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The role of narcissistic personality traits in the afffective experience of using Instagram

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THE ROLE OF NARCISSISTIC PERSONALITY TRAITS IN THE AFFECTIVE EXPERIENCE OF USING INSTAGRAM

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ABSTRACT

As Instagram's popularity has grown in recent years, so too has public and research interest grown in understanding the effects of Instagram use on young women. The present study joins a growing number of daily diary studies that explored momentary changes in negative affect, self-esteem, distress, vulnerable narcissism, and grandiose narcissism in response to browsing Instagram and exposure to distressing images. The role of narcissistic personality traits on such relationships was of particular interest. The present study implemented a naturalistic design with an in vivo procedure to also analyze post characteristics that contribute to negative emotional responses. Participants were 153 young adult women at a large urban university. Data were analyzed between- and within-subjects. At the average level, intense Instagram use was associated with increased negative affect, increased distress, and decreased self-esteem. Distress was associated with increased state vulnerable narcissism and decreased state grandiose narcissism. At the daily level, intense Instagram use was associated with decreased self-esteem and increased distress. Distress was associated with increased state vulnerable narcissism. Grandiose narcissism moderated the relationship between intensity of Instagram use and self-esteem at the daily level such that participants with higher levels of grandiose narcissism reported experiencing lower state self-esteem on days of intense Instagram use than those with lower levels of grandiose narcissism. Exploratory questions demonstrated the impact of image content and one's relationship to the poster on emotional response. These results inform our understanding of the effects of using Instagram on young women both momentarily and over time.

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CHAPTER I

Introduction

Instagram is a free, widely used social media platform in which users can upload and share images and videos amongst friends and followers. Since its creation in 2010, the site has grown both in terms of services provided and popularity amongst young adults. It has become one of the most popular social media applications, with 67% of people aged 18-29 using the platform. Most of these young people are regular users, with 76% visiting the site daily, and 60% visiting the site multiple times per day (Auxier & Anderson, 2021). Importantly, Paramboukis et al. (2016) found that while 51% of users frequented the app regularly, 77% of the sample infrequently uploaded pictures. This suggests that large numbers of young adults are actively engaging with the app every day, but the majority of a person's time spent on Instagram is dedicated to consuming rather than creating content.

Meta, the company that owns Instagram, touts its positive impacts on users such as connection, self-expression, and entertainment. Indeed, some research has demonstrated the positive effects of using Instagram (Mackson et al., 2019; Meier & Schafer, 2018; Trifiro & Prena, 2021) However, a larger body of research suggests that Instagram use is associated with negative outcomes such as low self-esteem, loneliness, depression, general anxiety, social anxiety, and body dissatisfaction (Lup et al., 2015; Martinez-Pecino & Garcia-Gavilán, 2019; Tiggeman & Zaccardo, 2015; Yurdagül, et al., 2019). However, many of the existing studies rely on cross-sectional research that fails to reflect transient fluctuations in response to an ever-changing feed of content. The present

study aims to examine both moment-to-moment and patterns over time of emotional response to browsing Instagram.

While it is not yet conclusive, social comparison has been proposed as one mechanism responsible for these effects, both positive and negative (de Vries et al., 2018; Lup et al., 2015; Stapleton et al., 2017; Vogel et al., 2014). Social comparison theory posits that humans innately seek information about the self by evaluating themselves relative to others (Festinger, 1954). The availability of sources to compare oneself to on social media is infinite, but it is particularly salient to Instagram. On Instagram, there is a culture of presenting an idealized representation of the self through polished and edited photographs. As such, users likely compare themselves to these presentations and find themselves inferior.

Given this public, idealized portrayal of oneself on Instagram, the role of narcissistic personality traits has been of particular interest. Narcissistic individuals rely on external validation to maintain their sense of self and obtain such validation through overt displays of grandiosity (Kohut, 1966). Research has observed these behaviors in social media as well. Specifically, narcissism was found to be related to more time spent on Instagram (Moon et al., 2016). Narcissistic individuals also engaged in more like-seeking behaviors on Instagram such as buying followers or using hashtags to increase the visibility of their posts (Dumas, et al., 2017). Analyzing the active components of Instagram use with narcissists provides important information as to how narcissists gain external validation through exhibitionism on social media. As the narcissist is prone to ego injuries in response to comparison with superior others, continuous exposure to idealized images of others may be particularly difficult for narcissists (Krizan & Johar,

2011). It follows that there may also be affective differences in narcissists' response to browsing Instagram, though there is a dearth of research on this topic at present.

The current study focused on the impact of exposure to content on Instagram and the interaction between Instagram use and narcissistic personality traits. It was expected that individuals with narcissistic traits have stronger, more negative responses to viewing Instagram content, which were expected to be perceived as an ego threat. The following chapter delves into the empirical and theoretical support for the present study, including prior studies on social media, Instagram, narcissism, and self-esteem. The chapter also details social comparison and dispositional envy, which have been identified in the previous literature as both moderators and mediators in the relationship between Instagram use and affect.

CHAPTER II

Review of the Literature

The following literature review first introduces the rise of social media sites eventually leading to the creation of Instagram and examines the known effects of Instagram use. It also outlines the previous studies about Instagram, noting the wide differences in methodology. Then, the theoretical and empirical literature of the relationship between Instagram use in grandiose and vulnerable narcissism is examined. Finally, related psychological processes that contribute to negative outcomes on Instagram are established, including self-esteem, social comparison, and dispositional envy. Methodological differences between studies and gaps in the literature are addressed, and the necessity of understanding the effects of Instagram consumption on young women is emphasized.

Social Media

Following the bursting of the dot.com bubble, executives responsible for the remaining websites that survived the crash met at a conference to discuss the future of the internet. As they spoke, it soon became clear that the websites which survived the bubble burst prioritized connection. In the wake of the crash, new sites emerged learning rapidly from their predecessors. These sites emphasized interaction, each finding a niche within their pocket of the internet: YouTube for videos, Flickr for photographs, X (formerly Twitter) for brief statements, MySpace for connecting with friends. Although not all of these sites remain popular, each was succeeded with a similar version of the platform that dominated the popular culture for a time with their own specific cultures and sets of social norms (Van Dijik, 2013).

Naturally, the founders of these sites are quick to point out the benefits of engaging with social media and their good intentions. In a testimony to the United States Congress in 2018, Mark Zuckerberg, founder of Facebook highlighted the benefits of the site: “Facebook is an idealistic and optimistic company. For most of our existence, we focused on all of the good that connecting people can do…for staying connected to the people they love, for making their voices heard, and for building communities and businesses” (Facebook, transparency and use of consumer data, 2018). Zuckerberg, and by extension Facebook, is not alone in its idealism. X similarly outlined the numerous positive outcomes of being a user including providing users with internet safety and education; promoting free expression and defending civil liberties; raising awareness of environmental conservation organizations; and aiding humanitarian responses during crises (Twitter, n.d.). Some evidence does support the claims that social media sites benefit its users by providing an outlet for self-expression, developing and maintaining relationships, and viewing light-hearted entertainment (Weinstein, 2018). Further, adolescents in particular may experience positive effects from using social media by facilitating the development of their identities through exposing themselves to new ideas topics, socializing with peers, and learning appropriate self-exposure and disclosure to others (Uhls et al., 2017). This identity exploration is particularly important for marginalized groups that are unable to connect with similar others in person (McConnell et al., 2017).

However, as these social media sites grew in popularity, independent researchers quickly began examining the effects of social networking, finding more nuanced results than those presented by the sites’ founders. Researchers recognized the prevalent and

malicious uses that the platforms provided including cyberbullying, online sexual harassment, and cyberstalking (Subrahmanyam & Greenfield, 2008). Moreover, early research into social media sites, primarily focused on Facebook and Myspace, indicated relationships between social media use and increased depression, anxiety, and perceived stress as well as decreased sleep, self-esteem, and overall well-being (Kalpidou, et al., 2011; Verduyn et al., 2017; Yoon et al., 2019).

As the research grew, the picture of social media use became more complicated as it became evident that the uses and effects of social media were not equal for all users. Demographic traits including age, gender, socio-economic status, and education levels all affect social media use. Such conditions increase the amount of time spent on social media and play a role in the emotional lives of users on social media (Acar, 2008; Appel, et al., 2016; Özgüven & Mucan 2013).

In addition to demographic traits, personality traits such as neuroticism, extroversion, and conscientiousness have been found to relate to higher usage and importance of social media to the user (Correa et al., 2010; Özgüven & Mucan, 2013). On a clinical level, more social media use was found to be related to more clinical symptoms of bipolar disorder, depression, histrionic personality disorder, and narcissistic personality disorder (Rosen et al., 2013). As such, the impact of social media is not a simple relationship between how much time is spent using social networking sites and mental health outcomes. Demographics, general well-being, and personality traits all affect which sites individuals use, in addition to why, how, and the frequency with which they are visiting the sites.

Moreover, research suggests that the effects of social media vary platform to platform. Specifically, Instagram has been found to be linked with worse outcomes than other apps. This may be due to the perceived realism of the pictures and the culture of formality on the app wherein perfect images are the norm as compared to other apps that de-emphasize appearance (Marengo et al., 2018; Sherlock & Wagstaff, 2019). Indeed, Engeln et al., (2020) tested this by exposing 308 undergraduate women to 7 minutes of browsing Instagram, browsing Facebook, or playing a game on their phone. Results indicate exposure to Instagram, but not Facebook, was associated with decreased body satisfaction, decreased positive affect, and increased negative affect. Similarly, internal research by Meta suggests that the effects of using Instagram are significantly worse compared to other popular social media apps such as Snapchat, TikTok, YouTube, and Pinterest. Importantly, the effects of using Instagram were more negative than the effects of using TikTok despite teens spending and estimated 2-3 times the amount of time on TikTok than Instagram (Facebook, 2019). As such, understanding the impact and conditions upon which it depends is important to study given the popularity and negative consequences of using the application. The present study contributes to the literature by analyzing the Instagram content and internal processes that contribute to the impact of Instagram consumption on young adults.

Instagram

While some social media sites quickly come and go out of trend, Instagram is unique in its wide-spread use and longevity, particularly amongst young adults. The social media application provides a platform for individuals 13 years and older to share photos and videos to followers and connect with other users through posted content. It is

estimated that Instagram has surpassed two billion monthly active users (Rodriguez, 2021). As the popularity of the application has grown, the negative impact on users' mental health has become a focus in the media after internal research was made public by a whistleblower. Key results from the internal documents will be presented below, as they offer global information about Instagram unavailable to outside researchers. However, Meta does not include details outlining the methodology of these studies and they have not been peer reviewed. Peer reviewed research largely supports these findings and will be presented subsequently. As such, the internal research results should be interpreted with caution.

According to internal data, in a sample of 2,504 teen users from the United States and the United Kingdom, 20% of participants reported that Instagram makes them feel worse about themselves (Facebook, 2019). While Meta research identifies social comparison as the driving factor of Instagram distress, the impact of using Instagram is not equal for all users and is heavily affected by who is posting, who is viewing the post, and what content is in the post. Internal research suggests that envy is a key mediating factor that determines whether the content of the post causes a positive social comparison that leads to inspiration or a negative social comparison that leads to distress. Meta proposes that negative social comparisons occur most when viewing posts with an emphasis on the body and idealized of commercial beauty standards, particularly when the images have been photoshopped or edited (Facebook, 2020). Moreover, the intensity and impact of social comparisons are exacerbated depending on the relationship to the user who posted the image. Meta suggests that images posted by acquaintances are more

distressing than images posted by close family, friends, celebrities, influencers, and strangers.

Given the considerable cultural impact of Instagram, outside researchers also became interested in the effects of its use. Yurdagul et al., (2019) investigated the effects of problematic Instagram use, defined as addictive behaviors related to using Instagram. Problematic Instagram use was associated with higher levels of loneliness, depression, general anxiety, social anxiety, and body dissatisfaction. Similarly, Lowe-Calverly et al. (2019) found that higher Instagram investment was associated with more depressive symptoms and higher reported stress. In this study, Instagram investment was defined as the feelings and reactions that a user may experience when preparing a post, posting, and anticipating responses on Instagram. Importantly, Instagram investment focuses on the feelings associated with the process of posting a picture. It does not account for the effects of seeing the images of other users (Lowe-Calverley et al., 2019).

However, posting images accounts for a small portion of time spent on the app. Paramboukis et al. (2016) found that in a sample of 200 adults, 51% of subjects used the app often or very often. However, 77% of the sample reported infrequently uploading pictures. Moreover, the most common motivation for using Instagram is "surveillance/knowledge of others," which was found to be a bigger driving factor to use Instagram than "documentation," "coolness," or "creativity," which focus on an individual's own content creation (Lee et al., 2015). Thus, seeing other users' content is an important, time-consuming, and motivating force to use Instagram. This means that the majority of a person's Instagram use is consumption rather than creating content.

Methodological Limitations of Instagram Studies

Unfortunately, much of the research on Instagram use is limited by methodology. While controlled experiments allow for isolation of variables and infer causation, they lack effectiveness. Cross-sectional research provides general information about Instagram between users. However, these studies do not account for the heterogeneity within people's feeds, which also change moment-to-moment. While daily diary methodology allows for analysis both between-person and within-person, they often rely on recall, which may be inaccurate. Finally, the literature is inconsistent in defining Instagram use, with different studies measuring time spent on Instagram, intensity of Instagram use, Instagram membership, or Instagram addiction.

Controlled experimental procedures of Instagram have frequently been used to establish the relationship between viewing idealized images on Instagram and body dissatisfaction. (Brown & Tiggeman, 2016; Kleemans et al., 2018; Lowe-Calverly & Grieve, 2021; Paramboukis et al., 2016; Tiggeman & Zaccardo, 2015). In one such study, Brown and Tiggeman (2015) found that exposure to images of celebrity or equally attractive peers increased negative mood and body dissatisfaction compared to travel photographs in a sample of 138 female undergraduates. Participants were randomly assigned to view a set of 15 Instagram posts sourced from public accounts. The sets contained images of celebrities, attractive unknown peers, or travel photographs. Researchers measured participants mood before and after exposure, and results indicate that exposure to celebrity and peer images increased negative mood and body dissatisfaction relative to travel images. While such experiments provide support that exposure to idealized images can lead to body dissatisfaction and negative affect, it is not

representative of regular Instagram use. During regular use, users are exposed to a wide range of content from familiar sources.

Interestingly, this study did not find a difference between celebrity photographs and attractive unknown peers. However, Lup et al. (2015) observed in a cross-sectional study of 117 young adults that number of strangers followed moderated associations between Instagram use and social comparison. For participants whom strangers constitute 10% or less of the total users they follow, more Instagram use was associated with more positive social comparison. Number of strangers followed also moderated the relationship between Instagram use and depressive symptoms. For participants whom strangers constitute 90% or more of the total users they follow, more Instagram use was associated with more depressive symptoms. The results from this study suggest that the effects of Instagram are partially influenced by who users follow. Given the mixed results between these two very different studies, the present study also examined the relationship between participants and users' whose posts they are exposed to.

Much of the existing research on Instagram use relies on cross-sectional methodology. Such research has been valuable in establishing general relationships between Instagram use and outcome variables including depression, anxiety, social anxiety, and self-esteem (Faelens et al., 2021; Yurdagul et al., 2019). However, cross-sectional data only analyzes the between-person effects of Instagram use and fails to account for any within-person variation. Just as each user has a unique feed, each session of Instagram use is unique. Given the ever-changing nature of a user's Instagram experience, it follows that one's emotional response may also change based on what they are exposed to during a specific session. Accordingly, more recent research has tended to

implement Ecological Momentary Assessment methodology, which allows the data to be analyzed both between-participants and within-participants. Such studies have found significant moment-to-moment variability in users' experiences, demonstrating the dynamic nature of Instagram use (Choi & Kim, 2021; Faelens et al., 2020; Garcia et al., 2021). For this reason, using state-based measures is crucial to capture the fluctuations in emotional response depending on the content participants are viewing at a given time.

One such study found significant relationships between daily Instagram use, life satisfaction, and negative affect using a daily diary methodology (Garcia et al., 2021). For 13 days, 45 college-aged participants were emailed a daily diary survey at 7:00 PM. Daily measures included time spent on Instagram, positive affect, negative affect, life satisfaction, well-being, and self-objectification. Data were analyzed using Multilevel Modeling in which daily surveys were nested within participants. At the average level, results indicated a negative relationship between Instagram use and life satisfaction. Thus, as Instagram use increases, self-reported life satisfaction decreases. Further, Instagram use had a positive relationship with negative affect such that the more time a participant spent on Instagram, the higher self-reported negative affect in general. This study contributes valuable information about the effects of Instagram use over time, though not all variables were analyzed the within-subject. It is also limited by potential recall bias and a relatively small sample size, which may have affected the validity of the results. Moreover, measuring daily Instagram use by time before the end of the day fails to capture any Instagram use that may occur after data are reported.

Moreover, the operational definition of Instagram use varies across studies, complicating comparisons between studies. Time spent on Instagram, addiction to

Instagram, Instagram membership, and intensity of Instagram use are all common measures of Instagram use (Adeyanju et al., 2021; Faelens et al., 2021). In a related area of study, problematic smartphone use, research has found the subjective self-report measure of intensity or problematic use to be a better predictor of mental health outcomes than objective measures such as time spent on the phone (Bermingham et al., 2021; Rozgonjuk, Levine, Hall, & Elhai, 2018). It was expected that Instagram use would be consistent with these results given that Instagram use contributes to screen time. Thus, it is important to consider the degree of investment or intensity of Instagram use rather than relying solely on time. This is particularly true for daily diary studies, as time spent on Instagram is likely to vary significantly depending on the time at which the survey is completed.

Narcissism

At its core, narcissism is a disorder of the self in which individuals do not possess the strong self-concept necessary to support healthy ego development (Kohut, 1966). Without a sense of self, the ego is unable to build healthy defenses. For this reason, narcissists experience very little tolerance for negative emotions, including depression and envy (Kernberg, 1970). Consequently, narcissists have more intense negative emotional responses to ego threats, or challenges to their self-esteem (Stucke & Sporer, 2002). In order to protect the self from negative feelings, narcissists are hypervigilant to detect potential threats to their enhanced self-worth (Morf & Rhodewalt, 2001). Accordingly, narcissism has been significantly positively associated with social comparison such that individuals who are more narcissistic tend to make more social comparisons (Krizan & Johar, 2011).

More recently, narcissism has been conceptualized with two phenotypes: Grandiose and vulnerable. Grandiose narcissism is characterized by overwhelming grandiosity and preoccupations with fantasies of power, superiority, perfection, and adulation. People high in grandiose narcissism tend to be interpersonally exploitive, lack empathy, and have feelings of intense envy and rage. They are extremely sensitive to criticism and will respond with remorseless rage when their fragile self-esteem is threatened (Cain et al., 2008). Conversely, vulnerable narcissism is characterized by private grandiose fantasies with feelings of intense shame about their need for approval and ambitions (Dickinson & Pincus, 2003). Like those high on grandiose narcissism, they are reactive to rejection, but vulnerable narcissists will avoid relationships to mitigate the risk of rejection (Cain et al., 2008). Research suggests that those high on grandiose and vulnerable narcissism are threatened by different events. While those high on grandiose narcissism are more sensitive to achievement-based threats, individuals high on vulnerable narcissism are more sensitive to interpersonal threats (Besser & Priel, 2010).

Although much of the literature on grandiose and vulnerable narcissism has measured the two variables as stable traits, research and clinical accounts suggest these are fluctuating states that may oscillate between grandiosity and vulnerability throughout the day (Giacomin & Jordan, 2016; Gore & Widiger, 2016). Recent developments in narcissism assessment have yielded short-form, adjective-based surveys that are distinct in their measurement of grandiosity and vulnerability and sensitive enough to measure emotional lability (Crowe et al., 2016; Crowe et al., 2018). Indeed, when measured using daily diary or Ecological Momentary Assessment methodology, results indicate

significant within-person variability over time, particularly in response to interpersonal events (Edershile & Wright, 2021).

In many ways, Instagram is the perfect platform for people with narcissistic traits to broadcast their success and quickly receive external praise through likes, comments, and direct messages. Accordingly, narcissism was found to be related to more time spent on Instagram and more frequently engaging in like-seeking behaviors such as buying followers or using hashtags in increase the visibility of their posts (Dumas et al., 2017; Moon et al., 2016). As such, people high in narcissism prioritize having a high number of friends/followers and posting positive images with the hopes that the followers will be interested in their lives (Kim et al., 2021). While being "cool" is a significant motivator to use Instagram, the biggest reason for Instagram use was "Surveillance/knowledge about others" (Sheldon & Bryant, 2016). As such, seeing other users' content is an important, time-consuming, and motivating force to use Instagram. However, the current literature primarily focuses on active Instagram use by analyzing participant profile characteristics such as number of followers, frequency of posting, or use of hashtags.

Moreover, the current literature on narcissism with Instagram is generally limited due to its measurement as a single variable. However, research suggests behavioral differences in Instagram use between individuals high on vulnerable versus grandiose narcissism. In a cross-sectional study of 154 young adults, it was found that participants high in grandiose and vulnerable narcissism use Instagram to inflate their self-esteem in distinct ways. Individuals high on vulnerable narcissism are more interested in seeking approval from others by requesting followers. They also have stronger emotional reactions to feedback on Instagram such as comments or like counts on their posts.

Conversely, those high on grandiose narcissism are more likely to use overt methods to promote themselves and attempt to gain the admiration of others by posting photos that portray them positively (Paramboukis et al., 2016). This study demonstrates behavioral and affective differences on Instagram between those high on vulnerable compared to grandiose narcissism. It also suggests that individuals high on narcissism's response to interactions on Instagram vary depending on their vulnerability or grandiosity. However, affective response was qualitatively analyzed, so the results are not statistically supported. Moreover, the cross-sectional nature of the study also prevents analysis of vacillations in self-esteem or narcissism in response to browsing Instagram, though evidence suggests narcissists to have unstable self-esteem. Thus, the role of narcissism after exposure to idealized images of others on Instagram is still unclear.

While Instagram can be used to gain attention from others through frequent posting, having a high follower account, or receiving positive comments from others, it also provides limitless exposure to idealized pictures of others. It is expected that these pictures will provide ample stimuli for social comparisons. Given that narcissists frequently engage in social comparisons, it is expected that using Instagram will be threatening to their sense of self-worth (Krizan & Johar, 2011). In consideration of their strong emotional responses to ego threats, it is expected that narcissists will respond differently to viewing the images of others. For this reason, it is crucial to measure narcissism and narcissistic responses at the state-level given the fluctuations in vulnerability, grandiosity, and self-esteem characteristic of narcissism.

Self-Esteem

Self-esteem has been studied widely across social and clinical psychology fields. Though definitions vary, self-esteem can be thought of as the attitude toward appraisals of self-value, including both cognition and affect (Leary & Baumeister, 2000). Inherently, self-esteem has an evaluative component to it that leads to changes in affect, which either confirms or disagrees with the individual's idea of their worth (Campbell, 1990). As such, low self-esteem can be thought of as an incongruence between perceived self-worth and desired self-worth, and high self-esteem can be thought of as satisfaction with one's perceived self-worth.

Theories regarding self-esteem date back to William James (1890) with the proposal that self-esteem is both a stable trait as well as a fluctuating state. While each person has a baseline sense of self-worth, actual levels of self-esteem can vary in response to environmental stressors. Although a student may generally feel positively about themselves, getting a bad grade on an exam may momentarily lower their self-esteem. However, this is conditional upon the degree to which the person values that area of their life. If the same student does not base their worth on academic success, their self-esteem will remain stable.

James' theory has been supported by current research in self-esteem, specifically contingent self-esteem. Contingent self-esteem is the degree to which a person's self-worth is threatened by setbacks or failures in specific domains important to the individual's self-concept (Crocker et al., 2003). Contingent self-esteem has also been found in the domains of body appearance, academics, financial success, sexual relationships, competition, family support, God's love, and virtue (Crocker et al., 2003;

Glowacka et al., 2017; Park et al., 2017; Patrick et al., 2004). As such, self-esteem can be thought of as a multidimensional construct, and a threat to one area of self-esteem may not affect an individual's overall self-esteem. Thus, there are specific domains in which people may have vulnerabilities to self-esteem threats. On Instagram, they are likely to be exposed to these domains given that users are likely to follow accounts that are personally relevant to them. For this reason, it is important to measure self-esteem across dimensions to accurately capture the effect of Instagram on self-esteem.

However, the measurement of self-esteem is often limited. Research on self-esteem has predominantly measured total trait self-esteem using the Rosenberg Self-Esteem Scale (Heatherton & Polivy, 1991). One limitation of this scale is that conceptualizes self-esteem as a unidimensional variable. As such, the scale does not distinguish between self-esteem domains, and threats to one domain may not be detected overall. Moreover, the Rosenberg Self-Esteem Scale was developed as a measure of stable self-esteem and has shown consistent reliability across time. As such, it is not sensitive to the fluctuations in self-esteem that may occur following a positive or negative external event (Rosenberg, 1965). State measures of self-esteem frequently implemented in daily diary or EMA studies rely on single-item, face-valid questions about the participant's self-esteem. Such questions show little variability in response to external events and overestimate self-esteem, as participants often inflate their responses in a socially desirable manner (Paulhus & Vazire, 2007).

To address these limitations, Heatherton and Polivy (1991) created the State Self-Esteem Scale (SSES) which has been shown to be sensitive to fluctuations in response to external events. The scale is comprised of three subscales: Performance self-esteem,

social self-esteem, and appearance self-esteem. The subscales are related but distinct, and a threat in one domain does not significantly affect fluctuations in the other subscales. Researchers tested this hypothesis by providing undergraduate participants with the SSES two weeks before an examination, which they were told would be difficult. After receiving their grades, participants who performed poorly experienced a significant decrease in performance self-esteem while there were no significant changes in their social or appearance self-esteem. Thus, it is important to distinguish between subcomponents of self-esteem that are independent but related, as global measures may not be sensitive enough to fluctuations within specific domains that have been threatened.

Thus far, research on Instagram behaviors and self-esteem is limited by methodology and conceptualization. Current studies on the relationship between self-esteem and Instagram rely on cross sectional research. These studies have widely used self-esteem as a predictor, mediator, or moderator. While the methodology is varied, results generally indicate a negative relationship between self-esteem and Instagram use (Faelens et al., 2021; Keles et al., 2019; Mackson et al., 2019). Additional research has shown found non-significant relationships between self-esteem and Instagram use (Paramboukis et al., 2016; Stapleton et al., 2017). Given the mixed results between Instagram use and self-esteem, additional research is necessary to better understand this relationship, particularly focusing on the transient changes in self-esteem that are more likely to be affected by external events.

In a two-part study, Sherlock and Wagstaff (2019) used a state self-esteem scale in a cross-sectional and experimental study on Instagram use. In a sample of 129 adult women, cross-sectional analysis indicated a negative relationship between state self-

esteem and Instagram use, which was mediated by social comparison orientation. In this study, Instagram use was measured as time spent on Instagram. In part two of the study, researchers used an experimental protocol to examine within-subject change after exposure to fake profiles. Participants were randomly assigned to the three experimental conditions: fitness posts, beauty posts, or travel posts. Participants viewed 10 mock posts from their respective category and subsequently completed rating forms. The study found no significant changes in self-esteem before and after viewing the mock posts (Sherlock & Wagstaff, 2019). Although the scale implemented in this study could be analyzed across performance, social, and appearance domains, the subscale results were not reported. It is possible that the experimental procedure failed to find significant changes in self-esteem due to previously addressed difficulties in Instagram methodology. While this standardized the conditions between participants, it does not reflect natural Instagram use. The authors hypothesized that they did not observe significant results because they only used 10 images, and the images may have been of people that were too dissimilar to them to cause a response. As such, more naturalistic studies of Instagram are necessary to accurately reflect the real-world experience of using Instagram and determine whether exposure to Instagram images can elicit significant changes in state self-esteem.

Social Comparison

In 1954, Leon Festinger proposed a theory that humans are innately driven to acquire information about the self by evaluating one's own opinions and abilities relative to others. Although humans typically strive to compare themselves to objective standards, they will compare themselves to the others in the absence of such measures. The effects

of these comparisons can result in significant positive or negative impacts on one's self-concept, level of aspiration, and subjective well-being (Suls et al., 2002).

The varied response to social comparison has been reflected in the literature. At times, social comparison can lead to increased positive affect, inspiration, positive behavioral changes, increased self-esteem, and increased subjective well-being (Buunk & Gibbons, 2006; Meier & Schafer, 2018; Van den Borne et al., 1987; Wheeler & Miyake, 1992). At other times, it is associated with negative effects including increased negative affect and depressive symptoms as well as decreased self-esteem, subjective well-being, and appearance dissatisfaction (Cattarin et al., 2000; Kulik & Gump, 1997; Li et al., 2018; Morse & Gergen, 1970; Wheeler & Miyake, 1992). As such, it can be difficult to predict whether a social comparison will have a negative or positive impact on the individual, though is suggested to be largely determined by the direction and similarity to the target (Gerber et al., 2018).

Direction is typically categorized as upward or downward, although a smaller proportion of the literature includes lateral comparisons. While upward social comparison occurs in comparison to a superior other, downward social comparison occurs in comparison to an inferior other. Morse and Gergen (1970) demonstrated these processes in their seminal study on social comparison, subjecting participants to an upward and downward comparison condition under the guise of applying for a job. Participants in the upward comparison group were placed in a room to complete paperwork with a well-dressed, ostensibly qualified confederate called "Mr. Clean" by researchers. The downward comparison participants found themselves in a room with a disheveled, disorganized, and confused confederate called "Mr. Dirty" by researchers. While upward

social comparisons generally produced decreases in self-esteem and downward social comparisons generally produced increases in self-esteem, the results were moderated by perceived similarity to the target.

This moderation demonstrates the second dimension of social comparison: Similarity—which is comprised of assimilation and contrast. While assimilation refers to an appraisal of the self as similar to a target other, contrast refers to an appraisal of the self as different from a target other. The direction of the comparison interacts with the perceived similarity to the target to produce distinct affective, behavioral, and self-esteem responses. In the Mr. Clean/Mr. Dirty experiment, participants in the Mr. Clean condition who identified as closely sharing the socially desirable traits with Mr. Clean (assimilation) experienced increased self-esteem, while those who did not share traits with Mr. Clean reported decreased self-esteem (contrast). Conversely, participants in the Mr. Dirty condition who identified with Mr. Dirty (assimilation) experienced decreased self-esteem while those who did not identify with Mr. Dirty (contrast) reported a bolstered self-esteem. As such, the responses to upward and downward social comparisons are affected by the appraisal of assimilation or contrast to the target. The varying results have been reproduced in additional experiments, complicating the prediction of response to upward and downward comparisons (Collins, 1996; Gerber et al., 2018; Suls et al., 2002).

Further, the effects of social comparisons are also dependent on the relationship with the target. Wheeler and Miyake (1992) found that upward social comparisons of assets such as ability, appearance, and social skills are more likely to happen with strangers and acquaintances than friends and close friends. These findings are consistent

with Lup et al. (2015) who found that people who follow fewer strangers have more positive social comparisons associated with Instagram use. As such, the familiarity a person has with the target other may impact the frequency and intensity of social comparisons for each user on Instagram differently given the individualized set of accounts each user follows.

Similar to the self-esteem research, social comparison researchers have identified three distinct but related domains of trait comparisons: Attractiveness, rank, and group fit (Allan & Gilbert, 1995). The relevance of the domain to a person's sense of self-worth impacts the strength of the response to upward social comparison. The more important that a topic is to a person, the more intense the reaction will be (Frijda, 1988). Many of these domains are reflected in dimensions found in the self-esteem literature and are particularly suited to be studied with the State Self-Esteem Scale, which factors items onto three subscales including performance, social, and appearance self-esteem (Heatherton & Polivy, 1991).

Social comparison is particularly relevant to social media as there is a culture of promoting overly positive self-images, thereby creating a limitless supply of superior targets. Indeed, upward contrast social comparisons are proposed to be the process underlying negative outcomes associated with social media use. As such, they are frequently used as moderators or mediators in studies. Accordingly, social comparison has been found mediate the negative relationship between intensity of Instagram use and self-esteem and moderate the relationship between intensity of Instagram use and contingent self-worth (Fagundes et al., 2018; Stapleton et al., 2017)

Relatedly, Vogel et al. (2014) measured the relationship between Facebook use, social comparison, and self-esteem in a two-part study. During part one, 145 undergraduates completed self-report measures of Facebook use, frequency of upward social comparison on Facebook, frequency of downward social comparison on Facebook, and trait self-esteem. Results demonstrated that participants who used Facebook more frequently also engaged more frequently in social comparisons. Specifically, they engaged in more upward social comparisons than downward social comparisons. Upward social comparisons significantly mediated the negative relationship between Facebook use and self-esteem. In part two, 128 undergraduate students were exposed to mock Facebook profiles intended to evoke either an upward or downward social comparison based on appearance, like count, and friend count. Results indicated that self-esteem decreased after exposure to upward social comparisons but did not significantly change after exposure to downward social comparisons. This widely cited study demonstrates the importance of distinguishing between upward and downward social comparison targets and suggests that the more one uses social media, the more frequently they engage in social comparisons.

A smaller body of research has focused on the use of social comparison on social media as a motivation for improvement. In fact, Ouwerkerk and Johnson (2016) found that inspiration is a significant motive for individuals to use social media sites in general. Specific to Instagram, Meier and Schafer (2018) found that in a sample of 385 German Instagram users, social comparison was significantly positively related to inspiration. This relationship was fully mediated by benign envy, which is an emotional response to upward assimilative comparisons. In turn, this inspiration was related to higher levels of

positive affect. However, this study is limited by the measurement of social comparison. Authors measured social comparison by including the only two nondirectional comparison items from the original six item Facebook Social Comparison Scale (Steers et al., 2014). The nondirectional nature of this modified scale may not fully capture the total effects of social comparisons on Instagram, in which both upward and downward social comparison are prevalent. Moreover, neither the social comparison nor the inspiration items specify the content of the target comparison. As such, it is impossible to determine which content is inspirational and whether specific stimuli are more likely to cause inspiration or varying levels of positive affect.

Given the complex range of responses to social comparison that are dependent on the interaction between direction, assimilation, salience of the domain, and familiarity with the target, it is difficult to predict the relationship between social comparison and other outcome measures. This process is further complicated when social comparison is broken into rank, group fit, and attractiveness, which may yield different results when overall self-esteem is further specified into its subscales. For this reason, the role of social comparison was included as an exploratory research question.

Envy

One common effect of social comparison is envy. In fact, envy is often defined as the negative, distressing affect that results from comparing unfavorably with others, and envy is frequently the outcome of negative social comparisons (Smith & Kim, 2007). There are two core components of envy: Feelings of inferiority and ill will towards the competitor (Smith et al., 1999). However, individuals feel envious to different extents. Some people are particularly threatened by upward social comparisons, leading to more

frequent experiences of envy. The proneness to experience envy can be construed as a type of stable personality trait often called dispositional envy (Lange et al., 2018).

People high in dispositional envy are generally emotionally unstable, have low self-esteem, and act in social situations with hostility and aggression (Cohen-Charash, 2009). These traits lead to lower well-being and unsatisfying relationships with others. There is often a cognitive piece to envy such that comparisons with an envious target typically leads to negative self-evaluations, which can lead to feelings of inferiority. People high in dispositional envy tend to feel frustrated with others' success and that an injustice has occurred because of the other's superiority. They also tend to be low in self-esteem as well as high in neuroticism, approval motivation, and levels of depression (Lange et al., 2018).

Similar to the social comparison and self-esteem literature, envy is also related to the importance of the domain in which it is experienced. Salovey and Rodin (1991) found that experiences of envy were particularly salient when the domain in which it was experienced was important to the participant. Similarly, it was found that academic envy was experienced to a greater degree when the participant valued academics (Rentzsch et al., 2015). This suggests that the degree to which a person feels envy corresponds to how important that domain is in a person's life.

Despite the research available on Instagram and social comparison, there is comparatively little literature available regarding Instagram and envy. In fact, much of the literature on envy also includes social comparison, and one study identifies social comparison and envy as sequential mediators. Specifically, Noon and Meier (2019) found in a sample of 266 British adolescents that the more strangers a person followed, the

more likely they were to compare themselves to others and to self-report feelings of envy. The authors posit that envy drives the social comparisons to either inspire or create negative feelings. Interestingly, the study measured the relationship between strangers followed on Instagram and envy and failed to find a significant relationship. These results are in contrast with previous studies suggests degree of familiarity with the target impacts one's emotional response (Lup et al., 2015; Wheeler & Miyake, 1992)

In a rare experience sampling methods study of 19 young adults, Ruensuk et al. (2022) created an ecological momentary assessment application for android smartphones that monitored Instagram activity and prompted participants to respond to short surveys when the application detected Instagram had been opened for at least 90 seconds before closing. The subsequent survey targeted seven constructs including social comparison, appearance comparison, and envy. Importantly, the survey distinguished between whether participants were actively posting on the application during that time or passively browsing Instagram. Results from the study confirmed that Instagram use is mostly passive consumption of media. While participants reported the experience of using Instagram as generally neutral or positive, participants also endorsed viewing content likely to elicit envy and appearance-related social comparison. While this novel methodology provides a naturalistic study of Instagram, it is limited by the small sample size and may be underpowered.

Given the dynamic relationship between social comparison and dispositional envy, it is difficult to distinguish the effects of each variable individually, as their combined effects are likely to provide a fuller understanding into the mechanism through which Instagram impacts users. Further complicating these closely related constructs is

the complexity arising from the measurement of social comparison itself. As such, the relationship between social comparison, dispositional envy, and outcome variable was studied through exploratory research questions.

Chapter III

Statement of the Problem

Instagram is an ever-growing social media platform in which users can upload photographs and videos to followers and strangers alike. Not only can people upload content of their own, but they can also spend endless hours browsing and interacting with other users from across the world. The application is particularly popular amongst adolescents and young adults, 76% of whom report checking the app at least once daily (Auxier & Anderson, 2021). Meta, the company that owns Instagram, highlights the positive uses and outcomes of the app including connecting with friends/family, enjoying entertainment, keeping up with current events, having a wider world view, and expressing oneself (Facebook, 2019). Indeed, some peer reviewed research has suggested that Instagram can have positive effects on users (Mackson et al., 2019; Meier & Schafer, 2018; Trifero & Prena, 2021). However, the literature predominantly demonstrates more negative consequences of Instagram use including lower self-esteem, loneliness, depression, generalized anxiety, social anxiety, and body dissatisfaction (Faelens et al., 2021; Martinez-Pecino & Garcia-Gavilan, 2019; Tiggeman & Zaccardo, 2015; Yurdagul et al., 2019). The mixed results reflect the varied methodologies and highlight the challenges in conducting Instagram research.

Much of the early Instagram research relied on cross-sectional studies that emphasized the behaviors and profile characteristics of participants (Faelens et al., 2021). These studies provided valuable insight into the general effects of Instagram use between users. However, it does not account for the significant differences within each user's feed. Just as each user has a unique feed, each session of Instagram use is unique. Given

the ever-changing nature of a user's Instagram experience, it follows that one's emotional response may also change based on what they are exposed to during a specific session. Moreover, cross-sectional studies are limited by measuring variables as stable traits. Empirical research has demonstrated that traits such as negative affect, self-esteem, grandiose narcissism, and vulnerable narcissism can also be conceptualized as dynamic processes measured as states (Crowe et al., 2018; Edershile et al., 2019; Heatherton & Polivy, 1991).

Indeed, daily diary studies have been increasingly implemented in social media research, enabling data to be analyzed both between-subjects and within-subjects. As such, they often implement state-based measures and have demonstrated significant fluctuations in self-esteem, negative affect, life satisfaction, social comparison, and envy associated with social media use (Choi & Kim, 2021; Garcia et al., 2021; Ruensuk et al., 2022). Yet many daily diary studies rely on retrospective reporting at the end of the day. As such, these studies are subject to recall bias, which may be impact the validity of the results. The present study aimed to address some of these limitations by including an in-vivo procedure within a daily dairy study to allow for in-the-moment reporting.

Experimental or quasi-experimental procedures tend to examine the effects of using Instagram on body image. Results of these studies suggest that viewing idealized images leads to more negative mood and body dissatisfaction, demonstrating the impact of exposure to unrealistically positive images on Instagram (Kleemans et al., 2018; Tiggeman & Zaccardo, 2015). While controlled experimental studies allow for isolation of variables, they lack effectiveness and are not representative of a typical user's experience. Each user curates their own feed through the accounts they follow and pages

they visit. As such, the content that that each user is exposed to is unique, varied, and often of familiar others. This heterogeneity illustrates the challenges of creating a lab-controlled experiment that retains external validity. Moreover, these studies are limited in that they primarily examine the effect of viewing body image-related content. As such, it is still unclear whether other content has similar effects. The present study explored the relationship between exposure to content and emotional response using a naturalistic design to capture normal Instagram use.

While research supports a connection between Instagram and mental health, the effects of using Instagram are not universal. Research supports the idea that people may be predisposed to feel the negative effects of Instagram exposure depending on underlying personality characteristics or vulnerabilities (Faelens et al., 2021; Fagundes et al., 2018; Stapleton et al., 2017). In particular, the interaction of narcissism with Instagram has been a topic of empirical study. Research has demonstrated positive relationships between use, behaviors, and emotional investment on Instagram and narcissism (Moon et al., 2016; Paramboukis et al., 2016). Given the increased time spent on Instagram, individuals high in narcissism are likely exposing themselves more frequently to the idealized pictures of superior others. As they tend to have intense negative emotional responses to threats to their self-esteem, it follows that these individuals may be particularly sensitive to content on Instagram use. For this reason, measuring narcissism as a dynamic state is necessary to understand momentary fluctuations in response to viewing images on Instagram. Moreover, many studies measure narcissism as a single variable rather than separating it into vulnerable and grandiose narcissism. Given the differences in presentation and affect between the

subtypes, a single measure of narcissism may not be sensitive enough to accurately interpret outcomes from Instagram consumption.

The present study expanded upon the current literature by analyzing the effects of browsing Instagram and exposure to distressing images on Instagram using a daily diary methodology. The study implemented a naturalistic design with an in-vivo procedure to allow for contemporaneous reporting of emotional response to viewing images on Instagram. Participants identified a distressing image during regular Instagram use and analyzed the characteristics of the post including the type of content present and relationship to the user who posted the image. The procedure allowed results to be analyzed both between-subjects and within-subjects. As such, the study provided information on day-to-day fluctuations in emotional response to Instagram use and established patterns between users over time. The present study implemented state-based measures to understand fluctuations in response to viewing distressing images on Instagram. The present study also analyzed interactions between emotional response and relevant traits identified in previous Instagram research including social comparison, dispositional envy, and narcissism. Narcissism was measured using its grandiose and vulnerable components.

Variable List

Within-Person Variables

- State self-esteem – Operationalized as the sum score on the Six-Item State Self-Esteem Scale, such that higher scores indicate higher levels of state self-esteem. This measure was completed daily (SSES-6; Webster et al., 2022).

- Daily negative affect – Operationalized as the sum score on the International Positive and Negative Affect Schedule Short Form—Negative Affect Scale, such that higher scores indicate higher levels of negative emotions. This measure was completed daily under the time condition "today" (I-PANAS—SF; Karim et al., 2011)
- Daily intensity of Instagram use – Operationalized as a one-item daily response to the prompt: "I lost track of time when I was using Instagram today" as taken from the Intensity of Instagram Use Scale such that higher scores were associated with greater intensity of Instagram use. This measure was completed daily (Fagundes et al., 2021).
- Distress from Instagram– Operationalized as the degree of self-reported distress in response to viewing an image on Instagram, as reported on the 1-item, face valid question completed daily. Higher scores on the item were associated with more distress. This measure was completed daily.
- State vulnerability – Operationalized as the mean score on the Narcissistic Vulnerability Scale, such that higher scores indicate a stronger vulnerable narcissistic response. This measure was completed daily (Edershile et al., 2019).
- State grandiosity –Operationalized as the mean score on the Narcissistic Grandiosity Scale, such that higher scores indicate more grandiose narcissistic responses. This measure was completed daily (Edershile et al., 2019).

Between-Person Variables

- Intensity of Instagram use – Operationalized as the mean score on the Intensity of Instagram Use Scale. Higher scores were associated with greater intensity of Instagram use (IIUS; Fagundes et al., 2021).
- Trait narcissism – Operationalized as the mean score on the Pathological Narcissism Inventory, such that higher scores were associated with higher levels of Narcissism (PNI; Pincus et al, 2009)
- Trait grandiose narcissism – Operationalized as the mean score of the four subscales on the Pathological Narcissism Inventory designed to measure grandiose narcissism, including Contingent Self-Esteem, Hiding the Self, and Devaluing, such that higher scores on these three subscales were associated with higher levels of grandiose Narcissism (PNI; Pincus et al, 2009)
- Trait vulnerable narcissism – Operationalized as the mean score of the three subscales on the PNI designed to measure vulnerable narcissism, including Contingent Self-Esteem, Hiding the Self, and Devaluing, such that higher scores on these three subscales were associated with higher levels of vulnerable narcissism (PNI; Pincus et al, 2009)
- Social comparison – Operationalized as the sum score on the Social Comparison Scale such that higher scores indicate self-perceived superiority compared to others (SCS; Allan & Gilbert, 1995)
- Dispositional envy – Operationalized as the sum score on the Dispositional Envy Scale, such that higher scores indicate a higher disposition to envy (DES; Smith et al., 1999).

Potential Covariates

- Age and ethnicity were tested as possible covariates as self-reported by participants.

Hypotheses

In a sample of undergraduate students at an urban, Northeastern university, it was predicted that:

1a. There would be a significant positive relationship between daily intensity of Instagram use and daily negative affect such that more intense daily Instagram use would be associated with greater daily negative affect.

b. The effect described above (1) would be moderated by total trait narcissism such that the relationship between intensity of Instagram use and negative affect would be significantly stronger for individuals high in trait total narcissism.

2a. There would be a significant negative relationship between daily intensity of Instagram use and state self-esteem such that more intense daily Instagram use would be associated with lower state self-esteem.

b. The effect described above (2) would be moderated by trait vulnerable narcissism such that the relationship between daily intensity of Instagram use and state self-esteem would be significantly stronger for individuals high in trait vulnerable narcissism.

c. The effect described above (2) would be moderated by trait grandiose narcissism such that the relationship between intensity Instagram use and

state self-esteem would be significantly weaker for individuals high in grandiose narcissism.

3a. There would be a significant positive relationship between daily intensity of Instagram use and daily distress from Instagram such that more intense daily Instagram use would be associated with greater distress from Instagram.

   b. The main effect described above (3a) would be moderated by trait vulnerable narcissism such that the relationship between daily intensity of Instagram use and daily distress from Instagram would be significantly stronger for individuals high in trait vulnerable narcissism.

4a. There would be a significant positive relationship between daily distress from Instagram and state vulnerable narcissism.

   b. The main effect described above (4a) would be moderated by trait vulnerable narcissism such that the relationship between daily distress from Instagram and state vulnerable narcissism would be significantly stronger for individuals high in trait vulnerable narcissism.

5a. There would be a significant negative relationship between daily distress from Instagram and state grandiose narcissism.

   b. The main effect described above (5a) would be moderated by trait grandiose narcissism such that the relationship between daily distress from Instagram and state grandiose narcissism would be significantly weaker for individuals high in trait grandiose narcissism.

Exploratory Questions

1a. Was there a pattern of specific content within Instagram posts associated with negative affect, self-esteem, distress, state vulnerable narcissism, or state grandiose narcissism?

2a. How did the relationship between the user who posted the photo on Instagram and the participant impact reported levels of negative affect, self-esteem, distress from Instagram, state vulnerable narcissism, and state grandiose narcissism?

3a. What was the nature of the relationship between intensity of Instagram use, dispositional envy, and negative affect?

4a. What was the nature of the relationship between intensity of Instagram use and state self-esteem when broken into subcomponents of appearance-based, performance-based, and social self-esteem?

b. How did the appearance subscale of social comparison affect the relationship between intensity of Instagram use and appearance state self-esteem?

c. How did the rank subscale of social comparison affect the relationship between intensity of Instagram use and performance state self-esteem?

d. How did the group fit subscale of social comparison affect the relationship between Instagram intensity and social state self-esteem?

CHAPTER IV

Method

Participants

The study recruited 178 students from a large, urban university. Participants were students from the university who met the following criteria: (1) female-identifying (2) between the ages of 18 and 25 (3) currently had an Instagram account (4) checked their Instagram account at least daily. These criteria were used based upon piloting and previous research that found increased personal relevancy and emotional responses to Instagram within young females (Auxier & Anderson, 2021; Facebook, 2020). Participants were recruited either via the university's "Psychology Experience Credit (PEC)" program in which they could earn credit to fulfill a course research requirement or through flyers posted in public spaces around the campus. Participants not eligible for course credit were compensated with a $20 Amazon gift card. Compensation was contingent on participants completion of the initial battery and at least 4 of the 6 subsequent daily surveys.

Twenty-four participants were excluded due to completing too few daily surveys or incomplete initial batteries. A total of 153 participants were included in the final analyses. Of the final sample, the age range was between 18 to 25 (M = 19.77, SD = 2.00). Regarding the racial and ethnic composition of the sample, 47 (30.7%) identified as White, 45 (29.4%) identified as Asian, 22 (14.4%) identified as Black or African American, 17 (11.1%) identified as Middle Eastern, 12 (7.8%) identified as Latina, 9 (5.9%) identified as Other, and 1 (.7%) identified as Native American/Alaska Native. The demographic data are displayed in Table 1.

Table 1

Sociodemographic Characteristics of Participants at Baseline

Variable	*M*	*SD*	*n*	%
Age	19.77	2.0		
Ethnicity				
White			47	30.7
Asian			45	29.4
Black/African American			22	14.4
Middle Eastern			17	11.1
Latina			12	7.8
Other			9	5.9
Native American/Alaskan Native			1	0.7
Recruitment Method				
PEC			113	73.9
Paid			40	26.1

Note. M = mean; *SD* = standard deviation; *n* = number of participants; % = percentage of sample

Measures

Demographic Questionnaire

Participants completed a brief demographic questionnaire, including questions about gender, age, and ethnicity.

Instagram Distress

The degree of Instagram distress in response to viewing an image on Instagram was measured using a 1-item, face-valid self-report question asked on each daily survey: "To what extent did this Instagram post bother you?" The item was measured on a 5-point scale ranging from 1 ("*not at all*") to 5 ("*very much*") in which higher scores on the item were associated with more distress. This item was derived from the methodology measuring distress in response to specific social media behaviors (Robinson et al., 2018)

Instagram Typicality

The degree to which an Instagram post chosen for analysis was representative of an Instagram post typically seen was measured using a 1-item, face valid self-report question asked on each daily survey: "How typical is this post of what you see on Instagram." The item was measured on a 5-point scale ranging from 1 ("*not at all*") to 5 ("*very much*") in which higher scores on the item are associated with more typical images.

Intensity of Instagram Use Scale (IIUS; Fagundes et al., 2021)

Intensity of Instagram use was measured using the IIUS. The 10-item scale is a self-report measure answered on a five-point Likert scale ranging from 1 ("*totally disagree*") to 5 ("*totally agree*"). The scale yields an average score, with higher scores representing more intense Instagram use. Example items include "I lose track of time

when I'm using Instagram" and "I often open Instagram automatically/without thinking." In a sample of 625 Brazilians, the scale showed adequate internal consistency (Cronbach's alpha = .85). It also showed convergent validity, as it correlated strongly with the face value question "If you could assess your level of intensity of Instagram use, how would it be?" $r(625) = .76$, $p < .001$ (Fagundes et al., 2021). In the present study, questions were worded to reflect general use at baseline as well as daily use. Daily intensity of Instagram use was measured from one item taken from the IIUS: "I lost track of time when I was using Instagram today." In the current sample, Cronbach's alpha was .71.

Pathological Narcissism Inventory (PNI; Pincus et. al, 2009)

Level of total narcissism, vulnerable narcissism, and grandiose narcissism was measured using the PNI. This self-report measure consists of 52 descriptive statements endorsed on a 6-point Likert-type scale ranging from 0 ("*not at all like me*") to 5 ("*very much like me*"). The PNI produces a continuous mean total narcissism score as well as mean scores for the two subscales: Vulnerable Narcissism and Grandiose Narcissism.

Exploratory and confirmatory factor analyses of the PNI using non-clinical, undergraduate samples yielded 7 distinct dimensions of pathological narcissism: Contingent Self-Esteem, Exploitiveness, Self-Sacrificing Self Enhancement, Hiding the Self, Grandiose Fantasy, Devaluing, and Entitlement Rage (Pincus et al., 2009). Vulnerable narcissism is measured by the mean scores of the Contingent Self-Esteem, Hiding the Self, and Devaluing subscales. An example item from the Contingent Self-Esteem subscale reads "I often find myself envying others' accomplishments." Grandiose Narcissism is measured by the mean scores of the Exploitiveness, Self-Sacrificing Self

Enhancement, Grandiose Fantasy, and Entitlement Rage. An example item from the Grandiose Fantasy subscale reads, “I often fantasize about being admired and respected.”

The PNI has been empirically validated in several large, nonclinical samples of college students as well as smaller groups from a clinical population (Pincus et al., 2009). The PNI has demonstrated excellent internal consistency (total PNI Cronbach’s alpha = .95). Further evaluation of the measure within a sample of 500 college students confirmed the 2-factor structure of the scale and support the convergent and discriminant validity of the grandiose and vulnerable scores (Thomas et al., 2012). High scores on the PNI were associated with low self-esteem, interpersonal distress, shameful affects, aggression, borderline personality organization, and low empathy (Pincus et al., 2009). In the current sample, Cronbach’s alpha was .96 for total narcissism and the subscales of vulnerable narcissism and grandiose narcissism were .95 and .88 respectively.

Social Comparison Scale (SCS; Allan & Gilbert, 1995)

Social comparison was assessed using the Social Comparison Scale (SCS). The SCS is a self-report measure that produces a continuous sum score, with higher scores indicating more positive social comparisons. The scale presented participants with the incomplete sentence, “when I am with other people I generally feel,” followed by 11 bipolar constructs. Examples of constructs include “inferior/superior” “untalented/more talented” and “unattractive/more attractive.” The SCS was validated with in a large, nonclinical college population ($N = 263$) as well as a smaller group from a clinical population ($N = 32$). The SCS has demonstrated good internal consistency in both the nonclinical (Cronbach’s alpha = .91) and clinical sample (Cronbach’s alpha = .88) (Allan & Gilbert, 1995). Authors performed exploratory and confirmatory factor analysis and

found that a two-factor structure and three-factor structure fit the data adequately. The identified factors were rank and group fit. Rank was further expanded into rank and attractiveness. High scores on the SCS have been found to be related to more depressive symptoms, hostility, and psychoticism (Allan & Gilbert, 1995). In the current sample, Cronbach's alpha was .92.

Dispositional Envy Scale (DES; Smith et al., 1999)

Dispositional envy was measured using the DES. The DES measures an individual's proneness to feel envy. The 8-item self-report scale yielded a continuous sum score that was rated on a 5-point Likert scale from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Higher scores on the scale indicated more dispositional envy. Example items included "it is so frustrating to see some people succeed so easily" and "it somehow doesn't seem fair that some people seem to have all the talent." The scale was found to be psychometrically sound across three samples of undergraduates including 204, 168, and 324 participants respectively. A principal-axis factor analysis was conducted using the first sample ($N = 204$) to reduce the original 54 items to a one-factor scale with 8 items. A second principal axis factor analysis was conducted using the second sample ($N = 168$) and was confirmed using the third sample ($N = 324$) $\chi^2 = 171.21$, $p < .001$, comparative fit index = .86. The scale showed excellent internal consistency with Cronbach's alpha values across the three samples ranging from .83 to .86. An additional sample of 136 undergraduates was used to confirm the criterion validity of the dispositional envy scale with reported experience of state envy ($r = .58$, $p < .001$) (Smith et al., 1999). In research, dispositional envy has been found to be related to more depressive symptoms, higher levels of narcissism, less perceived social support,

and lower self-esteem (Krizan & Johar, 2012; Xiang, Dong, & Zhao, 2020). In the present sample, Cronbach's alpha was .92.

International Positive and Negative Affect Schedule – Short Form (I-PANAS-SF; Thompson, 2007)

Daily negative affect will be measured using the Negative Affect Scale from the International Positive and Negative Affect Schedule, Short Form. The Negative Affect Scale is a 5-item self-report scale and yields a continuous sum score. Participants rated the extent to which they have felt each of the five emotions during the past day on a Likert scale from 1 ("*very slightly or not at all*") to 5 ("*very much*"). An example item from the Negative Affect Scale includes "hostile" and "ashamed." Across four samples of 407 university students from 38 different countries, the I-PANAS-SF showed adequate internal consistency with an average Cronbach's alpha of .76. Correlational analysis between the PANAS-X-NA and I-PANAS-SF-NA using Pearson's *r* was .92 ($p < .01$). The test-retest coefficient of reliability was also adequate at .84 ($p < .01$) demonstrating sufficient temporal stability (Thompson, 2007). In the present sample, Cronbach's alpha was .85.

Six-Item State Self-Esteem Scale (SSES-6; Webster et al., 2022)

State self-esteem was measured using the SSES-6. The authors modified the State Self Esteem Scale, a 20 item self-report measure with well-established psychometric properties, to brief form of the assessment (SSES; Heatherton & Polivy, 1991). The SSES-6 is a 6-item self-report scale that yields an overall sum score as well as scale-specific scores across three domains: Performance, social, and appearance self-esteem. Participants indicated the extent to which they felt each item in the moment. The scale

was rated on a Likert scale ranging from 1 ("*not at all*") to 5 ("*extremely*"), with higher scores reflecting higher levels of self-esteem. Example items from the subscales include "I am satisfied with the way my body looks right now (appearance)," "I feel like I am not doing well (performance)," and "I am worried about what other people think of me (social)." In a sample of 746 undergraduates, the scale showed good convergent validity with the SSES ($r = .89$, $p < .05$). Confirmatory factor analysis supported a three-factor structure, maintaining the integrity of the original SSES, $\chi^2(3) = 256.1$. In addition, the scale demonstrated adequate internal consistency on the overall score (Cronbach's alpha = .80) as well as the domain-specific scores (Cronbach's alpha ≥ .72). The scale also demonstrated adequate test-retest reliability over eight weeks, $r = .81$ (Webster et al., 2022). In the present sample, Cronbach's alpha was .87.

Narcissistic Vulnerability Scale (NVS; Edershile et al., 2019)

State vulnerable narcissism was measured daily using the Narcissistic Vulnerability Scale (NVS). The 4-item scale is an adjective-based self-report measure ranging from 0 ("*not at all*") to 100 ("*extremely*"). The scale yields a mean score, with higher scores representing higher levels of state narcissistic vulnerability. Example items from the scale include, "to what degree do you currently feel resentful?". The scale was adapted from a 6-item Narcissistic Vulnerability Scale to a 4-item scale to reduce the length of the surveys and limit the burden placed on participants during Ecological Momentary Assessment studies (Crowe et al., 2018). Preliminary analyses of a sample of 396 undergraduate students indicated weaker loadings on two adjectives in the 6-item survey, which were removed from follow-up studies. In a sample of 231 undergraduate students, the 4-item scale showed good internal consistency with McDonald's Omega

values ranging from Ω = .87 for between-person baseline measures analysis to Ω = .96 for within and between person analysis of ambulatory measures. Convergent validity analyses demonstrated that the NVS was positively associated with higher trait narcissism, negative affect, neuroticism, warmth, and agreeableness while negatively correlated to positive affect and self-esteem (Edershile et al., 2019). In the present sample, Cronbach's alpha was .90.

Narcissistic Grandiosity Scale (NGS; Edershile et al., 2019)

State grandiose narcissism was measured using the Narcissistic Grandiosity Scale (NGS). The 4-item scale is an adjective-based self-report measure ranging from 0 ("*not at all*") to 100 ("*extremely"*). The scale yielded a mean score, with higher scores indicating higher levels of state narcissistic grandiosity. Example items from the scale include "to what degree do you currently feel powerful?". The scale was adapted from a 6-item narcissistic grandiosity scale to a 4-item scale to reduce the length of the surveys and limit the burden placed on participants during Ecological Momentary Assessment studies (Crowe et al., 2016). Preliminary analyses of a sample of 396 undergraduate students indicated weaker loadings on two adjectives, which were removed from the survey in follow-up studies. In a sample of 231 undergraduate students, the 4-item scale showed good internal consistency with McDonald's Omega values ranging from Ω = .80 for within-person ambulatory measures analysis to Ω = .97 for between-person analysis of ambulatory measures. Convergent validity analyses demonstrated that the NGS is positively associated with trait narcissism, positive affect, dominance, and extraversion while negatively correlated to negative affect and agreeableness. In the present sample, Cronbach's alpha was .95.

Procedure

Piloting

The procedure for the current project was piloted twice, with significant modifications made after the first piloting. In the first piloting, 15 undergraduate participants completed the demographic questionnaire, Pathological Narcissism Inventory, Dispositional Envy Scale, State Self-Esteem Scale, and Social Comparison Scale. Participants were then shown a set of mock Instagram profiles generated from real, public images on Instagram sourced from posts using hashtags such as #summer #ootd and #tbt. Both sets were identical aside from the number of likes under the picture, which was either less than 10 (Low Likes) or between 500 and 800 (High Likes). Participants were randomly assigned to a "Low Like" or "High Like" condition. After exposure to the pictures, participants rated personality qualities about the subject of the photograph and completed a state measure of envy and social comparison. It was hypothesized that participants in the High Like condition would rate the personality qualities as worse than in the Low Like conditions. It was also hypothesized that the High Like group would report more state envy and state social comparison at the time. Feedback from participants suggested that the attention a post received was insufficient on its own to elicit strong responses. Participants indicated that they were largely unaffected by the mock posts because they did not have a relationship with the person in the picture, were not invested in the content of the post, and did not notice like count. Instead, participants identified several distressing themes of common content on Instagram such as unrealistic or unattainable appearance, extravagant lifestyles, overt displays of wealth, high user engagement, and exclusion from pictures. While many participants shared triggers,

individual differences in vulnerability to content were noted. Thus, the lab procedure with a standardized protocol was found to not be representative of a user's experience and failed to evoke a similar response to actual Instagram use.

Based on pilot participant feedback, the study protocol replaced the standard sets of images with those chosen from participants' own feeds to ensure the images were personally resonant. The scope of the experiment was also broadened to account for the multidetermined causes of distress beyond like count. In doing so, the study was able to capture the experience of using Instagram more accurately while maintaining its purpose in understanding the characteristics of a post that are distressing and its interaction with one's narcissistic traits.

The second piloting included 10 undergraduate participants and used a procedure similar to that of the present study. After consenting to participate in the study, subjects registered with an Ecological Momentary Assessment service that prompted participants to complete surveys throughout the study via text message. On the first day of the study, participants completed an initial battery of measures including the demographic questionnaire, PNI, DES, and SCS. On days two through seven, participants received a text message at 5:00 PM prompting them to complete the daily survey. For the daily survey, participants identified a picture that they recently viewed on Instagram that caused a negative emotional reaction. Participants then rated the degree to which they were distressed by the picture and completed the I-PANAS-SF and SSES-6. Preliminary analysis of mean Instagram distress, mean daily negative affect, and mean state self-esteem were conducted. The negative affect measure (I-PANAS-SF) demonstrated excellent reliability with a Cronbach's Alpha of .93. The self-esteem measure (SSES-6)

demonstrated adequate reliability with a Cronbach's Alpha of .82. The sample reported low means for Instagram distress ($M = 2.26$, $SD = 1.06$), negative affect ($M = 14.83$, $SD = 8.19$), and self-esteem ($M = 21.22$, $SD = 2.91$). Correlational analyses between variables were run using Pearson's *r.* Results indicated a significant positive relationship between daily Instagram distress and daily negative affect ($r = .29$, $p = .03$). However, the relationship between daily Instagram distress and daily state self-esteem was not significant ($r = .19$, $p = .15$).

Feedback from the second piloting improved the study design by changing the time of day that participants received the prompt to complete daily surveys from 5:00 PM to 12:00 PM. At 5:00 PM participants received a text message reminder if they had not completed the survey by that time. Additionally, an example of the daily surveys was provided on the first day of the study before daily measures began. The example provided participants with a preview of the daily protocol to increase awareness of the study and facilitate identifying a distressing photograph for the following six days. In order to address low mean scores of distress from Instagram, participants were encouraged to expand upon their reported distress elicited by the photograph through an optional text response. This text response was included to increase exposure thereby increasing distress. Moreover, the NVS and NGS were added to the daily surveys to account for expected narcissistic responses to viewing Instagram posts.

Primary Study Procedure

The present study was completed entirely online in two parts: 1.) an initial battery of surveys including demographic, personality, and baseline emotional experiences

information and 2.) six brief daily surveys including an analysis of an Instagram post and outcome measures. A detailed description of the measures is provided below.

Participants registered for the study online via Survey Signal, an Ecological Momentary Assessment service. The day after registration, participants received a text message at 9:00 AM containing a link to complete the initial battery. Failure to complete this battery by 5:00 PM generated a reminder text message to complete the battery before 11:59 PM of that day. Prior to beginning the study, participants electronically consented and verified eligibility to participate in the study. Participants were required to be daily Instagram users, identify as female, and be between the ages of 18 and 25. The initial battery collected demographic information followed by baseline measures described above (IIUS, PNI, SCS, DES). Participants were then provided a step-by-step example of the daily Instagram photo analysis using a celebrity post (see Figure A1). Finally, participants practiced filling out their own daily survey to familiarize themselves with the procedure. The practice Instagram task was not included in data analysis. Participants were instructed to remain aware of the study throughout the week while using Instagram in order identify distressing posts and complete the daily survey in real time.

At 12:00 PM on days two through seven, participants were sent a link to complete the daily surveys. Participants were encouraged to complete the Instagram survey when they noticed a post that either caused or was representative of an image that typically caused distress while using Instagram. After identifying a distressing Instagram post, participants clicked on the link to complete the daily survey. The daily survey included the I-PANAS-SF, SSES-6, Daily IIUS, NVS, NGS and an analysis of an Instagram post

(see Table A1). Participants were then provided with the following instruction to increase exposure to the stimuli:

> For the following questions, reflect on the pictures you have seen on Instagram today. Choose one picture that you saw recently on Instagram that caused a negative reaction. If no posts have caused a negative reaction today, choose a picture that may be representative of the type of post that would cause a negative reaction. Browse the profile and posts of the user whose picture you chose to get a sense of how they are digitally presenting themselves online. Keep this picture available, as you will answer several questions about it.

In order to ensure participants were actively viewing the image while responding, they provided details about the post to serve as attention checks. These details included describing the picture, reporting the number of likes it received, and transcribing the caption. Then, participants identified their relationship to the person who posted the image from a list including close friend, friend, celebrity, influencer, acquaintance, stranger, family member, or other. Participants were then asked to rate the level of distress that the image evoked: "What part of the post bothered you? ONLY indicate whether the following caused a negative emotional reaction, not whether it is present in the post." Participants chose from a list of common triggers found during the focus groups during piloting: unrealistic beauty standards, idealized body size, personal accomplishment of the poster, romantic/love life of the poster, a group of friends, being excluded from a situation, extravagant lifestyle, the attention it received, or other. Participants also had the option to explain their response in greater detail in a text box under the question. Upon completion of the final daily survey, participants were provided

with a debriefing form outlining the purpose of the study and providing referrals to mental health resources. Within 48 hours of completion, participants received PEC credits or a $20 Amazon gift card as compensation for the study.

Data Analytic Plan

The present study's implementation of daily diary methodology yielded longitudinal data, allowing for analysis both between-subjects and within-subjects. As such, statistical analysis was conducted using Multilevel Modeling (MLM) in which daily Instagram data were nested within individuals. Baseline narcissism was tested as a moderator in the primary hypotheses. Dispositional envy and social comparison were tested as moderators in the exploratory questions. Exploratory questions also analyzed the content of the post and relationship to the user who posted the image.

Hypothesis Testing

Prior to hypothesis testing, missing data were analyzed, and variables were assessed for normality. Demographic variables were evaluated as potential covariates. Inter-Variable correlations will be tested for Level-1 and Level-2 variables separately. Cross-level correlations will also be tested between Level-1 and Level-2 variables. All hypothesis testing was conducted using SAS ® On Demand for Academics Version 9.4. Multilevel Modeling allows for analysis to be simultaneously conducted on two levels: daily fluctuations within-participants (Level-1) and variation between participants (Level-2). In the present study, Level-1 within-person data were daily ratings of intensity of Instagram use (Hypothesis 1, 2, and 3), distress from Instagram (Hypothesis 3, 4, and 5), daily negative affect (Hypothesis 1), daily state self-esteem (Hypothesis 2), daily state vulnerable narcissism (Hypothesis 4), and daily state grandiose narcissism (Hypothesis

5). Level-2 between-person data were baseline measures of overall trait narcissism (Hypothesis 1), trait vulnerable narcissism (Hypothesis 2-4), and trait grandiose narcissism (Hypothesis 2 and 5). Additional Level-2 variables used in exploratory analyses include social comparison and dispositional envy.

CHAPTER V

Results

The following section presents an overview of the results of the present study including preliminary analyses, primary analyses, and exploratory analyses. Preliminary analyses were conducted using IBM ® SPSS ® Statistics while primary analyses were conducted using SAS ® On Demand for Academics Version 9.4.

Preliminary Analyses

Missing Data

A total of 178 individuals consented to participate in this study. Twenty-nine (14.50%) individuals were excluded from analysis due to not meeting the eligibility requirements of being between the ages of 18 and 25, identifying as female, or using Instagram at least once per day. An additional 18 (9%) participants were excluded from analysis due to not completing at least 80% of the baseline measures and/or at least four daily surveys. Missing data in Level-1 measures (daily measures) were of no statistical concern as Multilevel Modeling does not require complete data sets for parameters to be successfully estimated. As such, any Level-1 data that were missing at one time point did not require deletion or imputation. The final sample size for this study $N = 153$ with 911 daily surveys completed.

Descriptive Statistics

Means, standard deviations, skewness, and kurtosis were analyzed to assess the normality of the measures. Descriptive statistics for Level-2 variables can be found in Table 2. All variables were found to be normally distributed (skewness and kurtosis between -2.00 and +2.00) and did not require transformation. Descriptive statistics for

Table 2

Descriptive Statistics (Level-2 Variables)

Measure	Min	Max	Mean	SD	Skewness (SE)	Kurtosis (SE)
PNI-T	1.00	5.30	3.51	0.80	-0.31 (0.20)	0.52 (0.39)
PNI-V	1.00	5.48	3.42	0.92	-0.12 (0.20)	-0.25 (0.39)
PNI-G	1.00	5.60	3.64	0.78	-0.49 (0.20)	1.10 (0.39)
DES	8.00	39.00	18.75	8.04	0.39 (0.20)	-0.69 (0.39)
SCS	11.00	110.00	62.88	19.06	-0.49 (0.20)	0.22 (0.39)
SCS-R	5.00	50.00	28.97	8.85	-0.39 (0.20)	1.10 (0.39)
SCS-GF	3.00	30.00	16.09	6.01	-0.16 (0.20)	1.10 (0.39)
SCS-A	3.00	30.00	17.82	6.30	-0.43 (0.20)	1.10 (0.39)
IIUS	1.90	4.20	3.02	0.51	0.21 (0.20)	-0.54 (0.40)

Note. N = 153. PNI-T = Pathological Narcissism Inventory Total (Pincus et al., 2009). PNI-V = Pathological Narcissism Inventory Vulnerable (Pincus et al., 2009). PNI-G = Pathological Narcissism Inventory Grandiose (Pincus et al., 2009). DES = Dispositional Envy Scale (Smith et al., 1999). SCS = Social Comparison Scale (Allan & Gilbert, 1995). IIUS = Intensity of Instagram Use (Fagundes et al., 2021).

Level-1 variables can be found in Table 3. All Level-1 variables were found to be normally distributed, though MLM does not require an assumption of normality (Field, 2013).

Inter-Variable Correlations

Level-2 Correlations. Bivariate correlations among Level-2 variables (intensity of Instagram use, trait total narcissism, trait grandiose narcissism, trait vulnerable narcissism, social comparison, and dispositional envy) are displayed in Table 4 using Pearson's *r.* Positive associations with medium effect sizes were found between baseline intensity of Instagram use and total trait narcissism ($r = .32$, $p < .001$), trait vulnerable narcissism ($r = .31$, $p < .001$), and dispositional envy ($r = .26$, $p = .001$). Positive associations with large effect sizes were found between trait total narcissism and trait grandiose narcissism ($r = .93$, $p < .001$), trait vulnerable narcissism ($r = .89$, $p < .001$), and dispositional envy ($r = .54$, $p < .001$). Additionally, a large-sized positive effect was found between trait vulnerable narcissism and trait grandiose narcissism ($r = .71$, $p < .001$) as well as trait vulnerable narcissism and dispositional envy ($r = .59$, $p < .001$). A medium-sized negative effect was found between trait vulnerable narcissism and total social comparison ($r = -.28$, $p < .001$). A medium-sized positive effect between trait grandiose narcissism and dispositional envy ($r = .37$, $p < .001$). Dispositional envy was also found to have medium-sized negative associations with total social comparison ($r = -.37$, $p < .001$).

Level-1 Correlations. Bivariate correlations among Level-1 variables are displayed in Table 5 using Pearson's *r.* Positive associations with small effect sizes were found between intensity of Instagram use and Instagram typicality ($r = .08$, $p = .03$), daily

Table 3

Descriptive Statistics (Level-1 Variables)

Measure	N	Min	Max	M	SD	Skewness (SE)	Kurtosis (SE)
DIIUS	911	1.00	5.00	2.46	1.17	0.43 (0.08)	-0.85 (0.16)
NAS	911	5.00	25.00	8.92	4.21	1.26 (0.08)	1.19 (0.16)
SSES-6-T	911	6.00	30.00	20.40	5.66	-0.44 (0.08)	-0.46 (0.16)
SSES-6-P	911	2.00	10.00	7.22	2.07	-0.49 (0.08)	-0.37 (0.16)
SSES-6-S	911	2.00	10.00	6.89	2.43	-0.44 (0.08)	-0.90 (0.16)
SSES-6-A	911	2.00	10.00	6.29	2.02	-0.33 (0.08)	-0.32 (0.16)
IG DIST	910	1.00	5.00	2.74	1.17	0.25 (0.08)	-0.70 (0.16)
NVS	895	0.00	100.00	29.21	24.56	0.81 (0.08)	-0.14 (0.16)
NGS	902	0.00	100.00	39.86	27.81	0.50 (0.08)	-0.69 (0.16)

Note. DIIUS = Daily Intensity of Instagram Use Scale (Fagundes et al., 2021). NAS = International Positive and Negative Affect Schedule Short Form—Negative Affect Scale (Thompson, 2007). SSES-6-T= Six-Item State Self-Esteem Scale Total (Webster et al., 2022). SSES-6-P = Six-Item State Self-Esteem Scale Performance subscale (Webster et al., 2022). SSES-6-A = Six-Item State Self-Esteem Scale Appearance subscale (Webster et al., 2022). SSES-6-S = Six-Item State Self-Esteem Scale Social subscale (Webster et al., 2022). IG Dist = Instagram Distress. NVS = Narcissistic Vulnerability Scale (Edershile et al., 2019). NGS = Narcissistic Grandiosity Scale (Edershile et al., 2019).

Table 4

Correlation Matrix for Main Study Variables (Level-2)

Measure	1	2	3	4	5	6
1. IIUS	1.00					
2. PNI-T	.32*	1.00				
3. PNI-V	.31*	.96*	1.00			
4. PNI-G	.28*	.89*	.71*	1.00		
5. SCS-T	-.09	-.20***	-.03	-.48*	1.00	
6. DES	.26*	.54*	.37*	.51*	-.55*	1.00

Note. N = 153. IIUS = Intensity of Instagram Use (Fagundes et al., 2021). PNI-T = Pathological Narcissism Inventory-Total Narcissism (Pincus et al., 2009). PNI-V = Pathological Narcissism Inventory-Vulnerable Narcissism (Pincus et al., 2009). PNI-G = Pathological Narcissism Inventory-Grandiose Narcissism (Pincus et al., 2009). DES = Dispositional Envy Scale (Smith et al., 1999). SCS-T = Social Comparison Scale Total (Allan & Gilbert, 1995).

*$p < .001$.

**$p < .01$.

***$p < .05$.

Table 5

Correlation Matrix for Main Study Variables (Level-1)

Measure	1	2	3	4	5	6	7
1. DIIUS	1.00						
2. IG Dist	.20*	1.00					
3. Typicality of Post	.08***	.13*	1.00				
4. I-PANAS-SF	.22*	.44*	.15*	1.00			
5. SSES-6	-.14*	-.22*	-.21*	-.48*	1.00		
6. NVS	.16*	.21*	.17*	.51*	-.55*	1.00	
7. NGS	-.10***	-.18*	-.13*	-.20*	.46*	-.15*	1.00

Note. N = 890. DIIUS = Daily Intensity of Instagram Use Scale (Fagundes et al., 2021). IG Dist = Instagram Distress. I-PANAS-SF = International Positive and Negative Affect Schedule Short Form—Negative Affect Scale (Thompson, 2007). SSES-6= Six-Item State Self-Esteem Scale (Webster et al., 2022). NVS = Narcissistic Vulnerability Scale (Edershile et al., 2019). NGS = Narcissistic Grandiosity Scale (Edershile et al., 2019).

*$p < .001$.

**$p < .01$.

***$p < .05$.

negative affect ($r = .22$, $p < .001$), distress ($r = .20$, $p < .001$), and state vulnerable narcissism ($r = .16$, $p < .001$). Negative associations with small effect sizes were found between daily intensity of Instagram use and state self-esteem ($r = -.14$, $p < .001$) and state grandiose narcissism ($r = -.10$, $p < .001$). Distress from Instagram was found to be positively associated with daily negative affect with a medium effect size ($r = .44$, $p < .001$), state vulnerable narcissism with a small effect size ($r = .21$, $p < .001$), and Instagram typicality with a small effect size ($r = .13$, $p < .001$). Further, distress from Instagram was found to have small-sized negative association with state self-esteem ($r = -.22$, $p < .001$) and state grandiose narcissism ($r = -.18$, $p < .001$). Daily negative affect was positively associated with state vulnerable narcissism with a large effect ($r = .51$, $p < .001$) and Instagram typicality with a small effect size ($r = .15$, $p < .001$). Daily negative affect was negatively associated with state self-esteem ($r = -.48$, $p < .001$) with a large effect size and state grandiose narcissism ($r = -.20$, $p < .001$) with a small effect size. State self-esteem was found to have a large-sized negative association with state vulnerable narcissism ($r = -.55$, $p < .001$), a small-sized negative association with Instagram typicality ($r = -.21$, $p < .001$), and a medium-sized positive association with state grandiose narcissism ($r = .46$, $p < .001$). State vulnerable narcissism had a positive association with Instagram typicality with a small effect size ($r = .18$, $p < .001$) and a negative association with state grandiose narcissism ($r = -.15$, $p < .001$) with a small effect size. Instagram typicality had a positive association with state grandiose narcissism with a small effect size ($r = .13$, $p < .001$).

Cross-Level Correlations. Bivariate correlations among mean levels of Level-1 variables (daily intensity of Instagram use, daily negative affect, state self-esteem,

distress from Instagram, narcissistic vulnerability scale, narcissistic grandiosity scale) with Level-2 variables (intensity of Instagram use, trait total narcissism, trait grandiose narcissism, trait vulnerable narcissism). Correlations are displayed in Table 6 using Pearson's *r*.

Covariate Analysis

Age and ethnicity were tested as potential covariates with outcome variables. Bivariate correlations were conducted using Pearson's *r* to analyze age as a covariate. Age was significantly positively correlated with small effect sizes with state self-esteem ($r = .22$, $p < .001$) and state grandiose narcissism ($r = .12$, $p < .001$). Age was significantly negatively related to state vulnerable narcissism ($r = -.11$, $p < .001$) with a small effect size. As such, age was included as a covariate in the analyses of state self-esteem, state grandiose narcissism, and state vulnerable narcissism.

One-way between-subjects ANOVAs were conducted to compare the effect of race/ethnicity on the means of all dependent variables. Ethnicity was grouped into six major categories (White, Black, Middle Eastern, Asian, Latinx, and Other). Due to small group sizes, Native American/Alaskan Native and "Other" groups were combined into the category "Other." Racial/ethnic groups only differed significantly for state self-esteem $F(5, 147) = 2.34$, $p = .04$ and state grandiose narcissism $F(5, 147) = 2.85$, $p = .02$ (see Table 7). Tukey post hoc testing was conducted to determine which ethnicities were significantly different. Black participants reported higher self-esteem ($M = 23.53$, $SD = 3.82$) than Asian participants ($M = 19.71$, $SD = 5.03$) and participants of "Other" ethnicities ($M = 17.94$, $SD = 6.04$). Black participants also reported higher state grandiose narcissism ($M = 54.23$, $SD = 31.62$) than participants of "Other" ethnicities

Table 6

Cross-level Correlation Matrix for Main Study Variables (Level-1 and Level-2)

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. IIUS	1.00											
2. PNI-T	.32*	1.00										
3. PNI-V	.31*	.96*	1.00									
4. PNI-G	.28*	.89*	.71*	1.00								
5. SCS-T	-.09	-.20***	-.28*	-.03	1.00							
6. DES	.26**	.54*	.37*	-.37*	-.37*	1.00						
7. DIIUS	.45*	.11	.12	.07	-.06	.14	1.00					
8. NAS	.21**	.30*	.34*	.18***	-.25**	.34*	.31*	1.00				
9. SSES-6	-.17***	-.54*	-.61*	-.34*	.48*	-.50*	-.19**	-.56*	1.00			
10. IG Dist	.18***	.29*	.29*	.23**	-.08	.21**	.28*	.51*	-.26**	1.00		
11. NVS	.20***	.41*	.43*	.29*	.24**	.30*	.23**	.64*	-.62*	.26*	1.00	
12. NGS	-.05	-.31*	-.37*	-.15	.49*	-.29*	-.13	-.23**	.47*	-.24**	-.15	1.00

Note. N = 147. IIUS = Intensity of Instagram Use Scale (Fagundes et al., 2021). PNI-T = Pathological Narcissism Inventory—Total (Pincus et al., 2009). PNI-V = Pathological Narcissism Inventory—Vulnerable Narcissism (Pincus et al., 2009). PNI-G =Pathological Narcissism Inventory—Grandiose Narcissism (Pincus et al., 2009). SCS-T = Social Comparison Scale—Total (Allan & Gilbert, 1995). DES = Dispositional Envy Scale (Smith et al., 1999). DIIUS = Daily Intensity of Instagram Use Scale (Fagundes et al., 2021). NAS = International Positive and Negative Affect Schedule Short Form—Negative Affect Scale (Thompson, 2007). SSES-6 = Six-Item State Self-Esteem Scale (Webster et al., 2022). IG Dist = Instagram Distress. NVS = Narcissistic Vulnerability Scale (Edershile et al., 2019). NGS = Narcissistic Grandiosity Scale (Edershile et al., 2019).

*$p < .001$. **$p < .01$. ***$p < .05$.

Table 7

Between Groups ANOVA Test for Ethnicity Covariates on Outcome Variables in SPSS

Measure	Sum of Squares	Mean Square	F	Significance
DIIUS	5.02	1.00	1.21	.31
IG Dist	3.79	0.76	0.92	.47
NAS	95.20	29.04	1.60	.17
SSES-6	299.12	59.82	2.34	.04
NVS	2056.83	411.37	0.94	.46
NGS	8503.557	1700.71	2.84	.02

Note. N = 152. DIIUS = Daily Intensity of Instagram Use Scale (Fagundes et al., 2021). IG Dist = Instagram Distress. NAS = International Positive and Negative Affect Schedule Short Form—Negative Affect Scale (Thompson, 2007). SSES-6-T= Six-Item State Self-Esteem Scale (Webster et al., 2022). NVS = Narcissistic Vulnerability Scale (Edershile et al., 2019). NGS = Narcissistic Grandiosity Scale (Edershile et al., 2019).

(M = 32.63, SD = 18.81). However, as MLM models requires binary variables to be added as covariates, and the differences were found with small, unevenly sized groups ethnicity was not used as a covariate in the primary or exploratory hypotheses.

Primary Analyses

All primary analyses were conducted using SAS ® On Demand for Academics Version 9.4. Prior to hypothesis testing, the intraclass correlation (ICC) was calculated for Level-1 outcome variables. The ICC assessed the proportion of the total variability across Level-1 (within-person) that is attributable to Level-2 (between-person) differences in order to justify the use of MLM. 47.96% of the variance was determined to be within-person for daily distress from Instagram. 36.22% of the variance was determined to be within-person for daily negative affect. 32.02% of the variance was determined to be within-person for state vulnerable narcissism. 21.77% of the variance was determined to be within-person for state grandiose narcissism, and 16.62% of the variance was determined to be within-person for state self-esteem. While these ICCs suggest that a Multilevel Model is appropriate, it is important to note that most of the variance is between-person rather than within-person. As such, most fluctuations in scores were seen between participants. The daily surveys were relatively stable across days. All primary hypotheses were tested using MLM in which daily ratings were nested within individuals.

Hypothesis 1

Hypothesis 1a. Hypothesis 1a predicted that there would be a significant positive association between intensity of Instagram use and negative affect such that more intense Instagram use would be significantly associated with greater negative affect. At the

within-person level, daily intensity of Instagram use was not significantly associated with negative affect, $b = 0.15$ (0.12), $t(757) = 1.29$, $p = .20$. Thus, days on which participants reported more intense Instagram use were not associated with greater negative affect. At the between-person level, the mean daily intensity of Instagram use across the 6 daily surveys was significantly positively associated with the mean daily negative affect reported across the six daily surveys, $b = 1.19$ (0.30), $t(151) = 4.02$, $p < .001$. Thus, at the average level, more intense Instagram use was associated with greater overall negative affect. This hypothesis was supported at the average level but not at the daily level (see Table 8). As such, days on which participants reported more intense Instagram use, they did not necessarily feel more negative affect, but participants who generally reported more intense Instagram use in general also typically reported experiencing greater negative affect. Hypothesis 1a was partially supported.

Hypothesis 1b. Hypothesis 1b evaluated total trait narcissism as a moderator of the relationship between intensity of Instagram use and negative affect such that the relationship between intensity of Instagram use and negative affect will be stronger for individuals with higher total trait narcissism. As reported in hypothesis 1a above, a main effect for Instagram intensity on negative affect was observed at the average level but not at the daily level (see Table 9). Total trait narcissism did not significantly moderate the association between intensity of Instagram use and negative affect at the within-person level $b = -0.03$ (0.16), $t(756) = -0.17$, $p = .86$ or at the between-person level $b = 0.11$ (0.33), $t(149) = 0.33$, $p = .74$. Thus, feelings of negative affect associated with more Instagram use did not differ based on level of total narcissism. Hypothesis 1b was not supported.

Table 8

Multilevel Model Predicting the Effect of Intensity of Instagram Use on Daily Negative Affect (Hypothesis 1a)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	8.88	0.27	32.98	< .001
Instagram Intensity	1.19	0.30	4.02	< .001
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	0.15	0.12	1.29	.20

Note. N = 151. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). Negative Affect = International Positive and Negative Affect Schedule Short Form—Negative Affect Scale (Thompson, 2007).

Table 9

Multilevel Model Predicting the Moderating Effect of Trait Narcissism on Intensity of Instagram Use and Daily Negative Affect (Hypothesis 1b)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	8.88	0.26	34.00	<.001
Instagram Intensity	1.07	0.29	3.70	<.001
Total Trait Narcissism	1.19	0.33	3.60	<.001
Instagram Intensity*Total Trait Narcissism	0.11	0.33	0.33	.74
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	0.15	0.12	1.26	.21
Instagram Intensity*Total Trait Narcissism	-0.03	0.16	-0.17	.86

Note. $N = 149$. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). Negative Affect = International Positive and Negative Affect Schedule Short Form—Negative Affect Scale (Thompson, 2007). Total Trait Narcissism = Pathological Narcissism Inventory Total (Pincus et al., 2009).

Hypothesis 2

Hypothesis 2a. Hypothesis 2a predicted that there would be a significant negative association between intensity of Instagram use and state self-esteem such that more intense use of Instagram would be significantly associated with lower state self-esteem. At the within-person level, daily intensity of Instagram use was significantly negatively associated with state self-esteem, b = -0.28 (0.14), $t(751)$ = -1.98, p = .048. Thus, days on which participants reported using Instagram more intensely, they also reported experiencing lower momentary self-esteem. At the between-person level, average intensity of Instagram use was significantly negatively associated mean state self-esteem b = -0.98 (0.45), $t(149)$ = -2.19, p = .03. Thus, at the average level, greater intensity of Instagram use was associated with lower overall state self-esteem. Therefore, this hypothesis was supported at both the between-person level and the within-person level (see Table 10). As such, on days when participants reported more intense Instagram use, they tended to feel lower state self-esteem. Additionally, participants who generally used Instagram more intensely also generally reported experiencing lower self-esteem. Hypothesis 2a was supported.

Hypothesis 2b. Hypothesis 2b evaluated trait vulnerable narcissism as a moderator of the relationship between intensity of Instagram use and state self-esteem such that the relationship between intensity of Instagram use and state self-esteem will be stronger for individuals with higher trait vulnerable narcissism. As reported in hypothesis 2a above, a main effect for intensity of Instagram use on state self-esteem was observed at the daily level as well as at the mean level. Trait vulnerable narcissism did not significantly moderate the association between intensity of Instagram use and state

Table 10

Multilevel Model Predicting the Effect of Daily Intensity of Instagram Use on State Self-Esteem (Hypothesis 2a)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	10.07	4.05	2.48	.03
Instagram Intensity	-0.98	0.45	-2.19	.03
Age	0.52	0.20	2.57	.01
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	-0.28	0.14	-1.98	.048

Note. N = 149. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). State Self Esteem = Six-Item State Self-Esteem Scale Total (Webster et al., 2022).

self-esteem at the within-person level b = -0.21 (0.17), t(750) = -1.22, p = .22 or at the between-person level b = 0.21 (0.36), t(147) = 0.59, p = .56 (see Table 11). Thus, the relationship between intensity of Instagram use and state self-esteem did not change based on level of vulnerable narcissism. Hypothesis 2b was not supported.

Hypothesis 2c. Hypothesis 2c evaluated trait grandiose narcissism as a moderator of the relationship between intensity of Instagram use and state self-esteem such that the relationship between intensity of Instagram use and state self-esteem will be weaker for individuals with higher trait grandiose narcissism. As reported in hypothesis 2a above, a main effect for Instagram intensity on state self-esteem was observed at the daily level as well as at the average level. Trait grandiose narcissism significantly moderated the association between intensity of Instagram use and state self-esteem at the within-person level b = -0.42 (0.18), t(750) = -2.37, p = .02. As Figure 1 shows, participants with higher levels of grandiose narcissism reported experiencing lower state self-esteem on days of intense Instagram use than those with lower levels of grandiose narcissism. At the between-person level, trait grandiose narcissism did not significantly moderate the association between intensity of Instagram use and state self-esteem, b = -0.03 (0.51), t(147) = -0.05, p = .96 (see Table 12). Thus, in general, participants who used Instagram more intensely experienced lower self-esteem that did not differ by level of grandiose narcissism. Thus, Hypothesis 2c was partially supported.

Hypothesis 3

Hypothesis 3a. Hypothesis 3a predicted that there would be a significant positive association between intensity of Instagram use and distress from Instagram such that greater intensity of Instagram use would be significantly associated with greater distress

Table 11

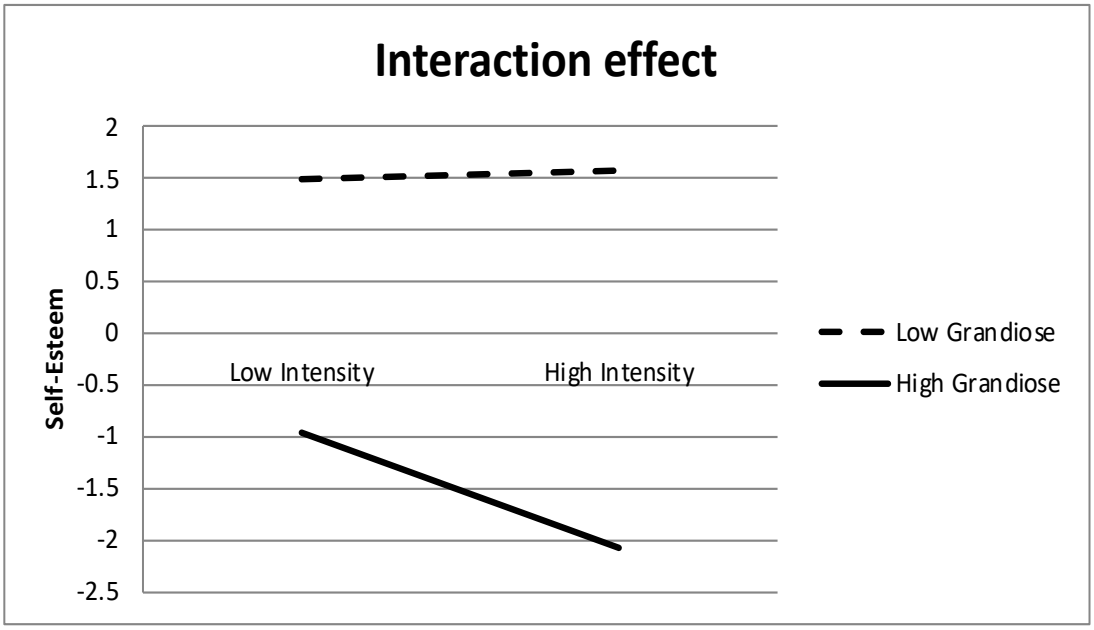
Multilevel Model Predicting the Moderating Effect of Trait Vulnerable Narcissism on Daily Intensity of Instagram Use and State Self-Esteem (Hypothesis 2b)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	14.88	3.32	4.48	<.001
Instagram Intensity	-0.66	0.36	-1.80	.07
Trait Vulnerable Narcissism	-3.26	0.37	-8.86	<.001
Instagram Intensity*Trait Vulnerable Narcissism	0.21	0.36	0.59	.55
Age	0.28	0.17	1.66	.10
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	-0.27	0.14	-1.92	.05
Instagram Intensity*Trait Vulnerable Narcissism	-0.21	0.17	-1.22	.22

Note. $N = 147$. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). State Self Esteem = Six-Item State Self-Esteem Scale Total (Webster et al., 2022). Trait Vulnerable Narcissism = Pathological Narcissism Inventory—Vulnerable Narcissism (Pincus et al., 2009).

Figure 1

Graphical Representation of the Level-2 Moderating Effect of Grandiose Narcissism on Daily Intensity of Instagram Use and State Self-Esteem (Hypothesis 2c)



Note. b = -0.42 (0.18), $t(750)$ = -2.37, $p < .05$. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). State Self Esteem = Six-Item State Self-Esteem Scale Total (Webster et al., 2022). Trait Grandiose Narcissism = Pathological Narcissism Inventory—Grandiose Narcissism (Pincus et al., 2009).

Table 12

Multilevel Model Predicting the Moderating Effect of Trait Grandiose Narcissism on Daily Intensity of Instagram Use and State Self-Esteem (Hypothesis 2c)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	12.60	3.95	3.19	.002
Instagram Intensity	-0.89	0.43	-2.08	.04
Grandiose Narcissism	-1.94	0.51	-3.82	<.001
Instagram Intensity*Trait Grandiose Narcissism	-0.03	0.52	-0.05	.96
Age	0.39	0.20	1.99	.049
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	-0.28	0.14	-2.05	.04
Instagram Intensity*Trait Grandiose Narcissism	-0.42	0.18	-2.37	.02

Note. N = 147. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). State Self Esteem = Six-Item State Self-Esteem Scale Total (Webster et al., 2022). Trait Grandiose Narcissism = Pathological Narcissism Inventory—Grandiose Narcissism (Pincus et al., 2009).

from Instagram. At the within-person level, daily Instagram Intensity was significantly positively associated with daily distress from Instagram, $b = 0.08$ (0.04), $t(756) = 2.04$, $p = .04$. Thus, days on which participants reported greater intensity of Instagram use were associated with greater distress from Instagram. At the between-person level, mean intensity of Instagram use was also significantly positively associated mean distress from Instagram $b = 0.29$ (0.08), $t(151) = 3.68$, $p = <.001$. Thus, at the average level, greater overall intensity of Instagram use was associated with greater overall distress from Instagram. This hypothesis was supported at both the mean level and the daily level (see Table 13). As such, on days when participants reported more intense Instagram use, they tended to experience greater distress from Instagram. Additionally, participants who generally reported more intense Instagram use also reported experiencing greater distress from Instagram in general. Hypothesis 3a was supported.

Hypothesis 3b. Hypothesis 3b evaluated trait vulnerable narcissism as a moderator of the relationship between intensity of Instagram use and distress from Instagram such that the relationship between intensity of Instagram use and distress from Instagram will be stronger for individuals with higher trait vulnerable narcissism. As reported in hypothesis 3a above, a main effect for intensity of Instagram use on distress from Instagram was observed at the daily level as well as at the average level. Trait vulnerable narcissism did not significantly moderate the association between intensity of Instagram use and distress from Instagram at the within-person level $b = -0.05$ (0.05), $t(755) = -1.09$, $p = .28$ or at the between-person level $b = -0.03$ (0.07), $t(149) = -0.33$, $p = .73$ (see Table 14). Thus, individuals with more trait vulnerable narcissism did not report increased feelings of distress from Instagram associated with more intense Instagram use

Table 13

Multilevel Model Predicting the Effect of Daily Intensity of Instagram Use on Daily Distress from Instagram (Hypothesis 3a)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	2.74	0.07	38.81	<.001
Instagram Intensity	0.29	0.08	3.68	<.001
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	0.08	0.04	2.04	.04

Note. $N = 151$. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021).

Table 14

Multilevel Model Predicting the Moderating Effect of Trait Vulnerable Narcissism on Daily Intensity of Instagram Use and Daily Distress from Instagram (Hypothesis 3b)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	1.86	0.27	6.94	<.001
Instagram Intensity	0.26	0.08	3.36	.001
Trait Vulnerable Narcissism	0.26	0.08	3.41	.001
Instagram Intensity*Trait Vulnerable Narcissism	-0.03	0.07	-0.33	.74
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Intensity	0.08	0.04	1.98	.048
Instagram Intensity*Trait Vulnerable Narcissism	-0.05	0.05	-1.09	.28

Note. $N = 149$. Instagram Intensity = Intensity of Instagram Use Scale (Fagundes et al., 2021). Trait Vulnerable Narcissism = Pathological Narcissism Inventory—Vulnerable Narcissism (Pincus et al., 2009).

compared to individuals with less trait vulnerable narcissism on a daily level or on an average level. Hypothesis 3b was not supported.

Hypothesis 4

Hypothesis 4a. Hypothesis 4a predicted that there would be a significant positive association between distress from Instagram and state vulnerable narcissism such that more distress related to Instagram would be significantly associated with greater state vulnerable narcissism. At the within-person level, daily distress from Instagram was significantly positively associated with daily state vulnerable narcissism, $b = 2.06$ (0.67), $t(737) = 3.07$, $p = .002$. Thus, days on which participants reported experiencing more distress from Instagram were associated with more state vulnerable narcissism. At the between-person level, average distress from Instagram was significantly positively associated state vulnerable narcissism $b = 6.00$ (1.81), $t(149) = 3.32$, $p = .001$. Thus, at the average level, more overall distress from Instagram was associated with greater overall state vulnerable narcissism. Therefore, this hypothesis was supported at the average level as well as at the daily level (see Table 15). As such, on days where participants reported experiencing more distress from Instagram, they tended to feel more state vulnerable narcissism. Additionally, participants who generally reported experiencing more distress from Instagram also reported experiencing greater state vulnerable narcissism in general. Hypothesis 4a was supported.

Hypothesis 4b. Hypothesis 4b evaluated trait vulnerable narcissism as a moderator of the relationship between distress from Instagram and state vulnerable narcissism such that the relationship between distress from Instagram and state vulnerable narcissism will be stronger for individuals with higher vulnerable trait

Table 15

Multilevel Model Predicting the Effect of Daily Distress from Instagram on State Vulnerable Narcissism (Hypothesis 4a)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	51.37	16.37	3.14	.001
Instagram Distress	6.08	1.81	3.35	.001
Age	-1.14	0.82	-1.39	.17
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Distress	2.14	0.62	3.46	<.001

Note. N = 149. State Vulnerable Narcissism = Narcissistic Vulnerability Scale (Edershile et al., 2019).

narcissism. As reported in hypothesis 4a above, a main effect for distress from Instagram on state vulnerable narcissism was observed at the average level as well as at the daily level. Trait vulnerable narcissism did not significantly moderate the association between distress from Instagram and state vulnerable narcissism at the within-person level b = -1.17 (0.68), $t(736) = -1.72$, $p = .09$ or at the between-person level b = -1.93 (1.85), $t(147) = -1.05$, $p = .30$ (see Table 16). Thus, the relationship between distress from Instagram and state vulnerable narcissism did not differ depending on levels of reported trait vulnerable narcissism. Therefore, hypothesis 4b was not supported.

Hypothesis 5

Hypothesis 5a. Hypothesis 5a predicted that there would be a significant negative association between distress from Instagram and state grandiose narcissism such that greater distress from Instagram would be significantly associated with lower state grandiose narcissism. At the within-person level, daily distress from Instagram was not significantly associated with daily state grandiose narcissism, $b = 0.07$ (0.60), $t(743) = 0.11$, $p = .91$. At the between-person level, average distress from Instagram was significantly negatively associated state grandiose narcissism b = -6.92 (2.16), $t(149) = -3.20$, $p = .002$. Thus, at the average level, distress from Instagram was associated with lower overall state grandiose narcissism. Therefore, this hypothesis was supported at the between-person level but not at the within-person level (see Table 17). As such, levels of state grandiose narcissism did not differ based on the intensity of Instagram use on that day. However, participants who tended to report more distress from Instagram posts also reported experiencing lower state grandiose narcissism in general. Hypothesis 5a was partially supported.

Table 16

Multilevel Model Predicting the Moderating Effect of Trait Vulnerable Narcissism on Daily Distress from Instagram and State Vulnerable Narcissism (Hypothesis 4b)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	11.33	17.52	0.65	.52
Instagram Distress	2.94	1.78	1.65	.10
Trait Vulnerable Narcissism	8.67	1.78	4.87	<.001
Instagram Distress*Trait Vulnerable Narcissism	-1.93	1.85	-1.05	.30
Age	-0.59	0.77	-0.76	.45
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Distress	2.11	0.66	3.21	.001
Instagram Distress*Trait Vulnerable Narcissism	-1.17	0.68	-1.72	.09

Note. $N = 147$. Trait Vulnerable Narcissism = Pathological Narcissism Inventory—Vulnerable Narcissism (Pincus et al., 2009). State Vulnerable Narcissism = Narcissistic Vulnerability Scale (Edershile et al., 2019).

Table 17

Multilevel Model Predicting the Effect of Daily Distress from Instagram on State Grandiose Narcissism (Hypothesis 5a)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	15.56	19.66	0.79	.43
Instagram Distress	-6.81	2.18	-3.13	.002
Age	1.12	0.99	1.24	.22
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Distress	0.11	0.59	0.19	.85

Note. N = 149. State Grandiose Narcissism = Narcissistic Grandiosity Scale (Edershile et al., 2019).

Hypothesis 5b. Hypothesis 5b evaluated trait grandiose narcissism as a moderator of the relationship between distress from Instagram and state grandiose narcissism such that the relationship between distress from Instagram and state grandiose narcissism will be weaker for individuals with higher grandiose trait narcissism. As reported in hypothesis 5a above, a main effect for distress from Instagram on state grandiose narcissism was observed at the average level but not at the daily level. Trait grandiose narcissism did not moderate the association between distress from Instagram and state grandiose narcissism at the within-person level b = -0.23 (0.80), $t(742)$ = -0.29, p = .77 or at the between-person level b = -1.69 (2.82), $t(147)$ = -0.60, p = .55 (see Table 18). Thus, the amount of state grandiose narcissism associated with distress from Instagram did not differ based on trait grandiose narcissism day-to-day or in general. Hypothesis 5b was not supported.

Summary of Results

The relationships between intensity of Instagram use, distress from Instagram, negative affect, state self-esteem, state vulnerable narcissism and state grandiose narcissism were evaluated in a sample of 153 ethnically diverse female-identifying individuals using a daily diary methodology. Analyses revealed positive associations between daily negative affect, state vulnerable narcissism, and daily Instagram distress. A positive association was also found between state self-esteem and state grandiose narcissism. Negative associations were found between state self-esteem and intensity of Instagram use, Instagram distress, daily negative affect, and state vulnerable narcissism.

Using Multilevel Modeling, a positive relationship was found between intensity of Instagram use and negative affect at the between-person level. As such, individuals

Table 18

Multilevel Model Predicting the Moderating Effect of Trait Grandiose Narcissism on Daily Distress from Instagram and State Grandiose Narcissism (Hypothesis 5b)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	32.07	23.67	1.35	.18
Instagram Distress	-6.55	2.25	-2.92	.004
Trait Grandiose Narcissism	-2.62	2.65	-0.99	.32
Instagram Distress*Trait Grandiose Narcissism	-1.69	2.82	-0.60	.55
Age	0.90	1.00	0.90	.37
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Instagram Distress	0.07	0.62	0.12	.91
Instagram Distress*Grandiose Narcissism	-0.23	0.80	-0.29	.77

Note. N = 147. Trait Grandiose Narcissism = Pathological Narcissism Inventory—Grandiose Narcissism (Pincus et al., 2009). State Grandiose Narcissism = Narcissistic Grandiosity Scale (Edershile et al., 2019).

who reported more intense Instagram use in general also tended to experience more negative affect overall. However, this relationship did not differ depending on level of trait narcissism reported.

Intensity of Instagram use was negatively associated with state self-esteem at the within-person and between-person levels. Days on which participants used Instagram more intensely, they also felt lower self-esteem. Participants who typically used Instagram more intensely tended to have lower self-esteem in general. While this relationship did not differ based participant trait vulnerable narcissism, it did differ based on participant grandiose narcissism. Trait grandiose narcissism significantly moderated the association between intensity of Instagram use and state self-esteem such that participants high in grandiose narcissism reported lower self-esteem on days which they used Instagram more intensely then those low in grandiose narcissism.

There were also significant positive daily-level and mean-level associations between intensity of Instagram use and distress from Instagram, such that days on which participants reported using Instagram more intensely, they also reported experiencing more distress from the post. Further, individuals who tended to use Instagram more intensely reported being more distressed by Instagram posts in general.

A significant positive relationship between distress from Instagram and state vulnerable narcissism was also found at the within-person and between-person level. The more distressing that a post was, the more state vulnerable narcissism was experienced. In general, participants who were more distressed by posts on Instagram also tended to report higher levels of state vulnerable narcissism.

Finally, a significant negative relationship between distress from Instagram and state grandiose narcissism was found at the average level. As such, individuals who were generally more distressed by posts from Instagram also tended to report lower levels of state grandiose narcissism.

Exploratory Research Questions

Exploratory Question 1

Exploratory question 1 assessed the relationship between the content of posts on Instagram and negative affect, self-esteem, distress, state vulnerable narcissism, and state grandiose narcissism. Participants indicated the type of distressing content present in the photograph: Idealized body size, unrealistic beauty standards, financial success, personal accomplishments, extravagant lifestyle, romantic success, social success, the attention that the post received, feeling excluded from the people in the photograph, and "other."

A Principal Component Analysis (PCA) with varimax rotation was conducted to identify the component structure of the content variables. A qualitative review of "other" responses was conducted using the description provided by participants. As no clear pattern emerged from the "other" responses, they were excluded from analysis in an effort to reduce the number of components. Four factors had eigenvalues over Kaiser's criterion of 1 and together explained 57.85% of the variance: 1) appearance, 2) achievement, 3) social success, and 4) external validation. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .56, which is above the acceptable limit of .5 (Field, 2013). Four factors were retained in accordance with the convergence of the scree plot and acceptable KMO. All four factors were found to be independent of one another.

A multiple regression analysis was conducted to determine whether picture content was significantly associated with daily negative affect, state self-esteem, distress from Instagram, state vulnerable narcissism, and state grandiose narcissism. Results indicated picture content was significantly associated with state self-esteem, $F(4, 908) = 10.63$, $p < .001$. Further analyses found appearance content ($t = -5.09$, $p < .001$) and achievement content ($t = -3.66$, $p < .001$) to be significantly associated with state self-esteem. State vulnerable narcissism was also found to be associated with picture content, $F(4, 908) = 3.94$, $p = .004$. Only achievement content ($t = 3.43$, $p < .001$) was significantly associated with state vulnerable narcissism. Finally, picture content was significantly associated with state grandiose narcissism $F(4, 908) = 7.02$, $p < .001$. Both appearance content ($t = -3.58$, $p < .001$) and achievement content ($t = -3.25$, $p < .001$) were found to be significant predictors of state grandiose narcissism. Significant predictors in the regression models were further tested in SAS to account for the hierarchical structure of the data. Variables that comprised factors of significant models were analyzed separately to allow for more precise analysis of data.

Content and Self-Esteem. Body, beauty, financial success, extravagant lifestyle, and personal accomplishment content were analyzed to determine their relationship to state self-esteem. Only body and beauty content were found to be significantly associated with state self-esteem. Body content was found to be significantly negatively associated with state self-esteem at the within-person level $b = -0.68$ (0.25), $t(751) = -2.76$, $p = .01$ and at the between-person level $b = -4.80$ (1.51), $t(149) = -3.18$, $p = .002$ (see Table 19). Beauty content was also found to be significantly negatively associated with state self-esteem at the within-person level $b = -0.45$ (0.22), $t(751) = -1.99$, $p = .047$ and at the

Table 19

Multilevel Model Predicting the Effect of Body Content on State Self-Esteem (Exploratory Question 1)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	13.06	4.12	3.17	.002
Body Content	-4.80	1.51	-3.18	.002
Age	0.37	0.21	1.80	.07
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Body Content	-0.68	0.25	-2.76	.01

Note. N = 149. State Self-Esteem = Six-Item State Self-Esteem Scale Total (Webster et al., 2022).

between-person level b = -3.86 (1.56), $t(149)$ = -2.47, p = .01 (see Table 20). As such, beauty related content in Instagram posts were associated with lower levels of state self-esteem at both the daily level and at the average level.

Content and State Vulnerable Narcissism. Financial success, extravagant lifestyle, and personal accomplishment content were analyzed to determine their relationship to state vulnerable narcissism. Posts with content displaying personal accomplishments were found to be significantly positively related to state vulnerable narcissism at the average level, b = 22.74 (10.35), $t(149)$ = 2.20, p = .03 (see Table 21).

Content and State Grandiose Narcissism. Body, beauty, financial success, extravagant lifestyle, and personal accomplishment content were analyzed to determine their relationship to state grandiose narcissism. Only body and beauty content were found to have a significant relationship to state grandiose narcissism. On the average level, state grandiose narcissism was found to be negatively associated with body content, b = -18.12 (7.55), $t(149)$ = -2.40, p = .02 (see Table 22) and beauty content b = -15.98 (7.77), $t(149)$ = -2.05, p = .04 (see Table 23).

Exploratory Question 1 Summary. Exploratory question 1 examined the relationship between the distressing Instagram content and state self-esteem, state vulnerable narcissism, and state grandiose narcissism. Individual posts containing beauty and body content on Instagram were associated with lower self-esteem, and participants who reported seeing more unrealistic beauty and body content in general also reported having lower self-esteem. Additionally, individual posts displaying one's personal accomplishments were associated with higher levels of state vulnerable narcissism at the daily level. Finally, participants who more frequently identified being distressed by posts

Table 20

Multilevel Model Predicting the Effect of Beauty Content on State Self-Esteem (Exploratory Question 1)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	11.52	4.08	2.83	.01
Beauty Content	-3.86	1.56	-2.47	.01
Age	0.45	0.21	2.20	.03
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Beauty Content	-0.45	0.22	-1.99	.047

Note. N = 149. State Self-Esteem = Six-Item State Self-Esteem Scale Total (Webster et al., 2022).

Table 21

Multilevel Model Predicting the Effect of Personal Accomplishment Content on State Vulnerable Narcissism (Exploratory Question 1)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	50.01	16.68	3.00	.003
Personal Accomplishment Content	22.74	10.36	2.20	.03
Age	-1.07	0.84	-1.27	.20
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Personal Accomplishment Content	2.33	2.95	0.79	.43

Note. N = 149. State Vulnerable Narcissism = Narcissistic Vulnerability Scale (Edershile et al., 2019).

Table 22

Multilevel Model Predicting the Effect of Body Content on State Grandiose Narcissism (Exploratory Question 1)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	27.66	20.66	1.34	.18
Body Content	-18.12	7.55	-2.40	.02
Age	0.63	1.04	0.61	.55
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Body Content	-1.78	1.29	-1.38	.17

Note. N = 149. State Grandiose Narcissism = Narcissistic Grandiosity Scale (Edershile et al., 2019).

Table 23

Multilevel Model Predicting the Effect of Beauty Content on State Grandiose Narcissism (Exploratory Question 1)

Fixed Effects				
Between-Person (sample-centered)	*b*	*SE*	*t*	*p*
Intercept	21.70	20.32	1.07	.29
Beauty Content	-15.98	7.77	-2.05	.04
Age	0.93	1.02	0.91	.36
Within-Person (person-centered)	*b*	*SE*	*t*	*p*
Beauty Content	0.35	1.24	.28	.78

Note. N = 149. State Grandiose Narcissism = Narcissistic Grandiosity Scale (Edershile et al., 2019).

containing beauty and body content also generally reported experiencing lower levels of state grandiose narcissism. As such, the type of content posted on Instagram affects the subjective experience of the person viewing the posts.

Exploratory Question 2.

Exploratory question 2 examined the association between the relationship to the user who posted the distressing image and outcome measures. Participants indicated the type of relationship between themselves and the person who posted the picture identified as distressing. The eight categories were close friend, friend, acquaintance, stranger, family, celebrity, influencer, and other. Relationship types were combined in order to make three, evenly sized groups for the ANOVA analysis: 1.) Family, friend, and close friend 2.) celebrity and influencer 3.) and acquaintance and stranger. The "other" category descriptions provided by participants were examined, and any descriptions that could reasonably be categorized using one of the provided descriptions were manually sorted into the appropriate category. The remaining responses (n = 46) tended to be anonymous, news, or brand accounts. Given the heterogeneity and relatively low frequency of these responses and in an effort to create equal group sizes, "other" responses were excluded from further analysis. Results from the ANOVA analysis show relationship type was associated with significant differences in daily negative affect $F(4, 861) = 3.17$, $p = .01$, such that negative affect was significantly higher for posts from acquaintances and strangers. Instagram distress $F(4, 861) = 9.85$, $p < .001$ was also found to be significantly different between groups such that pictures from acquaintances and strangers were associated with more distress from Instagram. Finally, state vulnerable narcissism, $F(4, 861) = 8.13$, $p < .001$ was found to be significantly between groups such

that photographs from influencers and celebrities were associated with less state vulnerable narcissism.

Significant ANOVA models were further analyzed in SAS to account for the hierarchical structure of the data including daily negative affect, distress from Instagram, and state vulnerable narcissism. As SAS does not allow for categorical variables to be used in MLM, three binary variables were created based on the Tukey Post Hoc ANOVA testing: 1.) Acquaintance and stranger; 2.) friends and family; and 3.) influencer and celebrity.

Relationship types were analyzed to determine their relationship to daily negative affect, Instagram distress, and state vulnerable narcissism. Significant differences were found between distress from Instagram and relationship type. Distress from Instagram was found to be negatively associated with influencers and celebrities at the within-person level, b = -0.16 (0.07), $t(756)$ = -2.27, p = .02 and the between-person level, b = -0.56 (0.22), $t(153)$ = -2.51. p = .01. At the between-person level distress from Instagram was negatively associated with posts from friends and family, b = -0.89 (0.36), $t(151)$ = -2.49. p = .01. Distress from Instagram was positively associated with posts from acquaintances and strangers at the between-person level, b = 0.60 (0.24), $t(153)$ = 2.47. p = .01. Additionally state vulnerable narcissism was significantly negatively associated with posts from influencers and celebrities at the between-person level, b = -10.54 (0.84), $t(149)$ = -1.99, p = .049. Thus, posts by influencers, celebrities, friends, and family tended to elicit less distress than posts by acquaintances and strangers generally did. Individual pictures posted by influencers and celebrities also elicited less distress than other relationships. Moreover, when participants viewed pictures posted by celebrities

and influencers, they also generally reported feeling lower levels of state vulnerable narcissism.

Exploratory Question 3

Exploratory question 3b assessed the nature of the relationship between dispositional envy, intensity of Instagram use and negative affect. As reported in hypothesis 1a above, a main effect for intensity of Instagram use on negative affect was observed at the average level but not at the daily level. Dispositional envy did not moderate the association between intensity of Instagram use and negative affect at the within-person level $b = 0.01$ (0.02), $t(756) = 0.82$, $p = .41$ or at the between-person level $b = 0.04$ (0.03), $t(149) = 1.16$, $p = .24$. Thus, negative affect associated with intensity of Instagram use did not differ based on level of dispositional envy at the daily level or at the average level.

Exploratory Question 4

Exploratory question 4a. Exploratory question 4a assessed the nature of the relationship between intensity of Instagram use and state self-esteem when broken into subcomponents of appearance-based, performance-based, and social state self-esteem. First, a bivariate correlation analysis using Pearson's *r* was conducted to test the correlation between the mean of the daily intensity of Instagram use items and the mean of the daily appearance state self-esteem responses, $r(912) = -.15$, $p < .001$, the mean of the daily performance state self-esteem responses $r(912) = -.17$, $p < .001$, and the mean of the daily social state self-esteem responses, $r(912) = -.11$, $p < .001$. Significant negative correlations were found between the mean of the daily intensity of Instagram use and the mean of daily state self-esteem when broken into subcomponents of appearance-based,

performance-based, and social self-esteem. As such, individuals reporting more intense Instagram use also reported experiencing lower levels of appearance, performance, and social state self-esteem.

Exploratory question 4b. Exploratory question 4b evaluated the attractiveness social comparison subscale as a moderator of the relationship between Instagram intensity and appearance state self-esteem. Daily Instagram intensity was negatively associated with appearance state self-esteem at the within-person level, b = -0.11 (0.06), $t(750)$ = -1.98, p = .048 and the between-person level b = -0.31 (0.14), $t(147)$ = -2.24, p = .03. Attractiveness social comparison did not moderate the association between intensity of Instagram use and appearance state self-esteem at the within-person level b = 0.01 (0.01), $t(750)$ = 0.94, p = .35 or at the between-person level b = 0.00 (0.02), $t(147)$ = 0.11, p = .92. Thus, level of appearance state self-esteem associated with intensity of Instagram use did not differ due to attractiveness social comparison.

Exploratory question 4c. Exploratory question 4c evaluated the group rank social comparison subscale as a moderator of the relationship between intensity of Instagram use and performance state self-esteem. Daily intensity of Instagram use was negatively associated with performance state self-esteem at the between-person level b = -0.34 (0.06), $t(147)$ = -1.22, p = .02. Daily intensity of Instagram use was not associated with performance self-esteem at the within-person level b = -0.07 (0.06), $t(750)$ = -1.22, p = .22. Group rank social comparison did not moderate the association between Instagram intensity and performance state self-esteem at the within-person level b = 0.01 (0.01), $t(750)$ = -1.22, p = .10 or at the between-person level b = -0.01 (0.02), $t(147)$ = -0.54, p =

.59. Thus, level of social state self-esteem associated with intensity of Instagram use did not differ due to group rank social comparison.,

Exploratory question 4d. Exploratory question 4d evaluated the group fit social comparison subscale as a moderator of the relationship between intensity of Instagram use and social state self-esteem. Daily intensity of Instagram use was not associated with social state self-esteem at the within-person level b = -0.09 (0.06), $t(750)$ = -1.46, p = .14 or at the between-person level b = -0.24 (0.18), $t(750)$ = -1.29, p = .20. Group fit social comparison did not moderate the association between Instagram intensity and social state self-esteem at the within-person level b = 0.01 (0.01), $t(750)$ = -1.37, p = .17 or at the between-person level b = 0.02 (0.04), $t(147)$ = -0.72, p = .48. Thus, level of social state self-esteem associated with intensity of Instagram use did not differ due to group fit social comparison.

Exploratory Questions Summary

Exploratory questions 1 through 4 explored additional factors that may influence the relationship between intensity of Instagram use and outcome variables including picture content, relationship to the poster, dispositional envy, and self-esteem subscales.

Exploratory question 1 examined the relationship between type of content participants identified as distressing on Instagram and state self-esteem, state vulnerable narcissism, and state grandiose narcissism. Body and beauty content were both found to be significantly negatively associated with state self-esteem at the between-person and within-person levels. Beauty and body content were also significantly negatively associated with state grandiose narcissism at the average-level. Posts with content

displaying personal accomplishments were found to be significantly positively related to state vulnerable narcissism at the average level.

Exploratory question 2 examined the effect of the individual's relationship to the person who posted the picture on Instagram on outcome variables. Significant differences were found between relationship type and distress from Instagram. Distress from Instagram was found to be significantly negatively associated with posts from influencers and celebrities at the within-person and between-person level. Distress from Instagram was significantly negatively associated with posts by friends and family at the between-person level. Distress from Instagram was also significantly positively associated with posts from acquaintances and strangers. Posts from influencers and celebrities were also significantly, negatively associated with state vulnerable narcissism at the between-person level.

Exploratory hypothesis 3 assessed the nature of the relationship between dispositional envy, intensity of Instagram use and negative affect. While a main effect for Instagram Intensity on negative affect was found at the average level, dispositional envy did not moderate this relationship at the within-person or between-person level.

Exploratory hypothesis 4 assessed the nature of the relationship between intensity of Instagram use and state self-esteem when broken into subcomponents of appearance-based, performance-based, and social state self-esteem. Intensity of Instagram use was negatively associated with appearance state self-esteem at both the within- and between-person level. Attractiveness social comparison did not moderate this relationship at the within- or between-subject level. Intensity of Instagram use was negatively associated with performance state self-esteem only at the between-person. This relationship was not

moderated by performance self-esteem at the within- or between-person level. Intensity of Instagram use was not associated with social state self-esteem at either the within-person or between-person level. This relationship was not moderated by group fit social comparison at the within- or between-person level.

Chapter VI

Discussion

The purpose of this study was to expand the current research on emotional responses to using Instagram and examine personality traits influencing that relationship. Further, it explored whether patterns of content within the image and relationship to the person who posted the photograph affect such emotional responses.

Since its inception in 2010, Instagram has grown to be one of the most widely used social media platforms. The photo-sharing application is particularly popular amongst adolescents and young adults who widely report checking the app at least daily (Auxier & Anderson, 2021). As a result, research interest examining the effects of Instagram use has also grown. While touted as a platform for connection and expression, peer-reviewed research has generally demonstrated negative outcomes of Instagram use, though results are mixed at times (Adeyanju et al, 2021; Appel et al., 2020; Faelens et al, 2021). The mixed results reflect the varied methodologies and operationalization of Instagram use between studies. Generally, the previous literature has relied on cross-sectional data that focuses on user behavior and profile attributes. A smaller portion of studies implemented experimental conditions by exposing participants to experimenter-altered Instagram images sourced from public accounts. Most of this research has demonstrated a positive relationship between more time spent on Instagram and higher rates of depression, generalized anxiety, social comparison, social anxiety, loneliness, and body dissatisfaction (Adeyanju et al., 2021; Yurdagul et al., 2019).

The current study aimed to expand upon the existing research by focusing on the effects of browsing Instagram and exposure to images on Instagram that elicit distress.

Given the highly individualized nature of each user's timeline, the study implemented a naturalistic design with an in-vivo procedure. Participants identified a distressing post seen during normal Instagram use. As each user's timeline also changes moment-to-moment, the study used a daily diary methodology to account for daily variability while assessing patterns over time. The data were then analyzed using Multilevel Modeling to address the differences both between and within each user's experience.

The present study examined the effects of intense Instagram use on negative affect, self-esteem, distress from Instagram posts, state vulnerable narcissism, and state grandiose narcissism. After completing the in-vivo analysis of a post, participants completed the above state measures. These measures linked emotional responses more directly to Instagram use both momentarily and across time. Moreover, it examined in the relationship between narcissism and Instagram use at both trait and state levels. The study was particularly interested in the role of narcissism on Instagram use given the culture on Instagram to present oneself in an overly positive light. This relationship has been supported in previous studies (Moon et al., 2016; Paramboukis et al., 2016). Additional constructs established in the literature as related to Instagram use were also examined, including social comparison and dispositional envy (Faelens et al., 2021; Noon & Meier, 2019). Finally, the present study explored the type of content presented and the relationship to the user who posted the image to better understand characteristics of posts that contribute to emotional response.

Summary of Key Findings

The results of the study were as expected and generally supported the hypotheses. All data were analyzed at both the average level and daily level. The average level results

provide between-subject information on how participants typically responded to surveys during the study. The average-level results indicate that the more intensely a person uses Instagram, the more negative affect they tend to feel. Similarly, more intensity of Instagram use in general was linked to lower state self-esteem. This sample also demonstrated that intensity of Instagram use was positively associated with distress from Instagram. Thus, participants who reported typically using Instagram more intensely were more distressed by images on Instagram than those who reported using Instagram less intensely. In turn, participants who rated images as more distressing also reported experiencing higher narcissistic vulnerable responses overall. Conversely, participants that tended to be more distressed by images on Instagram reported lower narcissistic vulnerable responses.

The within-subject results provide information on the day-to-day fluctuations within each user. As expected, intensity of Instagram use was positively associated with self-esteem within-subject, suggesting that on days which participants used Instagram more intensely, they experienced lower self-esteem. Results also suggest that on days which participants reported using Instagram more intensely, they also reported experiencing more distress from Instagram posts. In turn, specific images rated as more distressing were associated with higher vulnerable narcissistic response. Unexpectedly, daily intensity of Instagram use was not associated with daily negative affect, and distress from Instagram was not significantly associated with state grandiose narcissism within-subjects.

Of note, trait grandiose narcissism moderated the relationship between intensity of Instagram use and self-esteem at the daily level. Participants with higher levels of

grandiose narcissism reported experiencing lower state self-esteem on days of intense Instagram use than those with lower levels of grandiose narcissism. These results demonstrate that highly grandiose individuals' self-esteem were particularly affected by the intensity of their Instagram use on a given day.

The study also provided insight into the effects of post characteristics on emotional response. Results indicate that the type of content in the Instagram post as well as the relationship to the person who posted it affected one's emotional responses. Specifically, appearance-related content that displayed an idealized body type or an unrealistic beauty standard was found to be significantly associated with lower self-esteem at all levels. As such, individuals reported lower self-esteem on days that they viewed Instagram posts containing idealized bodies and unrealistic beauty standards. At the average level, individuals who reported more idealized bodies and unrealistic beauty standards also tended to report lower state self-esteem and lower grandiose narcissistic responses. Also at the average level, posts that displayed a user's personal accomplishments were associated with higher levels of state vulnerable narcissism. Finally, results indicate that individual posts displaying a user's financial success were associated with more state vulnerable narcissism.

Moreover, one's relationship to the person who posted the picture predicted level of distress and narcissistic vulnerable response. Images posted by strangers or acquaintances were associated with more distress at the daily level. At the average level, images posted by acquaintances and strangers also typically elicited higher levels of distress. In general, images posted by influencers, celebrities, friends, and family were

less distressing to participants. Finally, images posted by celebrities and influencers tended to predict lower levels of a narcissistic vulnerable response in general.

Explanation of Findings

Negative Affect

As expected, intensity of Instagram use was positively associated with negative affect at the average-level. Individuals who used Instagram more intensely across the 6 days of the study also tended to report higher negative affect in general. This is consistent with previous cross-sectional research that demonstrated the relationship between social media use and negative mood (Faelens et al., 2021). However, intensity of Instagram use was not significantly associated with negative affect at the daily level. There is a dearth of research on the within-subject association between Instagram use and negative affect. However, the results of the current study are consistent with an Experience Sampling Method study that also failed to find a significant relationship between time spent on Instagram and negative affect when measured contemporaneously (Faelens et al., 2020).

Negative affect has been conceptualized as the result of a discrepancy between one's idealized self and current perception of the self, often in response to some external stimuli (Carver & Scheier, 1990). Moreover, the degree to which negative affect is felt is related to the duration of the exposure and degree to which one ruminates upon it (Ingram, 1990). Increased Instagram use been linked to increased repetitive negative thoughts and ruminative thinking associated with negative affect (Faelens et al., 2020; Teo & Collinson, 2018). Applied to the current study, individuals who use Instagram more intensely expose themselves to idealized images of others that may cause

ruminative dissonance between their idealized self and current self. The duration and frequency of those exposures likely compound over time amplifying its effects on mood.

Relatedly, research has demonstrated that while single exposures to media have relatively small effects, repeated exposures to similar content have the power to change people's self-perceptions, attitudes, and mood over time (Koch et al., 2017; Zajonc, 1968). As such, individual posts on Instagram are unlikely to have significant effects on a user's mood. However, if that same user is regularly exposed to similar content, the effects will be amplified. It is possible that the effects of viewing Instagram posts accumulates over time, which would explain the discrepancy in significance between the average-level and daily-level negative affect findings. The results of the current study demonstrate a pattern over time such that individuals who generally use Instagram more intensely tend to report higher negative affect. However, daily increases in intense Instagram use may not be sufficient to cause noticeable changes in negative affect.

Self-Esteem

Self-esteem can be thought of as the evaluation toward oneself that includes both cognitive and affective components (Leary & Baumeister, 2000). Intensity of Instagram use was significantly negatively associated to self-esteem at all levels. As such, individuals who report using Instagram more intensely also typically report lower state self-esteem. Further, on days that individuals use Instagram more intensely, they report experiencing lower state self-esteem.

Previous research has demonstrated that state responses generally fluctuate around their corresponding traits, and mean-level analyses of state measures correlate highly to trait-based variables. (Crowe et al., 2018; Edershile et al., 2019; Fleeson et al.,

2001; Giacomin & Jordan, 2016; Watson & Clark, 1984). As such, cross-sectional research provides the closest comparison to average-level analysis of state self-esteem. The present study found a negative association between intensity of Instagram use and self-esteem in general. As such, individuals who typically use Instagram more intensely also tend to have lower state self-esteem.

The existing literature on the relationship between Instagram use and self-esteem is mixed (Faelens et al., 2021). However, much of the existing literature relies on cross-sectional data to examine the effects of Instagram (Keles et al., 2019). Cross-sectional studies of Instagram use and self-esteem have largely used self-esteem as both mediating and moderating variables on mental health outcomes such as anxiety or depression (Mackson et al., 2019). Additional research has shown found non-significant relationships between self-esteem and Instagram use (Paramboukis et al., 2016; Stapleton et al., 2017).

Importantly, these cross-sectional studies generally measure self-esteem as a stable trait largely unaffected by external events whereas the present study measured state self-esteem. While the average-level data provides evidence for a pattern of self-esteem, it is still derived from a momentary measurement of self-esteem, which may explain differences between the present study and past research. It also suggests that these dips in self-esteem are associated with intensity of Instagram use are relatively transient.

While many previous studies have examined the relationship between Instagram and self-esteem, far fewer studies have examined this relationship at a momentary level. However, Faelens (2020) found that time spent on Instagram predicted decreased self-esteem. Other studies have demonstrated that short exposures to mock Instagram posts

showcasing physically fit individuals decreased self-esteem in individuals (Tiggeman & Zicardo, 2015). The present study is consistent with previous literature. In the current sample, on days that individuals used Instagram more intensely, they also reported lower state self-esteem.

Low self-esteem has been conceptualized as a disparity between an idealized self and perceived self after exposure to idealized others. The impact of such appraisal is dependent on the importance of a particular domain to one's identity (Crocker et al., 2003). As such, it is unsurprising that Instagram use is associated with decreases in self-esteem. On Instagram, individuals control the type and quantity of content presented to them through who they follow. People are likely to follow users that post personally resonant and interesting content. Due to the culture and social norms of Instagram, these posts are also likely to be highly polished images and reflect generously upon the user who posted them. For this reason, the more intensely individuals use Instagram, the more likely they are to be exposed to idealized images that are relevant and important to them. It follows that such exposure might widen the gap between one's desired self-worth to and their currently perceived state, leading to lower self-esteem.

Distress From Instagram

Intensity of Instagram use was positively associated with distress from Instagram at all levels. As such, images are more upsetting on days that individuals use Instagram more intensely. Further, individuals who use Instagram more intensely also tend to also be more distressed by posts in general. This hypothesis particularly relied on the in vivo aspect of the study in which participants identified an image that was upsetting to them during naturalistic use of Instagram. This measure was important to facilitate exploration

of the specific aspects of the picture such as the type of content in the photograph and the relationship type to the user who posted it that contribute to negative outcomes.

To this writer's knowledge, the current study is the first to measure the degree of distress from individual Instagram posts, preventing direct comparison to other studies. While the present study implemented a novel methodology, it aligns with previous cross-sectional research that found Instagram use to be related to psychological distress (Mahmood et al., 2020). More generally, it aligns with previous research demonstrating negative outcomes of Instagram use as well as the other results of the present study (Choi & Kim, 2021; Garcia et al., 2022; Paramboukis et al., 2016). It can similarly be understood using social comparison theory and accumulation, as explained above (Vogel et al., 2014; Koch et al., 2017). As such, it was expected that the more intensely individuals used Instagram, the more content they would be exposed to. The frequency and duration of exposure has been demonstrated to amplify its effects on mood, attitude, and self-perception. Exposure is particularly important to this hypothesis, as the participants were required to engage with the distressing image for longer than during ordinary scrolling, which may only last a few moments. Indeed, the procedure was modified to include a text box with an option to describe the aspect of the image that was distressing to them to further increase exposure. As the exposure to the distressing image was longer than ordinary use, it was expected that participants would rate images as upsetting both in the moment and over time.

Narcissism

Kohut (1966) conceptualized narcissism as a failure to integrate the self, leaving narcissists without a sense of a cohesive identity and exposing them to vacillations in

self-regard between grandiosity and vulnerability. They rely on others entirely for validation and regulation of their self-esteem and are particularly prone to threats to their self-esteem. More recent research has categorized narcissism into its vulnerable and grandiose subtypes, reflecting the two extremes in self-esteem (Pincus & Lukowitsky, 2010). In order to regulate their self-esteem, those high on narcissistic personality traits maintain a sense of superiority through constant comparisons with others they perceive as inferior. When they are confronted with a superior other it leads to narcissistic injury and intense negative emotions of rage and shame. As such, research has demonstrated that narcissism predicts frequency of social comparison. However, these comparisons are intentionally downward in direction to continue feeling better off than others (Krizan & Johar, 2012). Given the prevalence of social comparison on social media, the relationship between narcissism and Instagram is an emerging area of research interest. Prior studies have observed narcissism to be related to more time spent on Instagram (Dumas et al., 2017; Moon et al., 2016). Indeed, correlations between baseline measures of intensity of Instagram use were positively significantly related to total, vulnerable, and grandiose trait narcissism.

Recent research has demonstrated transient fluctuations of narcissism within individuals that establish it as independently important to measure from trait narcissism. Much of this research has focused on the fluctuations in narcissism around interpersonal interactions (Crowe et al., 2018; Edershile et al., 2019). It was expected that individuals high in narcissism would be particularly distressed by images on Instagram given the culture of idealized presentation that lend themselves to upward social comparisons. As narcissists are particularly sensitive to self-esteem threats, it was hypothesized that this

distress would be associated with grandiose and vulnerable narcissistic responses. Cross-level correlations indicate that total, vulnerable, and grandiose narcissism were positively associated with mean distress from Instagram.

Results of the study indicate that distress from Instagram was significantly positively associated with state vulnerable narcissism at all levels. While not specific to Instagram, previous research on state vulnerable has observed that vulnerable responses are elicited when one is feeling threatened (Edershile & Wright, 2019). Applied to the current study, distressing images on Instagram may be threatening to participants and lead to increases in vulnerable narcissism.

Distress from Instagram was negatively associated with state grandiose narcissism at the average level only. Individuals high in trait grandiose narcissism completely repress any negative self-evaluations and discredit any external evidence that may jeopardize their bolstered self-image (Pincus & Lukowitsky, 2010). However, the results of the current study are inconsistent with this theory. Conversely, distressing images tend to lower feelings of self-esteem and grandiosity. Again, the average level results suggest the presence of an accumulation of exposure to social comparisons in which individuals find themselves inferior.

It is interesting to compare previous research that has demonstrated narcissistic fluctuations in response to interpersonal situations with that of the present study. While Instagram involves representations of others, it does not directly require interactions with them. However, the present research suggests that Instagram is interpersonal without requiring active engagement with others. Merely the representation of others is enough to evoke such responses. Alternatively, it could suggest that narcissistic responses are not

limited to interpersonal interactions, though more research is needed to clarify this relationship.

Personality Interactions

The relationship between self-esteem and narcissism has long been theorized and established through research. Indeed, narcissism can be conceptualized at "repetitive, violent oscillations of self-esteem" (Reich, 1960). As such, it was expected that grandiose narcissism would moderate the relationship between intensity of Instagram use and self-esteem. Interestingly, these results were found only at the daily level. On days that participants used Instagram more intensely, they reported lower state self-esteem. Individuals high in grandiose narcissism experienced lower self-esteem associated with days of intense Instagram use than individuals low in grandiose narcissism. Plainly, individuals high in grandiose narcissism's self-esteem was particularly affected by the intensity of their Instagram use on a given day.

While grandiose narcissism has historically been associated with high self-esteem, cross-level correlations revealed that participants high in grandiose narcissism reported lower state self-esteem after viewing a distressing image on Instagram on average. The protocol of this study required participants to engage with a distressing image on Instagram and immediately report their levels of self-esteem. Again, individuals high in grandiose narcissism typically reject or deny threats to their self-esteem (Pincus & Lukowitsky, 2010). For this reason, the results of the study are particularly interesting. If participants high in grandiose narcissism were protecting against threats to their self-esteem, the results of the study would demonstrate that they have higher self-esteem associated with Instagram use. Importantly, participants filled out the state self-esteem

scale after exposing themselves in depth to a single distressing image on Instagram. It is possible that the in vivo procedure did not allow participants sufficient time to regulate their emotions before completing the measures. This may be the reason individuals high in grandiose narcissism experience significantly lower self-esteem on days that they use Instagram intensely. Given the theory of individuals high in grandiose narcissism having unstable self-esteem, it is congruent that this relationship would be similarly variable and not observed at the average level.

Image Content

Much of the psychological research on Instagram has been dedicated understanding the emotional and cognitive processes within users associated with mental health outcomes. With the exception of body image content, few studies have analyzed post-specific characteristics that may influence such outcomes. However, it has been consistently demonstrated that exposure to idealized bodies on Instagram is associated with body dissatisfaction, lower self-esteem, decreased mood, and envy (Brown & Tiggeman, 2016; Kleemans et al.,2018; Lowe-Calverly & Grieve, 2021; Paramboukis et al., 2016; Tiggeman & Zaccardo, 2015). The present study aimed to expand upon the existing literature by having participants identify the type of content present in a distressing image found during naturalistic Instagram use.

Consistent with the body dissatisfaction literature, the present study found that idealized beauty and body content were negatively associated with state self-esteem at all levels. Participants who reported being distressed more frequently by beauty and body content on Instagram typically reported lower self-esteem. Specific posts that included beauty and body content were associated with lower state self-esteem. Correlational

analyses suggest that the distressing image identified by participants was typical to that which is usually present on their feed. As such, images with idealized beauty and body standards are both commonly displayed on Instagram and negatively impact self-esteem. Moreover, participants who viewed more beauty and body content tended to report lower state grandiose narcissism. These results are consistent with the significantly positive Level-1 correlation between self-esteem and grandiose narcissistic response. Importantly, a large percentage of images on Instagram are edited in some way with estimates ranging from 71-90% of users altering an image in some way before posting it (Agrawal & Agrawal, 2021). The present study demonstrates the powerful impact of an individual appearance-related image on self-esteem, and the overall impact on self-esteem and state grandiose narcissism.

Beyond appearance-related content, increased exposure to pictures displaying a user's personal accomplishments tended to increase feelings of state vulnerable narcissism. As average-level state measures correspond to dispositional characteristics, it is interesting that the finding should be significant for vulnerable narcissism given individuals high in grandiose narcissism tend to be more threatened by achievement based-threats while vulnerable narcissism is associated with interpersonal threats (Besser & Priel, 2008). As such, seeing the accomplishments of others may threaten the ego of users and cause a narcissistic vulnerable response.

Relationship To User

The second exploratory question analyzed the relationship of participants to the user that posted the image identified as distressing. Wheeler and Miyake (1992) found that upward social comparisons of assets such as ability, attractiveness, and social skills

are more likely to happen with strangers and acquaintances than friends and close friends. Instagram-specific research on the relationship to the user has focused on celebrities/influencers and strangers. In one such self-report study, Lup et al. (2015) found a positive relationship between the time spent on Instagram and higher depression scores through social comparison when moderated by strangers followed. This suggests that the content of strangers amplifies feelings of depression. Consistent with this research, the present study found that images posted by strangers and acquaintances were associated with more distress at both the average and daily level. Conversely, images posted by influencers, celebrities, friends, and family were associated with lower levels of distress on average. Interestingly, pictures posted by influencers and celebrities were also found to be less distressing and cause less of a vulnerable narcissistic response in general. Wheeler and Miyake (1992) posited that people are less likely to identify with acquaintances and strangers, thus eliciting more intense upward social comparisons associated with negative responses. Applied to the current study, users may be less affected by positive images posted by celebrities, influencers, close friends, and family because they are identifying themselves as similar to the target.

Parasocial interaction theory may explain the relationship between users and celebrities and influencers. A parasocial relationship is a one-sided relationship in which audiences develop a perceived connection with a media figure which acts similarly to traditional social relationships. This concept has been observed within celebrities and influencers on social media. For this reason, they may feel more similar to friends and family than strangers and acquaintances. Users may feel an affiliation with them causing increased positive feelings at their success (Sokolova & Kefi, 2020).

These results demonstrate that the effects of intense Instagram use depend not only on the person viewing Instagram but also on the content of the post and the relationship to the person who posted the image.

Limitations

The current study had several limitations. The sample was comprised of female-identifying university students between the ages of 18 to 25, which limits the generalizability of the results. Previous studies found significant differences between males and females' Instagram use and their vulnerability to frequently displayed content posted on Instagram, with young females more likely to be sensitive to idealized content. In particular, young women are sensitive to appearance-relate content, and images on Instagram frequently display unrealistic beauty. Previous research has demonstrated that young people are especially sensitive to what they see on Instagram. For this reason, the sample only included young, female-identifying adults between the ages of 18 and 25 (Yurdagul et al., 2019). Indeed, even within this limited age range, age was significantly associated with self-esteem, state vulnerable narcissism, and state grandiose narcissism. As people age, they tend to have higher levels of state self-esteem and state grandiose narcissism and lower levels of state vulnerable narcissism. As such, the relationships found in this study may be stronger than they are for all adults. Conversely, they may be weaker than the relationships that would be found for younger adolescents. Thus, the age and gender of this sample limit the generalizability of the results found.

While the procedure of this study was intended to reflect a naturalistic use of Instagram, it differed from normal Instagram use in several important ways. First, although participants were instructed to identify an image that they came across during

their normal Instagram use that was distressing, there is no way to know whether participants adhered to these directions. Completing the daily measures while using Instagram was quite important to capture the cumulative effects of using Instagram rather than exposure to a single image. This was reflected in the results. All main effects of the hypotheses were significant at the average level, whereas only self-esteem, distress, and state vulnerable narcissism were significant at the daily level.

While the naturalistic procedure was meant to reflect the personalized feed that each user sees when using Instagram, it also complicates the comparison of images to one another. This limits the degree to which we can attribute results to any single factor. Further, many images identified by participants contained "other" content that was too variable to categorize together. These pictures may not have evoked social comparisons, which was crucial to the measurements in this study. It is possible that some images induced negative emotional responses that were not interpersonally dependent.

The daily diary procedure itself presented several limitations. First, the number of questions that were able to be reasonably asked each day are limited. As such, Instagram use was measured by a single question from a larger questionnaire and may not reflect the most valid definition of intensity of Instagram use. Further, most studies that measure Instagram use measure it in terms of time spent on Instagram. While this was an intentional choice for the study, as time has been found to be an insufficient measure of phone use, it also prevents this study from being directly compared to similar studies on the effects of using Instagram.

Further, the study required participants to identify an image that they found to be distressing. For this reason, the study only looked at the negative effects of using

Instagram, thereby ignoring the positive aspects of using it. As such, the negative outcomes observed may be higher than that of normal Instagram use. Presumably, each user ultimately determines the benefit of using Instagram to outweigh the costs, or they would not use their Instagram accounts daily. As such, this study does not account for positive effects of using Instagram and paints an incomplete, inherently negative picture of Instagram use.

Directions for Future Research

Instagram remains a subject for further investigation given its sustained popularity and the public interest in its negative effects on teen health. Building upon the design of this study, future research should utilize an Ecological Momentary Assessment methodology in which the survey reminders are linked to Instagram use. While not economically feasible for this project, certain EMA platforms can connect survey prompts to app use allowing a person to complete a survey each time they use the app. This research would allow the compounded effects of Instagram to be explored in vivo rather than relying on retrospection or using time as catch all for Instagram use.

Further, research studies have generally looked at the internal processes one engages in when using Instagram. The results from this study imply that the features and photographs on the app itself have more universal effects despite differences in individual personality traits. As such, research should turn its attention to understanding what aspect of Instagram contributes to these outcomes. Research into this subject has the potential to influence positive change on the application.

Additionally, future researchers should focus on younger teens and include males. Within this study, age was related to state self-esteem, state vulnerable narcissism, and

state grandiose narcissism. While they were excluded from this sample, previous research has demonstrated a negative impact on males as well. Future studies should examine the differences and commonalities between all genders, as certain genders may be particularly vulnerable to Instagram or interact with it in different ways than the current sample.

Conclusion

The findings of this study provide additional support for the existing literature and nuance into the understanding of the negative effects of Instagram use. First, it sought to establish the relationship of Instagram use to emotional responses. Then, it examined internal factors such as personality traits hypothesized to influence that relationship, particularly narcissism. Finally, the study explored and analyzed factors from Instagram posts that contribute to negative outcomes.

Results of the study indicate that Instagram use has a negative effect on users. The study implemented a daily diary methodology that allowed results to be analyzed at both daily level and an average level across 6 days. The daily level results indicate that days on which individuals use Instagram more intensely, they experience lower state self-esteem and find individual images to be more distressing. On days that they find an image to be more distressing, they also reported experiencing more of a vulnerable narcissistic response. The within-subject results suggest that there are significant fluctuations in self-esteem, vulnerable narcissistic response, and distress from Instagram day-to-day.

The average-level analysis allowed the data to be compared between-participants. Results indicated that individuals who used Instagram more intensely typically reported

higher negative affect, lower state self-esteem, and were more distressed by images on Instagram. Individuals who were more distressed by images on Instagram tended to report higher narcissistic vulnerable responses and lower narcissistic grandiose responses. The average results suggest patterns of negative outcomes associated with intense Instagram use and supports the theory that that the effects of Instagram use accumulate over time.

Trait levels of total (vulnerable and grandiose) narcissism were found to be related to more intense Instagram use and more distress from Instagram. Grandiose narcissism was found to moderate the relationship between Instagram use and self-esteem at the daily level. As such, individuals high in grandiose narcissism experience significantly lower self-esteem associated with intensity of Instagram use than those low in grandiose narcissism. These results suggest that exposure to the idealized presentations of others on Instagram is particularly threatening to individuals high in grandiose narcissism and leads to lower self-esteem.

This study also explored the content that users are frequently exposed to and the effects of such exposure. The presence of content containing unrealistic beauty standards and idealized body size were associated with lower self-esteem both daily and over time. Over time, it was also associated with lower grandiose narcissistic response. Posts displaying one's personal accomplishments were associated with higher vulnerable narcissistic response in general. On days which individuals saw the financial success of others in posts, they experienced higher vulnerable narcissistic responses. As such, the type of content that people are exposed to has effects on self-esteem and state vulnerable responses.

It does not just matter what people are seeing but also who they are seeing. Posts from acquaintances and strangers were more distressing than posts from celebrities, influencers, friends, and family in general. Similarly, posts from influencers and celebrities tended were associated with a less intense vulnerable narcissistic response. Thus, the relationship to the user who posted the picture changes the impact of the picture on self-esteem and vulnerable narcissistic response. Taken together, what people are being exposed to and by whom affects how they feel after using Instagram.

Despite the widely known research highlighting the negative effects of using Instagram, which are particularly pronounced for young people, it continues to be one of the most popular social media apps available. This relationship is surely multidetermined with individual characteristics of users interplaying with content that they are uniquely exposed to. In better understanding the processes that contribute to this relationship, it becomes possible to protect users from some of its harmful effects through policy change and psychoeducation. Clinical work and research should continue to examine the impact of Instagram to better protect its' users' mental health.

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Appendix A

Daily Instagram Procedure

Table A1

Novel Daily Diary Items

Item	*Construct*
Who posted the picture?	Relationship Type
Close Friend	
Friend	
Acquaintance	
Stranger	
Celebrity	
Influencer	
Not Listed Here (Please Specify)	
What part of the post bothered you? ONLY indicate whether the following caused a negative emotional reaction, not whether it was present in the post	Content
Unrealistic Beaty Standards	
Idealized Body Size	
Financial Success of Poster	
Personal Accomplishment of Poster	
Romantic/Love Life of Poster	
A Group of Friends	
Being Excluded from a Situation	
Extravagant Lifestyle	
The attention the post received	
Other	
To what extent did this Instagram post bother you?	Distress from Instagram
How typical is this post of what you see on Instagram?	Instagram Typicality

Figure A1

Daily Instagram Procedure Example