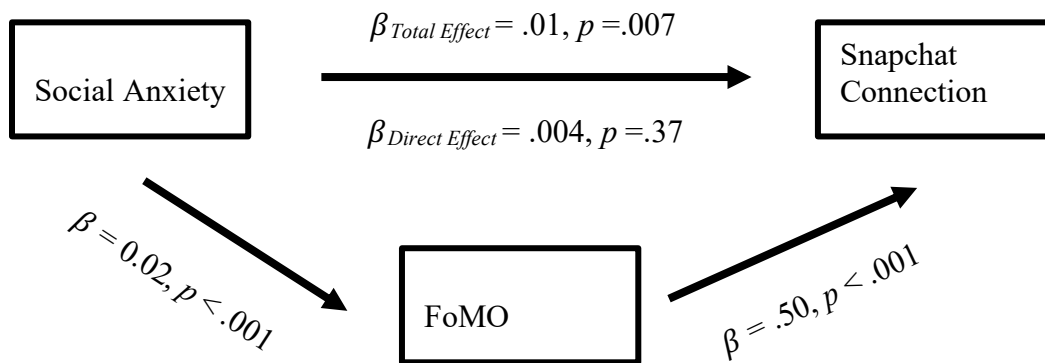


Figure 4

Relationship between Social Anxiety and Snapchat Connection as Partially Mediated by FNE

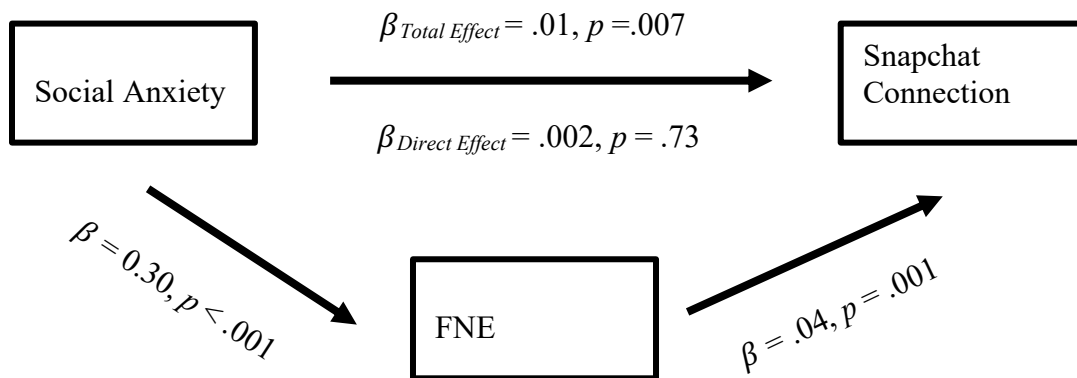
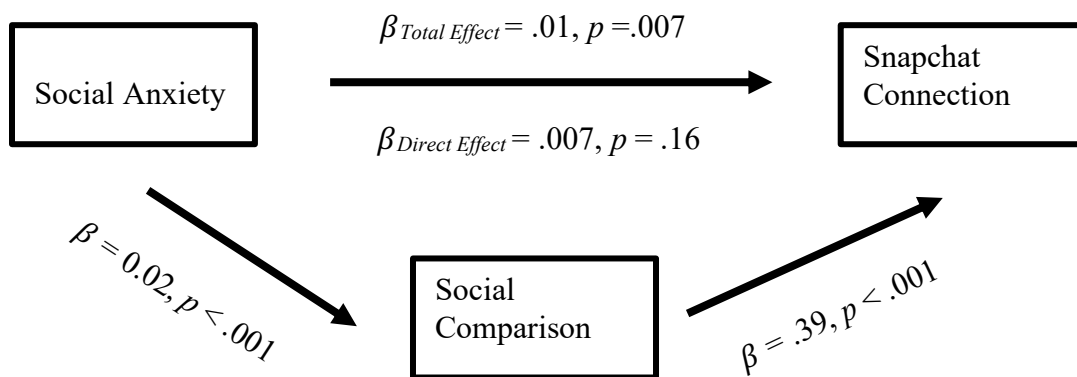


Figure 5

Relationship between Social Anxiety and Snapchat Connection as Partially Mediated by Social Comparison



Appendix G: Social Interaction Anxiety Scale (SIAS)

SIAS

For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows

0 = Not at all characteristic or true of me 3 = Very characteristic of me
 1 = Slightly characteristic or true of me 4 = Extremely characteristic or true of me
 2 = Moderately characteristic or true of me

	Not at all	Slightly	Moderately	Very	Extremely
1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.).	0	1	2	3	4
2. I have difficulty making eye-contact with others.	0	1	2	3	4
3. I become tense if I have to talk about myself or my feelings.	0	1	2	3	4
4. I find difficulty mixing comfortably with the people I work with.	0	1	2	3	4
5. I find it easy to make friends of my own age.	0	1	2	3	4
6. I tense-up if I meet an acquaintance on the street.	0	1	2	3	4
7. When mixing socially, I am uncomfortable.	0	1	2	3	4
8. I feel tense if I am alone with just one person.	0	1	2	3	4
9. I am at ease meeting people at parties, etc.	0	1	2	3	4
10. I have difficulty talking with other people.	0	1	2	3	4
11. I find it easy to think of things to talk about.	0	1	2	3	4
12. I worry about expressing myself in case I appear awkward.	0	1	2	3	4
	Not at all	Slightly	Moderately	Very	Extremely
13. I find it difficult to disagree with another's point of view.	0	1	2	3	4
14. I have difficulty talking to an attractive person of the opposite sex.	0	1	2	3	4
15. I find myself worrying that I won't know what to say in social situations.	0	1	2	3	4
16. I am nervous mixing with people I don't know well.	0	1	2	3	4
17. I feel I'll say something embarrassing when talking.	0	1	2	3	4
18. When mixing in a group, I find myself worrying I will be ignored.	0	1	2	3	4
19. I am tense mixing in a group.	0	1	2	3	4
20. I am unsure whether to greet someone I know only slightly.	0	1	2	3	4

Appendix H: Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10)

Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10)

Below is a list of some of the ways you may have felt or behaved.

Please indicate how often you have felt this way during the past week by checking the appropriate box for each question.

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I had trouble keeping my mind on what I was doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt depressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I felt that everything I did was an effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I felt hopeful about the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I felt fearful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. My sleep was restless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I was happy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt lonely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I could not "get going."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. If I was doing something well in front of others, I would wonder whether I was doing "too well".

0 (not at all true) 1 2 3 4 5 6 7 8 9 (very true)

8. I generally feel uncomfortable when people give me compliments.

0 (not at all true) 1 2 3 4 5 6 7 8 9 (very true)

9. I don't like to be noticed when I am in public places, even if I feel as though I am being admired.

0 (not at all true) 1 2 3 4 5 6 7 8 9 (very true)

10. I often feel under-appreciated, and wish people would comment more on my positive qualities.

0 (not at all true) 1 2 3 4 5 6 7 8 9 (very true)

Appendix J: Brief Fear of Negative Evaluation Scale-II (BFNE – II)

Brief Fear of Negative Evaluation Scale Leary (1983)

Read each of the following statements carefully and indicate how characteristic it is of you according to the following scale:

- 1 = Not at all characteristic of me
- 2 = Slightly characteristic of me
- 3 = Moderately characteristic of me
- 4 = Very characteristic of me
- 5 = Extremely characteristic of me

- _____ 1. I worry about what other people will think of me even when I know it doesn't make any difference.
- _____ 2. I am unconcerned even if I know people are forming an unfavorable impression of me.
- _____ 3. I am frequently afraid of other people noticing my shortcomings.
- _____ 4. I rarely worry about what kind of impression I am making on someone.
- _____ 5. I am afraid others will not approve of me.
- _____ 6. I am afraid that people will find fault with me.
- _____ 7. Other people's opinions of me do not bother me.
- _____ 8. When I am talking to someone, I worry about what they may be thinking about me.
- _____ 9. I am usually worried about what kind of impression I make.
- _____ 10. If I know someone is judging me, it has little effect on me.
- _____ 11. Sometimes I think I am too concerned with what other people think of me.
- _____ 12. I often worry that I will say or do the wrong things.

Appendix K: The Fear of Missing Out (FoMO) Scale

Fear of Missing Out Scale: FoMOs

Przybylski, Murayama, DeHann, & Gladwell (2013)

Participant Instructions

Below is a collection of statements about your everyday experience. Using the scale provided please indicate how true each statement is of your general experiences. Please answer according to what really reflects your experiences rather than what you think your experiences should be. Please treat each item separately from every other item.

Response Anchors

Not at all true of me		1
Slightly true of me		2
Moderately true of me		3
Very true of me		4
Extremely true of me		5

Items

1. I fear others have more rewarding experiences than me.
2. I fear my friends have more rewarding experiences than me.
3. I get worried when I find out my friends are having fun without me.
4. I get anxious when I don't know what my friends are up to.
5. It is important that I understand my friends "in jokes."
6. Sometimes, I wonder if I spend too much time keeping up with what is going on.
7. It bothers me when I miss an opportunity to meet up with friends.
8. When I have a good time it is important for me to share the details online (e.g. updating status).
9. When I miss out on a planned get-together it bothers me.
10. When I go on vacation, I continue to keep tabs on what my friends are doing.

Appendix L: The Iowa-Netherlands Comparison Orientation Scale (INCOM)

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. We would like to find out how often you compare yourself with other people. To do that we would like to ask you to indicate how much you agree with each statement below, by using the following scale where 1 is disagree strongly and 5 is agree strongly.

	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
1. I often compare how my loved ones (boy or girlfriend, family members, etc.) are doing with how others are doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
2. I always pay a lot of attention to how I do things compared with how others do things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
3. If I want to find out how well I have done something, I compare what I have done with how others have done	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
4. I often compare how I am doing socially (e.g., social skills, popularity) with other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
5. I am not the type of person who compares often with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
6. I often compare myself with others with respect to what I have accomplished in life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. I often like to talk with others about mutual opinions and experiences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
8. I often try to find out what others think who face similar problems as I face	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
9. I always like to know what others in a similar situation would do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
10. If I want to learn more about something, I try to find out what others think about it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1 (Disagree strongly)	2	3	4	5 (Agree strongly)
11. I never consider my situation in life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
relative to that of other people					