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When Looking Up Leads to Feeling Down: Situational Moderators of the Effects of Social Comparisons on Social Media

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When Looking Up Leads to Feeling Down: Situational Moderators of the Effects of Upward Social Comparison on Social Media

A Thesis Presented

by

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Abstract

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Social media use is ubiquitous, especially among young adults. Negative consequences of social media use has been associated with engaging in upward social comparisons with others on social media. The current paper presents a series of two studies that seek to understand the nuances of social comparisons as they occur while browsing social media. In Study 1 ($N = 161$) we tested whether upward social comparisons would be less harmful when the comparer focuses on the similarities, rather than differences, with the comparison target. We observed a marginal interaction indicating that when thinking about similarities with the target, upward comparisons were slightly less detrimental to self-evaluations, than when thinking about differences. Study 2 ($N = 320$) tested other potential moderators of upward social comparisons suggested by traditional theories of social comparison to see if they would apply to a social media context. We predicted when a participant rates the comparison target to be more similar (vs. different) and distant (vs. close) and the domain to be more attainable (vs. less attainable), upward social comparisons will be less harmful to self-evaluations. Neither similarity nor closeness were significant moderators. Multilevel models showed a significant interaction between upward comparisons and attainability on self-evaluations ($p < .001$). Simple slopes indicated viewing the domain as attainable amplified the

harmful effects of upward social comparisons on self-evaluations compared to viewing the domain as less attainable. These results are contrary to our predictions and suggest that traditional theories of social comparisons may not apply to a social media context. We also investigated how the target of the social comparison would impact the experience of the social comparison and its impact on self-evaluations. Results from Study 2 showed that participants who made comparisons with distant others (celebrities/strangers) were more likely to have higher upward social comparison scores, lower levels of similarity and closeness and view the domain as less attainable. These results display when we could expect harmful consequences following making a social comparison with a celebrity or stranger while viewing Instagram, posts. Study limitations and advantages are discussed along with future research to be explored.

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CHAPTER 1

INTRODUCTION

Use of social media sites is extremely common and has increased in popularity globally over time. Worldwide, we spend an average of two hours and twenty-four minutes on social media everyday (Kemp, 2021). In 2018, approximately 70% of U.S. adults used at least one social media platform, a 65% increase from 2005 and a 20% increase from 2011 (Pew Research Center, 2021). There is variability in social media use by age and platform type. Indeed, whereas Facebook is most commonly used among older adults, young adults spend most of their time on TikTok, Instagram and Snapchat (Auxier & Anderson, 2021). In addition, young adults spend more time online than adults aged 30 and over (Henderson, 2020). Among all U.S. adults, 21% report visiting Insagram about once a day; this number is much less than the 73% of young adult users who report visiting the site daily and more than half (53%) visiting multiple times a day (Auxier & Anderson, 2021). Given the extent to which young adults use social media to communicate with peers and gather information, an important question is whether use of social media has negative effects on psychological health. Such implications have not been fully explored and therefore warrants empirical scientific research to help guide how we can coexist with social media in a way that promotes more positive outcomes instead of negative.

Past research has generally observed negative effects of social media use on psychological functioning and mental health, with a common theme emerging around the role that social comparison likely plays in these harmful effects (Clark et al., 2017; Huang, 2017; Saiphoo et al., 2020). A review on social media and well-being suggests

that social comparison processes explain the negative relationship between use of social media and well-being (Verduyn et al., 2017). Recently researchers have been focusing on how the positivity bias in content on social media facilitates social comparisons (Gomez et al., 2021) and have largely taken the position that social comparisons are damaging and should be avoided at all costs. However, the literature is nuanced, as there are studies that report contradicting evidence. For instance, Meier and Schäfer (2018) found that social comparisons can provoke positive emotional reactions online, such as benign envy, which is defined as an emotion that "elicits a more benevolent motivation to self-improve and become more similar to the superior comparison target" (p. 412, Meier & Schäfer, 2018). Additionally, social comparisons on Facebook were positively correlated with improved affect (Cramer et al., 2016). These positive effects undermine the narrative that all social comparisons are harmful. Perhaps inconsistencies in the literature about the effects of social comparison can be attributed to other variables that moderate these relationships. The proposed research will seek to identify whether the moderators from traditional perspectives of social comparison theory hold true when applied to social media.

1.1 Social Comparison Theory

A long theoretical tradition in social psychology sheds light on the conditions under which social comparison has positive versus negative effects on well-being. The idea that social comparisons are inherently harmful is rooted in the classic social comparison theory proposed by Festinger (1954). This theory states that humans are motivated to evaluate themselves and use others to gain insight on how they measure up to this standard. Humans have a natural tendency to gravitate to compare with those who

are better than them, referred to as upward comparison, which is driven by motivations to self-improve. Upward comparisons result in declines in self-evaluation by the comparer whose positioned themselves below the upward target and thus concludes they are worse-off than their higher-status counterparts.

Downward social comparison theory (Wills, 1991) was later explored as a framework concerning how preferences for comparison targets shifted under certain contexts. The main principle of this theory was that a person can enhance or restore their well-being by comparing with a less fortunate other in order to make them feel better following a significant threat to their ego. Likewise, lateral comparisons can also occur in which individuals compare with a target who is at the same level as the self. However, lateral comparisons, as opposed to upward or downward, tend to be less informative since learning you have outperformed someone who is similar in ability is less surprising than learning you outperformed someone who is superior (Alicke, 2000). Therefore, implications for self-evaluation are driven more strongly by upward and downward comparisons, rather than lateral, which may produce minimal changes in self-evaluations (Arigo et al., 2020). To summarize, downward social comparisons are more likely to elicit positive affect and improve self-esteem, while upward comparisons create negative affect and reduced feelings of satisfaction with life (Alicke, 2000; Festinger, 1954; Gomez et al., 2021)

Another perspective concerning the direction of a social comparison was suggested by Locke (2003), who advocated that the vertical direction of comparisons (downward/ lateral/ upward) is only part of the picture. We could further expect diverging outcomes when taking into consideration how similar or different one feels

relative to the comparison target, independent of whether the comparison is upward or downward. It is suggested that when individuals view themselves as similar to the comparison target, also referred to as a connective comparison, they are more likely to view the comparison as helpful and experience positive affect. On the other hand, when a target is perceived not to share the target trait in common with the self, then more negative outcomes would be expected (Locke, 2003). In summary, when only considering the perceived similarity of social comparison, thus removing the idea that the other is either better- or worse-off, we would expect more positive outcomes to be associated with connective comparisons with similar others and negative outcomes with those perceived to be less similar to oneself.

There is evidence that the direction of comparisons occur in similar rates (Locke, 2003). A study that assessed comparisons as they occurred over a week "Every direction occurred with some frequency: 24% of comparisons were upward, 25.8% were downward, 32.3% were contrastive and 17.0% were connective" (page 627, Locke, 2003). Furthermore, among romantic partners, 41% made an upward comparison, 27% lateral and 32% downward (Pinkus et al., 2008). These frequencies and types of comparisons that occur overtime suggest that individuals do not consciously make comparisons to feel better but rather they happen automatically (Gilbert et al., 1995; Locke, 2003). The rate at which the different types of comparisons occur have given researchers a greater interest and reason to investigate how individuals' comparison patterns fluctuate over time (Arigo et al., 2020).

1.2 Social Comparisons on Social Media

Initial research on the nature of social comparison on social media has utilized these classical views, examining the extent to which upward, downward and lateral comparisons occur on social media. Across four studies, Midgley et al. (2021) found that comparisons made on social media were overwhelmingly in the upward direction (M = 1.04, SD = 1.54) and that upward comparisons were more frequent (M = 5.32, SD = 3.85) than downward (M = 1.20, SD = 1.55) or lateral (M = 1.90, SD = 2.46) comparisons. Additionally, they found that participants were more likely to make upward social comparisons when using social media, relative to other contexts (i.e., email, face-to-face), resulting in individuals feeling worse about themselves. Midgley et al. (2021) also observed that comparisons were made with targets who were rated as low in closeness and in domains that were low in personal relevance, which is opposite to what traditional theory would suggest. Nonetheless, these comparisons had a stronger negative impact on participants' self-evaluations following the comparison. Furthermore, there is reason to believe that being exposed to a stranger's post on social media has different effects than exposure to posts from people considered to be close friends (de Vries et al., 2018; Haferkamp & Krämer, 2011). These results provide some evidence that social comparisons in an online environment may differ from what previously was observed in real world offline contexts.

Although Midgley et al.'s (2021) findings point to upward comparisons as a reason to expect negative effects of social media use, an open question is whether other aspects of the comparison might mitigate any negative impacts of upward comparison on self-evaluation. Social comparison theory has evolved over the past 50 years and has

provided evidence that not all upward social comparisons are harmful (see Figure 1). Variables suggested to influence how upward social comparisons influence outcomes include personality-related factors and situational-based variables. For the purpose of the planned research, we chose to concentrate on the situationally based variables within a social media context. Specifically, upward social comparisons are hypothesized to be less harmful when targets are perceived to be more similar, are a close other (versus stranger), in a domain viewed as attainable. These situationally based variables mentioned here will be the focus for the series of proposed studies that aim to understand the complexities of how social comparisons impact changes in self-evaluations and overall self-esteem and affect.

1.3 Situational Moderators of Upward Comparisons

Similarity. How similar or different one perceives themselves in relevance to their comparison target is thought to be one avenue in which the outcomes of upward comparison may diverge (Locke, 2003; see Figure 1, paths A and B). It is suggested that when individuals view themselves as similar to the upward comparison target, they are more likely to view the comparison as helpful and experience positive affect. Thus, if an individual feels that they are like their upward target, they are thought to benefit from the comparison and draw inspiration (Collins, 1996; Lockwood & Kunda, 1997; Taylor & Lobel, 1989). However, when upward targets are viewed as very different from the individual, they are even more scathing to one's self-evaluations (Locke, 2003; Mussweiler et al., 2004). The role of similarity has been understudied in social media research, as it has been assessed only in a few studies and has not been consistently operationalized in a single way (Arigo et al., 2020).

Closeness. There is evidence to suggest that different outcomes in self-evaluations result when social comparisons are made with upward targets who are perceived to be psychologically close versus distant (Tesser et al., 1988). Although, comparisons that are with close others tend to be more common within face-to-face settings and are associated with positive connective comparisons (Locke, 2003) negative outcomes are predicted when the comparison involves an upward comparison with a close target (Tesser, 1991). This may be driven by the idea that when comparisons are made with a psychologically close other, they have a stronger impact on affective responses versus if the target was a stranger (Tesser et al., 1988). Therefore, when the close other outperforms the one making the comparison resulting in greater declines in self-evaluations due to the close other posing a greater threat to one's self-worth. There are theories that focus on the defensive mechanisms that ensue when a close other outperforms oneself such as the self-evaluation maintenance model (Tesser et al., 1988). This model suggests that the relevance of the domain involved in the comparison plays a role in why upward comparisons with close others are so damaging. There is conflicting evidence when viewing closeness of comparison targets in a social media context. Midgley et al. (2021) reported that upward social comparisons occur more often with those rated as less close who also report feeling worse about themselves. These results suggest that social comparisons processes may play by different rules when applied to a different context such as social media.

Relevance. One of the most critical features involved in eliciting a social comparison deals with the level of relevance of the domain to one's self-identity or worth. If the domain is not personally relevant or important to one's self-identity, there is

less of a chance that a social comparison will even occur (Lockwood & Kunda, 1997). When the domain is highly relevant, and the target is psychologically close, negative outcomes are more likely (See Figure 1, Path C). A caveat to this and would be expected to result in a different outcome is when the domain is not relevant, but the target is considered to be a close other (See Figure 1, Path D). In this scenario we would expect that a close other's superior performance would induce reflective processes where the individual can bask in the reflected glory of another's accomplishments. However, this is not something that is thought to occur when the other is a stranger or distant other and therefore are unable to reap the benefits associated when an accomplishment is achieved by a stranger. In summary, it is expected that upward comparisons made in highly relevant domains with a close other, will result in more negative views of oneself.

Attainability. When trying to predict which outcome would occur following a social comparison, an important factor to consider is the attainability of the domain in question and how it is viewed by the individual who is comparing themselves with others (see Figure 1, Paths G and H). There is research to support that when a domain is viewed as attainable, the upward comparison could serve as a source of inspiration (Lockwood & Kunda, 1997). This may be because these upward targets can serve as a role model for individuals who are striving for similar accomplishments and model their efforts to reach similar achievements. Similar to the processes that link attainability to positive outcomes, perceiving one has control over their ability to achieve similar accomplishments can also positively influence self-views (Mussweiler et al., 2004). This has been referred to as the process of upward assimilation and proposes that when individuals feel that it is within their control to achieve that level of success now or in the future these pre-existing beliefs

and perceptions can have a positive influence on the outcomes of the comparison on the comparer.

1.4 Overview of the Research Aims

Social comparison research has been useful in the past to understand how interpersonal comparisons influence changes in self views for better or worse. With the rise in social media use and other technology-assisted communications, theories of social comparison are relevant, but their complexity has not been incorporated into social media research. From Midgely et al.'s (2021) studies, we can clearly see that upward social comparisons are common and dominate the types of comparisons that occur while viewing social media. Furthermore, social comparisons that occurred within a social media context involved domains that were moderately relevant and were with targets rated low in closeness. These findings already highlight the ways in which mean levels of the types of social comparisons that occur on social media differ drastically from prior work in real world, face to face contexts. Additional research is therefore needed on whether the variables hypothesized to influence face-to-face social comparisons similarly moderate the effects of upward comparison in the context of social media.

The goal of the proposed research is to understand the circumstances in which social comparisons on social media are likely to produce harmful vs. beneficial outcomes. We also extend existing theories of social comparison processes to a novel context, to examine whether previously documented associations replicate in the context of social media. There is some indication that social comparison processes, including frequency of comparison and with whom individuals compare, differ online, but there is also the chance to answer questions related to situational factors that may drive how comparisons

on social media influence mental health outcomes. Study 1 describes the findings from a pilot study conducted with college students in the Spring of 2021.

CHAPTER 2

STUDY 1

This study tested the implications of social comparisons that occurred among young adults while viewing Instagram posts during a single browsing session. The focus on Instagram was based on its popularity with the study's college-aged sample. In addition, Instagram is theoretically and practically unique, given that Midgley et al. (2021) observed more upward comparisons on Instagram than Facebook and recent company documents highlight especially detrimental effects of Instagram on young women's mental health (Wells et al., 2021). While the number of young adults who use Facebook and Instagram are roughly the same in the year 2021 (70% vs. 71%), reports from 2016 suggest that Instagram has been growing in popularity in the past 5 years (59% in 2016 to 71% in 2021) while the adoption of Facebook has slowly declined (88% in 2016 to 71% in 2021) (Auxier & Anderson, 2021; Greenwood et al., 2016).

The goal of Study 1 was to test traditional theories of social comparison by applying them to a social media context. Our hypotheses focused on upward comparisons given Midgley's (2021) finding that such comparisons dominate on social media. More specifically, we tested whether viewing the target as similar versus different to oneself moderated the effect of upward comparison on self-evaluations. We predicted that upward comparisons in which the comparison target was seen as similar (see Figure 1, Path A) would result in more positive self-evaluations, state self-esteem and positive affect, than upward comparisons in which the comparison target was seen as different (Figure 1, Path B). Furthermore, we sought to replicate Midgley et al.'s (2021) finding that the social comparisons on social media were primarily upward in nature, occurred

within domains that were moderately important and were with targets rated low in closeness. We also explored whether comparisons were predominantly focused on differences versus similarities.

2.1 Methods

Participants

Participants were 161 undergraduate psychology students who completed an online survey in exchange for course credit in their psychology course. Most participants were female (80.1%) and White (64.0%) and were either in their first (24.3%) or second year of school (38.5%). Participants were considered eligible if they were aged 18 or older and had at least one Instagram account that they could access throughout the study.

Procedures

Participants completed the study entirely online with the assistance of an undergraduate research assistant on Zoom. After participants consented, they were instructed to complete a pre-study survey that included items assessing Instagram use, importance of domains and basic demographic characteristics. Afterwards, participants completed a brief social comparison training in order to correctly identify instances in which social comparisons occur. Participants read a series of scenarios where they first were asked to identify who is the person making the social comparison and were given feedback on their answer followed by asking them to indicate the direction of the comparison. After training, participants were instructed to complete a series of social comparison records for the first 20 Instagram posts on their newsfeeds. They reported whether they had made a comparison after viewing each post and if they did, they reported the target, domain, upward comparison dimension, perceived similarity and their

current self-evaluation. After the browsing session was complete, participants completed the final questionnaire that included a series of items measuring state affect, self-esteem, and psychological functioning and were debriefed on the studies aims.

Measures

Instagram Use

Participants indicated whether they had an Instagram account, if they had more than one account and the average amount of time they spent on Instagram over the past week. Time spent on Instagram was collected by asking participants to navigate to their Instagram app and report their time in hours and minutes as it was recorded in the mobile application.

Demographics

Participants reported their age, sex, year in school, and race/ethnicity.

Domain importance ratings

Participants rated how important the following topics or domains were to their self-worth using a 5-point scale (1 = *not important at all*, 5 = *extremely important*). Domains were adapted from Study 1 of Midgley et al. (2021). Domains included looks/attractiveness; health/physical fitness/mental health; vacation/activities/lifestyle; social/friendships/ popularity; personality/morality; skills/abilities; academics/career; wealth/finances/ possessions; dating/romantic relationships; family; attitudes/feelings/opinions and number of social media likes/comments.

Social Comparison Records

Items were asked for each of the first 20 posts on participants' Instagram feeds. Participants were prompted to complete a record only if they made a social comparison,

implied by scoring 2 or higher on the following question: *When you were reading this post, to what extent did you compare yourself to another person (either the person who posted it, or someone else)?* (1=*not at all,* 7=*completely*). This method has been used in the past when studying social comparisons as they occur naturally during everyday life (Locke, 2003; Wheeler & Miyake, 1992).

Comparison Target. Participants reported with whom the comparison was made, response options were close friend, acquaintance, stranger, imaginary person/fictional character, oneself, family member/relative, famous person/public figure/athlete/influencer, or other (specify). These categories are a compilation of what has been used by other researchers that use the social comparison record method for data collection (Locke, 2003; Midgley et al., 2021; Wheeler & Miyake, 1992).

Comparison Domain. The domain in which the comparison was made was also assessed, and come from a list based on options previously used in earlier studies (Wheeler & Miyake, 1992). Participants chose from the following domain options: looks/attractiveness, health/physical fitness/mental health, vacation/activities/lifestyle social/friendships/ popularity; personality/morality; skills/abilities; academics/career; wealth/finances/ possessions; dating/romantic relationships; family; attitudes / feelings /opinions; number of likes/ comments; multiple (please specify) and other (specify).

Upward Comparisons. To test the vertical dimension of the comparison, indicating if the comparison was considered a downward, lateral or upward social comparison, participants answered the following question, "*When you compared yourself, to what extent did you notice the other person doing better or worse than you*?" Response options being -3 to -1 = (*very much worse off*; downward comparison) and 1 to 3 (*very*

much better off; upward comparison) with 0 serving as a benchmark for a lateral comparison (Locke, 2003; Midgley et al., 2020).

Perceived Similarity. To test how participants perceived how similar they were to the comparison target the following item was asked "When you compared yourself, to what extent did you feel similar to or different from them with respect to this domain?" Participants answered using a scale that ranged from -3 (*very much different*) to 3 (*very much similar*) (Locke, 2003).

Self-evaluation. Participants responded to the item, "Overall, did this comparison make you feel better or worse?"(Midgley et al., 2021). Response options ranged from -3 (*much worse about myself than usual*) to 3 (*very much better about myself than usual*). Higher scores indicate a more positive self-evaluation following the social comparison.

End of Study Outcomes

After browsing the first 20 posts on Instagram feeds, participants completed measures assessing state self-esteem and positive affect and trait measures of depressive symptoms and life-satisfaction.

State Self-esteem. Participants completed a state self-esteem measure (Heatherton & Polivy, 1991) which assessed how accurate a series of 20 items (e.g., "I feel confident about my abilities") were for them "right now" using a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). Cronbach $\alpha = .94$.

State Positive Affect. Participants answered 10-items about positive affect taken from the larger 43-item PANAS-X scale (Watson & Clark, 1999). Items assessed to what extent they felt general positive affect, including inspired, interested, and determined

"right now" at that present moment using a 5-point scale (1=*very slightly or not at all*, 5= *extremely*). Cronbach α =. 89.

Depressive Symptoms. Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). Items (e.g., "I felt that everything I did was an effort") were rated 0 (*none of the time*) to 3 (*most or all of the time*). Relevant items were reverse scored, and items were summed. Cronbach α =.91.

Life-Satisfaction. We assessed subjective well-being by having participants answer the five-item Satisfaction with Life Scale (Diener et al., 1985) indicating their agreement with each statement using a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*, Cronbach α = .86). Items included "If I could live my life over, I would change almost nothing".

2.2 Data Analysis

All analyses were conducted in SPSS. Descriptives were examined to determine whether mean levels of domain importance, upward comparisons, and self-evaluations were similar to what had been reported by Midgley et al. (2021). We tested our prediction that upward comparisons would interact with perceived similarity in two ways. First, we estimated a multilevel model to capture the maximum of 20 social comparison records completed after viewing each post (level 1), nested within each individual (level 2). We utilized the ratings taken after each social comparison record and estimated whether the upward comparisons and perceived similarity scores interacted when predicting self-evaluations. Scores were centered within person to capture the level 1 associations (post-level) among variables (Enders & Tofighi, 2007). Once scores were mean centered within person, we created interaction terms to test whether perceived similarity and upward

comparison scores would interact when predicting self-evaluations at the individual post level. Significant interactions were probed at 1 standard deviation above and below the mean of similarity.

Level 1 Model

The data included multiple level 1 observations (a social comparison record for each post) that were nested within level 2 observations (participants). We were mostly interested in comparison experiences that vary within study participants while comparing themselves with Instagram posts. We analyzed the data using multilevel random coefficient modeling. The continuous variables (i.e., upward comparisons, similarity) were standardized relative to their within-subjects means and standard deviations to provide each variable with a meaningful zero needed to interpret results.

The level 1 model assessed variability in self-evaluations at the post level within each individual with the following equation:

$$\text{SelfEval}_{ij} = \beta_{0j} + \beta_{1j}*(\text{wUp}_{ij}) + \beta_{2j}*(\text{wSim}_{ij}) + \beta_{3j}*(\text{wUp}_{ij}*\text{wSim}_{ij}) + r_{ij}$$

The subscript $_i$ represents the repeated measures, or the social comparison record for an individual Instagram post. The subscript $_j$ indicates the observation of each individual as nested within the person.

Level 2 Model

Level 2 model assessed the variability of self-evaluations between study participants.

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$\beta_{3j} = \gamma_{30}$

Mixed Model

The mixed model for this analysis was as follows:

$$SelfEval_{ij} = \gamma_{00} + \gamma_{10} * wUp_j + \gamma_{20} * wSim_j + \gamma_{30} * wUp_j * wSim_j + u_{0j} + r_{ij}$$

Level 2 Model

Additionally, we ran linear regressions predicting variables assessed at the end of study, after viewing all posts—state self-esteem, positive affect, depressive symptoms, and well-being. We calculated each participant's average upward and similarity scores by totaling these scores and dividing by the number of social comparisons made by each individual participant. Upward and similarity scores were mean centered prior to forming interactions (Aiken & West, 1991). Significant interactions were probed at 1 standard deviation above and below the mean of the similarity dimension.

2.3 Results

Comparison Descriptives

We first sought to replicate Midgley et al.'s (2021) finding that the social comparisons on social media were primarily upward in nature, involved less important domains and targets that were less close. We replicated these findings with our sample showing that participants on average made social comparisons that were primarily in the upward direction ($M = 0.997$, $SD = 0.68$), as positive numbers indicated upward comparisons and negative numbers, downward comparisons. Furthermore, the domains that social comparisons occurred within showed that they too were moderately important and ranged in the types of categories they fell into (see Table 1). Replicating Midgley et al.'s (2021) findings, appearance, lifestyle, and popularity were the three most popular

domains of comparison. Our samples mean importance scores were slightly greater than Midgley's in the top 3 domains most common but overall, showed a similar pattern that they were not rated as the most important domains as what was reported by Midgely et al. (2021).

To examine closeness, we looked at the proportion of comparisons that were made with targets considered to be less close (i.e., celebrity, stranger) relative to the total number of comparisons made by the participant. This analysis included a subset of the sample (n=59) due to mechanical error when administering the online survey. A breakdown of the various comparison targets that resulted from these comparisons can be found in Table 2. Overall, the majority of comparisons were made with a famous person (34.1%) or a stranger (21.8%); only 11.7% of the comparisons made were with someone considered to be a close friend. Thus, comparison targets involved those who were not particularly close to the individual making the comparison.

Across Midgley et al.'s (2021) studies, self-evaluations decreased following the browsing session. Our findings were similar such that across all comparisons (n = 1496) the average self-evaluation reported following a comparison on social media was - 0.31 (SD = 1.20). The negative number indicates that after each comparison, participants on average felt worse about themselves. Further expanding upon Midgley's work, we also explored whether comparisons were predominantly focused on differences versus similarities. The average similarity score was - 0.07 (SD = 0.92), suggesting that participants rated themselves to be slightly different from the comparison target.

Upward by Perceived Similarity Interactions

Social Comparison Records and Self-evaluations

At the post-level, meaning categorizations of and responses to an individual post where a social comparison record was completed, multilevel models showed that there was a significant main effect of upward comparisons on self-evaluations, indicating that when an individual made a more upward comparison, they reported lower self-evaluation. Likewise, the main effect of perceived similarity indicated that the more similar participants felt they were to the comparison target, the more positive their self-evaluations were following the comparison. The interaction between similarity and upward comparisons was marginally significant (p = .063). We nonetheless probed the interaction to examine whether the pattern of results was consistent with our hypotheses. Indeed, simple slopes indicated that when participants viewed themselves to be similar to the comparison target in the domain of interest (i.e., similarity = high), the effect of upward social comparison was slightly less harmful to self-evaluations (b = - 0.29, SE = 0.03, p < .001) than when participants perceived themselves to be more different from the comparison target (i.e., similarity = low; b = - 0.36, SE = 0.02, p < .001). See Table 3 for coefficients for level 1 and level 2 models.

Social Comparison Records and End of Study Outcomes

We also examined the cumulative effects at the end of the browsing session. As shown in Table 4, there were no main effects of upward comparisons on any post-session outcomes except for predicting lower cumulative reports of self-evaluations. Perceived similarity predicted positive affect, well-being and self-evaluations, such that individuals who overall thought more about the ways in which they were similar to comparison targets reported greater positive affect, well-being and how they evaluated themselves. However, these effects were qualified by a significant upward by similarity interaction

predicting state self-esteem, positive affect and self-evaluations. Simple slopes for state self-esteem showed that when participants viewed themselves as similar to the target (similarities = high), upward comparisons were associated with worse state self-esteem (b = - 0.37, SE = 0.13, p = .004). However, when thinking about differences (similarity = low) there was a nonsignificant effect of upward comparisons on self-esteem (b = 0.09, SE = 0.12, p = .468). In other words, when comparing with targets rated as better than oneself, thinking about similarities appeared to exacerbate the negative effects of the upward comparison on self-esteem, which is opposite to what we had predicted.

The interaction between the mean similarity and upward scores was also significant when predicting positive affect. This pattern of results is similar to what was reported for state self-esteem. Simple slopes analysis findings were such that when thinking about similarities (similarity = high), the effect of upward comparisons on positive affect was negative and significant (b = - 0.15, SE = 0.07, p = .032). However, when the focus was on differences (similarity = low), the effect of upward comparisons on positive affect was non-significant (b = 0.06, SE = 0.06, p = .381). Again, the harmful impacts of upward comparisons on positive affect were exacerbated by perceived similarity and was contrary to our predictions.

Lastly, we tested the cumulative effect of viewing social media posts on self-evaluations by using the aggregate of self-evaluation scores made for each social comparison. There was a significant interaction between upward comparisons and similarity when predicting self-evaluations (p = .024). Unlike state self-esteem and positive affect, the effect of upward comparisons on self-evaluations showed a pattern of results more like what was reported in the MLM analyses. Such that, when viewing

oneself as less similar (different) was a more prominent factor such that it was associated with a stronger negative effect of upward comparisons on self-evaluations (b = -0.30, p = .002) compared to when viewing oneself as more similar to comparison targets (b= -0.004, p = .970). In other words, perceived similarity with the comparison target had a non-significant and negative effect on self-evaluations which are more impacted by perceived differences with the comparison target.

Post-hoc Analysis

We ran a post-hoc analysis within the multi-level model to see if at the post level whether the type of comparison target would predict upward comparisons and perceived similarity. More specifically, we were interested in whether targets that were identified as celebrities or strangers were related to making an upward comparison and lower perceived similarity. We dummy coded the target of each post that resulted in a comparison (celebrity/stranger=1, all else = 0) then centered these scores within person prior to running a multilevel model to test these relationships. The results did in fact show that comparisons with a celebrity or stranger were significant and positively associated with upward comparison scores (b = 0.90, SE = 0.14, p < .001). This suggests that when an individual engages in social comparison with a celebrity/stranger, we would expect it to result in an upward social comparison. Furthermore, we also wanted to see whether comparing with a celebrity or stranger would also result in lower perceived similarity. This was also shown to be the case when assessing the association between these two variables, showing a significant and negative relationship (b = - 0.74, SE = 0.16, p < .001). These results suggest that social comparisons with celebrities and strangers, who

are presumably more distant comparison targets, were rated as less similar and thus more different from themselves.

2.4 Discussion

Consistent with Midgley et al. (2021) Study 1 demonstrated that upward social comparisons are occurring at a greater frequency than downward comparisons while viewing social media, here Instagram. Likewise, participants tended to compare with others in domains that were only moderately important to their self-worth and with individuals with whom they were less likely to share a close relationship, primarily celebrities and strangers. It is also worth noting, a limitation in Midgely et al.'s (2021) study was that these importance items were captured after the comparison had been made and could be influenced by a threatening upward comparison by devaluing the comparison domain. Considering their limitation, we captured importance scores prior to participants completing the social comparison records, thus minimizing the chances their scores would reflect their reaction to the social comparison.

Furthermore, participants tended to focus on their differences with the comparison target rather than their similarities. The main effects of both upward comparisons and perceived similarity indicated viewing a comparison target as better off and less similar resulted in lower self-evaluations and that perceived similarities with the target were associated with more positive self-evaluations. We also observed a marginal interaction between the upward and perceived similarity dimensions of social comparison at the post level. When thinking about similarities with the target, upward comparisons were slightly less detrimental to self-evaluations, than when thinking about differences. However,

when looking at overall, end of study outcome we saw upward comparisons relating to lower self-esteem and positive affect when thinking about similarities.

What is puzzling is our findings for the overall effect of upward social comparisons on end of study measures in which we saw an opposite pattern. We can speculate that the extremity of the upward comparison may have made it harder for the effects of similarity to weaken the relationship. In other words, at one standard deviation below the mean upward score, the upward comparison is still positive and therefore at the upper end of the spectrum, the upward comparison target was seen as much greater off than oneself compared to being slightly better off. Furthermore, in line with Tesser's (1988) SEM model, thinking about differences with an upward comparison may be a defense mechanism to maintain self-esteem and is perhaps why we saw no effect on self-esteem when similarity was low (see Figure 2). Nonetheless, given the differing effects of perceived similarity at the post- versus end of study-levels, it remains unclear whether considering how one is similar to the target has generally positive or negative effects on upward comparisons.

The findings from Study 1, in combination with theories and research on social comparisons, suggests that social comparisons that occur while on social media do not follow the same rules as ones that occur elsewhere. For instance, a surprising finding in Study 1 was that most comparisons were made with celebrities and strangers. Although Midgley et al.'s (2021) found that comparison targets were not very close, we are unaware of any previous research that has focused on the identity of comparison targets on social media. If comparisons with celebrities and strangers are widespread on social media, this may largely explain why browsing social media tends to result in upward

comparisons and considering differences. Understanding when and what aspects of using social media leads to more negative self-evaluations is important for identifying strategies that might ameliorate such effects. Therefore, in our second study we explored the possibility that it may be who the target is that drives the negative effects of social media.

CHAPTER 3

STUDY 2

Study 1 demonstrated high levels of social comparison with celebrities and strangers on Instagram. Accordingly, in Study 2, we sought to replicate the finding that engaging primarily in comparisons with celebrities and strangers leads to the tendency to engage in upward comparisons and to focus on differences. Moreover, we expected that two factors shown to exacerbate upward comparisons would be especially true of participants who primarily compared with celebrities and strangers – lower levels of both attainability and closeness. A secondary goal was to clarify whether celebrities and strangers are more likely to elicit a social comparison than other targets. This was accomplished by assessing the identity of the subject in all social media posts, even if they do not elicit a social comparison. Lastly, we recruited only female participants for this study to eliminate the need to consider gender as another moderator and given work pointing to detrimental effects of Instagram use particularly among young women.

For Study 2, we made several predictions based on Study 1, related theories, and empirical research. First, we anticipated when a comparison is made with a celebrity or stranger on social media, participants would be more likely to report an upward comparison and see themselves as different from the target. We also expected the domain in question will be viewed as less attainable and that celebrity/strangers would be rated by the participant as less close.

Furthermore, we expected that the association of upward comparisons with self-evaluations will be moderated by similarity, attainability and closeness using MLM analysis. Specifically, we expect that when a participant rates the comparison domain to

be more attainable, upward social comparisons will be less harmful to self-evaluations. In a similar fashion we also expect that closeness will moderate the relationship with self-evaluations such that the closer one perceives themselves to be with upward comparison the higher participants' self-evaluations would be. This relationship was explored given the conflicting views from traditional theoretical views vs. empirical work on social media. Lastly, it is unclear whether the type of comparison target plays a role in whether upward comparison targets viewed as more similar will also be less harmful. Therefore, we explored the possibility that target type (celebrity/ stranger versus others) further moderated the effects of similarity, attainability, and closeness in three-way interactions. Given that the upward comparison by similarity interaction functioned counter to expectations when using end of study outcomes, all analyses focused on the post-level analyses using multilevel modeling.

3.1 Methods

Participants

Study 2 recruited 399 US-based female MTurk workers between the ages of 18 and 30 years old who completed an online survey using Qualtrics survey software. Participants were required to have an Instagram account that could be accessed throughout the study.

Procedures

MTurk participants completed the study entirely online. Once participants consented to the study, they were instructed to complete a screening survey that included items assessing Instagram use and basic demographic characteristics for $0.05. If eligible, participants continued on to the primary study. Participants first rated different social

comparison categories in relevance to their self-worth and then completed the same social comparison training used in Study 1. After training, participants were instructed to complete a series of social comparison records for the first 20 Instagram posts on their newsfeeds. To improve on Study 1's design, we assessed who is featured in the post regardless of whether the post elicited a social comparison. If participants did, however, report a social comparison they were asked to answer additional questions including the domain of comparison, attainability, closeness with the target, upward comparisons and perceived similarity with target, and their current self-evaluation. Following the browsing session, participants were debriefed on the study aims and compensated with an additional $2.00. [1]

Measures

Instagram Use

Similar to Study 1, participants reported their average time spent on Instagram in hours and minutes using the mobile applications associated with the social media platform. Unlike Study 1, we also asked participants to report the last time they had logged into their Instagram accounts, response options included: earlier today, yesterday, last week, last month, and unsure. Participants were also asked to report the number of accounts they follow on Instagram and the percentage of those accounts they considered consisted of close friends (0-100%).

Demographics

Participants reported their age, sex and race/ethnicity.

Domain Importance Ratings

[1] The first 63 participants received $3.00 for completing the survey.

Similar to Study 1, participants were asked to rate how important the following topics or domains are to their self-worth using a 5-point scale (1 = *not important at all*, 5 = *extremely important*). Domains included looks/attractiveness; health/physical fitness/mental health; vacation/activities/lifestyle; social/friendships/ popularity; personality/morality; skills/abilities; academics/career; wealth/finances/ possessions; dating/romantic relationships; family; attitudes/feelings/opinions and number of social media likes/comments. These categories were the same as what was used in Study 1.

Social Comparison Records

All items below were assessed for each of the first 20 posts on participants' Instagram feeds.

Post subject. Unlike Study 1, we had participants first report who was the subject of the Instagram post regardless of it resulting in a social comparison. Response options included stranger, acquaintance, close friend, imaginary person/fictional character, oneself, family member/relative, famous person (celebrity)/ public figure/ athlete, influencer, model (ad), or other (specify). These options were adapted from the original comparison targets from Study 1 such that we created separate options for influencer and added the option of model (ad) (Study 4, Midgley et al., 2021). We grouped these subjects into two categories indicating whether the subject was a celebrity/stranger or a non-celebrity/stranger. Subjects considered to be a celebrity/stranger included: Stranger, imaginary person/fictional character, famous person/public figure/athlete, influencer or model (ad). Non-celebrity/stranger subjects included the following categories: close friend, acquaintance, oneself, family member/relative, and other (specify).

Social comparison. The second item assessed whether a social comparison occurred "*When you were reading this post, to what extent did you compare yourself to another person (either the person who posted it, or someone else)*?" (1=*not at all,* 7=*completely*) (Locke, 2003; Wheeler & Miyake, 1992). The presence of a social comparison was indicated by responses of 2 or higher.

Comparison Target. Participants reported with whom the comparison was made, response options were the same post subjects which were the same as study 1 apart from the new categories included to better understand these relationships. Response options include close friend, acquaintance, stranger, imaginary person/fictional character, oneself, family member/relative, famous person/public figure/athlete, influencer, model (ad) or other (specify). (Midgley et al., 2021). We used the same method when grouping Post Subject above, where we grouped targets into two categories indicating whether the target was a celebrity/stranger or a non-celebrity/stranger. Targets considered to be a celebrity/stranger included targets that were coded as: Stranger, imaginary person/fictional character, famous person/public figure/athlete, influencer or model (ad). Non-celebrity/stranger targets included the following categories: close friend, acquaintance, oneself, family member/relative and other (specify).

Closeness. A single item captured the level of closeness the participant shares with the target, "*How close are you to this person*?" (1 = *not close at all*, 7 = *extremely close* (Midgley et al., 2021).

Attainability. To assess the level of perceived attainability of the domain in question, participants answered the following item, "*Considering the comparison target's standing in this domain, how attainable is the domain for you*?". Response options

ranged from 1 (*very unattainable)* to 7 (*very attainable*). Higher scores indicate participants viewed the domain in question as something they could achieve relative to the standard set by the comparison target.

Upward Comparisons. The same item from Study 1 was used to capture the vertical dimension of the comparison, "*When you compared yourself, to what extent did you notice the other person doing better or worse than you*?" Response options being -3 to -1 = (*very much worse off*; downward comparison) and 1 to 3 (*very much better off*; upward comparison) with 0 serving as a benchmark for a lateral comparison (Locke, 2003; Midgley et al., 2021).

Perceived Similarity. To test how participants perceived how similar they are to the comparison target the following item was asked "*When you compared yourself, to what extent did you feel similar to or different from them with respect to this domain*?" Participants responded with a scale ranging from -3 (*very much different*) to 3 (*very much similar*) (Locke, 2003).

Self-evaluation. Participants responded to the item, "*Overall, did this comparison make you feel better or worse*?" (Midgley et al., 2021). Response options range from -3 (*much worse about myself than usual*) to 3 (*very much better about myself than usual*). Higher scores indicate a more positive self-evaluation following the social comparison.

3.2 Data Analysis

Participants who did not complete the social comparison training (n = 37), did not complete at least one social comparison record (n = 9) or had more than 50% missing data from social comparison records (n = 33), were excluded from all analyses, resulting

in a final sample size of 320. The rational for the decision to remove participants with more than 50% missing data was based on a predetermined cut off for missing data. We analyzed the data to report sample descriptives for variables of interest. We then tested whether the subject of the Instagram post would predict making a social comparison. We dummy coded each Instagram post's subject by celebrity/stranger subjects (1) vs. non celebrity/strangers (0) to predict whether the post resulted in a social comparison or not (yes = 1, no = 0). A multilevel logistic model was estimated to determine the probability of making a social comparison when the subject of the post was a celebrity/stranger. Additionally, we tested whether the target of the comparison (Celebrity/Stranger = 1 vs. Non-Celebrity/Stranger =0) predicted certain features of the social comparison including the extremity of the upward comparison, perceived similarity, attainability, and closeness.

In order to replicate the moderation analyses reported in Study 1, we tested the interactions within a multilevel model to assess the relationships at the post level. Scores were centered within person to capture the level 1 associations (post-level) among variables (Enders & Tofighi, 2007). Once scores were mean centered within person, we created interaction terms to test the proposed hypothesis that perceived similarity, attainability and closeness interact with upward comparison when predicting self-evaluations. Significant interactions were probed at 1 standard deviation above and below the mean of the moderator. We also tested exploratory three-way interactions, in which celebrity status was examined as a moderator of the interaction between upward comparison and similarity, attainability and closeness. Initially, all models controlled for which post the participant was viewing (i.e., 1-20) to account for the possibility that ratings on the comparison records changed across the browsing session. However, there

was a non-significant effect of the index variable for self-evaluations in all models (p's > .631) therefore we removed this parameter from the models for parsimony.

3.3 Results

Preliminary Analyses

Participants reported a mean age of 26.01 (SD = 3.16) and were primarily White (67.5%). Most study participants reported logging into their Instagram accounts "earlier today" (n = 260; 81.3%) and on average follow approximately 608 accounts (SD = 1,317.09). Additionally, about 29% of these accounts consisted of those considered to be close friends.

The analyzed dataset consisted of 320 participants who made a total of 2,967 comparisons out of the total possible of 6,400 comparisons. The average number of comparisons made while viewing 20 Instagram posts was 9.27 (SD = 6.00). Thirteen participants did not make any social comparisons, whereas 32 made a social comparison with all 20 Instagram posts. Replicating Study 1 and Midgley et al.'s (2021) findings, the two most popular domains of comparisons involved appearance and lifestyle. These domains were also rated lower in importance to self-worth compared to other domains listed. Details on the ratings of domain importance and how many comparisons were made in each category can be found in Table 5. Across all 20 posts, 53.8% of posts featured a subject categorized as a Celebrity/Stranger. In a similar fashion, we saw that when a comparison was made, 55.3% were with targets considered to be a Celebrity/Stranger (see Table 6). It is reasonable to conclude that when browsing Instagram, more than half of the posts will involve a subject that is a celebrity or stranger

which are also likely to elicit making a social comparison in domains rated as less important to their self-worth.

Mean Scores for Social Comparison Features

Similar to findings reported in Midgely et al. (2021) and Study 1 above, we observed that participants on average made social comparisons that were primarily in the upward direction (M = 0.84, SD = 1.02), as positive numbers indicated upward comparisons and negative numbers, downward comparisons. In addition, the average similarity score was - 0.62 (SD = 1.12), which indicates a greater tendency to view themselves as different from their comparison target rather than similar. On average participants viewed the domain as moderately attainable (M = 3.96, SD = 1.07) and felt less close to the comparison targets (M = 2.41, SD = 1.29). Finally, across all comparisons, the average self-evaluation score was – 0.38 (SD = 0.85), participants on average felt worse about themselves after each comparison.

Celebrity/Stranger Comparison Subjects Predicting Making a Comparison and Attributes

We asked participants to report the subject of each Instagram post they came across, regardless of whether it had elicited a social comparison or not. We wanted to investigate if the subject of the post was a celebrity/stranger would be more likely to elicit a social comparison versus a non-celebrity/stranger subject. Results supported our prediction showing that participants who viewed a celebrity/stranger subject were 67.6% more likely to make a social comparison (b = 0.74, SE= 0.28, p = .008).

We investigated the idea that who the comparison target was could influence the different features of the comparison made. In the same manner as above, these analyses

were conducted using the MLM data structure looking at variability within-subjects. As predicted, we observed that making a comparison with a celebrity/stranger target increased the degree of an upward comparison by 0.20 compared to comparisons with a non-celebrity/stranger target (b = 0.20, SE = 0.06, p = .001). Furthermore, making a comparison with a celebrity/stranger target reduced perceived similarity by 0.71 compared to comparisons with a non-celebrity/stranger target (b = - 0.71, SE = 0.06, p < .001). Celebrity/stranger targets reduced perceived attainability (b = - 0.81, SE = 0.06, p < .001) and perceived closeness (b = - 2.05, SE = 0.06, p < .001) compared to comparisons with a non-celebrity/stranger target. Comparisons with celebrities/strangers were also associated with lower self-evaluations (b = -0.35, SE = 0.05, p < .001). In summary, these findings suggest that the type of target, in this case, one that involves a celebrity or stranger elicits higher upward comparisons scores, lower perceived similarity, attainability and closeness. Notably, these features of social comparisons have been previously associated with worse outcomes.

Moderators of Upward Comparisons

Upward by Similarity Interaction. At the post-level, meaning categorizations of and responses to an individual post where a social comparison record was completed, multilevel models showed that there was a significant main effect of upward comparisons on self-evaluations (b = -0.14, SE = 0.02, p < .001), indicating that when an individual made a more upward comparison, they reported lower self-evaluation. Likewise, the main effect of perceived similarity indicated that the more similar participants felt they were to the comparison target, the more positive their self-evaluations were following the comparison (b = 0.27, SE = 0.01, p < .001). The interaction between similarity and

upward comparisons was non-significant (b = -0.01, SE = 0.01, p = .317). These results did not replicate the marginally significant interaction from Study 1.

Upward by Attainability Interaction. Multilevel models containing attainability also showed a significant main effect of upward comparisons on self-evaluations (b = -0.13, SE = 0.01, p < .001). A main effect of attainability indicated that the more attainable the domain was perceived the more positive their self-evaluations were following the comparison (b = 0.28, SE = 0.01, p < .001). The interaction between attainability and upward comparisons was significant (b = -0.07, SE = 0.01, p <.001). Simple slopes indicated that when participants viewed the domain of interest as attainable (i.e., attainability = high), the effect of upward social comparison was more harmful to self-evaluations (b = - 0.22, SE = 0.02, p <.001) than when participants viewed the domain of interest to be less attainable (i.e., attainability = low) (b = -0.04, SE = 0.02, p = .024). These results are contrary to our prediction that high attainability will have a less severe impact when making an upward comparison on self-evaluations.

Upward by Closeness Interaction. Multilevel models also showed that there was a significant main effect of upward comparisons on self-evaluations (b = - 0.15, SE = 0.02, p < .001) and a main effect of closeness indicated that the closer one felt to the comparison target the more positive their self-evaluations were following the comparison (b = 0.11, SE = 0.01, p < .001). The interaction between closeness and upward comparisons was non-significant (p < .914).

Exploratory 3-Way interactions

Upward by Similarity by Comparison target (Celebrity/Stranger vs. Non-Celebrity/Stranger). Multilevel models showed there were significant main effects for

upward comparisons, similarity, and type of target on self-evaluations (p's < .001), indicating higher perceived similarity and making a comparison with a non-celebrity/stranger lead to higher self-evaluation scores. On the other hand, greater upward comparison scores were associated with lower self-evaluation. The three-way interaction between upward, similarity and target type was significant (b = - 0.16, SE = 0.02, p < .001). However, when comparing to non-celebrity targets, there was no two-way interaction between upward comparisons and similarity (b = -0.02, SE = 0.03, p = .591). When comparing to celebrity/stranger targets, there was also a non-significant interaction between upward comparisons and similarity (b = -0.01, SE = 0.02, p = .745). These results suggest that the type of target, whether it be a celebrity/stranger or not does not influence how upward comparisons and similarity interact when predicting self-evaluations.

Upward by Attainability by Comparison target (Celebrity/Stranger vs. Non-Celebrity/Stranger). Multilevel models showed there were significant main effects for upward, attainability and comparison target on self-evaluations (p's < .005). The three-way interaction between upward, attainability and comparison target was significant (b = - 0.13, SE = 0.02, p < .001). The two-way interaction between upward comparisons and attainability was marginally significant when the comparison target was a non-celebrity/stranger (b = -0.07, SE = 0.04, p = .071). Mirroring the two-way interaction, simple slopes indicated that the effect of upward comparisons was more negative on self-evaluations when attainability was high (b = -0.34, SE = 0.06, p <.001) then when attainability was low (b = -0.16, SE = .08, p = .040) (see Figure 3). When the comparison

target was a celebrity or stranger, the two-way interaction between upward comparisons and attainability was non-significant (b = -0.02, SE = 0.02, p = .372).

Upward by Closeness by Comparison target (Celebrity/Stranger vs. Non-Celebrity/Stranger). The last 3-way interaction we tested was to see whether the relationship between upward comparisons and closeness depended on the comparison target. The results from the multilevel model did not support our predictions such that the effect of upward comparisons and closeness did not depend on whether the target was a celebrity/stranger for self-evaluations (b = -0.01, SE = 0.02, p = .762). In sum, the significant three-way interaction with similarity as the focal moderator did not support our initial prediction that higher levels of similarity would weaken the relationship between upward comparisons on self-evaluations when the target was a celebrity or stranger. The significant three-way interaction with attainability did show evidence that upward comparisons and attainability did vary as a function of comparison target, however the results did not support our hypothesis. In fact, it showed that upward comparisons and attainability were the most harmful when attainability was high, and the comparison target was a non-celebrity/stranger. Lastly, there was a non-significant three-way interaction between upward comparisons, closeness and comparison target, suggesting that these variables do not depend on each other when it comes to predicting self-evaluations made after making a comparison.

3.4 Study 2 and General Discussion

Results across Studies 1 and 2, confirm the notion that social media provides ample opportunities for social comparisons with those viewed as better off. We observed that the two most popular domains to report making a social comparison within involved

attractiveness and lifestyle activities. These domains are consistent with what was reported in both Study 1 and past research by Midgley et al. (2021). Studies 1 and 2 taken together showed limited evidence for the interactions between factors previously shown to moderate upward comparisons (e.g., similarity, attainability, and closeness). Moreover, the effects that did emerge in Study 2 were counter to theoretical predictions; domains viewed as attainable exacerbated, rather than reduced, the effect of upward comparisons. Finally, Study 2 demonstrated that comparison with a celebrity/stranger target is associated with higher upward comparison scores and lower similarity, attainability and closeness.

A major take away from Study 2 was that more than half of the subjects of Instagram posts involved a celebrity or stranger, which in turn made it significantly more likely one would make a social comparison when viewing the post. Based on the results from both Study 1 and Study 2, social comparisons with celebrity/stranger targets lead to more extreme upward comparisons ratings, lower perceived similarity, and closeness, each of which was also associated with lower self-evaluation scores. This leads us to believe that comparing with celebrities or strangers on Instagram is inherently harmful to one's self-evaluations due to viewing them as better off, being more different, the domain to be less attainable and feel less close to these targets. These results add new insight into why social media appears to be harmful to self-worth.

In the two-way interactions independent of target type, we did not find evidence that greater perceived similarity or closeness with the comparison target buffered against the negative effects of upward comparison on self-evaluations. Likewise, target type (i.e., celebrity/ stranger vs. close other) did not further moderate these two-ways. Thus, we

failed to replicate the marginal upward by similarity interaction from Study 1 and our finding for closeness is similar to the negative relationship observed between closeness and comparison targets reported by Midgely et al. (2021). Close targets should theoretically be less threatening (Tesser, 1991), yet these relatively unclose targets still had harmful impacts on self-evaluations. Closeness may have less impact on social media due to upward comparisons being so much more frequent and extreme. The consistent encountering of social information of superior others regardless of closeness may represent standards that are used as references for success. Surprisingly, the association between upward comparisons and self-evaluations did not depend on similarity. The lack of evidence for the previously proposed moderating variables theorized to weaken the harmful impact of upward comparisons may be due to the unique context that social media provides that differs to other environments and may operate differently.

When testing the hypothesis that higher attainability of the domain would weaken the effect of upward social comparisons on self-evaluations, we found evidence for the opposite. The effect of upward comparisons was instead exacerbated by higher perceived attainability of the domain. These findings are contrary to past theory (Lockwood & Kunda, 1997). Potentially, viewing the domain to be attainable may not necessarily translate into having the confidence or the self-efficacy to achieve such a goal. When the comparison target is doing much better in a domain that is seemingly achievable, it may make the individual feel worse such that they have not yet achieved the same goal. Lockwood and Kunda (1997) suggested that attainability works to increase motivation to achieve in the future. However, some domains or other factors such as timing or age make these types of future selves unconceivable, resulting in feeling worse about oneself.

Additionally, past research (Lockwood & Kunda, 1997) has focused exclusively on domains of ability or achievement, which were not commonly reported in this sample. Whereas viewing academic outcomes as attainable may motivate working hard, it is less clear what it means when individuals rate attractiveness and vacations as attainable. Given the unknowns about how these relationships operate in an online context, future research should seek to understand whether attainability in this sense only applies to certain domains or can be generalized across many. We saw that the most common domain reported was looks and attractiveness may be the reason for these conflicting results and perhaps other domains such as ability or skills would lead to different types of outcomes. Lastly, the exploratory three-way interaction indicated that high attainability exacerbated effects of upward comparison a negative effect on self-evaluations only when comparing to close others. The idea that non-celebrity targets were more harmful to self-evaluations could be supported by Tesser's (1991) theory in that comparison targets considered to be closer produce stronger emotional effects when outperformed by a close other. Future research should seek to dismantle why higher attainability led to worse self-evaluations.

The results are confusing but could be related to the context in which social comparisons are taking place (i.e., via social media vs. face to face). Other factors surrounding the context and the social media post itself may lend insight into these relationships. One study showed how users' behaviors on different platforms changed as a result of the design and layout of the social media platform used (Binns, 2014). It also may be warranted to see how social comparisons with celebrities or strangers operate

when viewing them in the format of social media compared to other traditional means such as fashion magazines.

Another thing to consider about these results is that models, did not account for the relevance of the domain to self-worth. The main effects for upward comparisons, similarity, attainability, and closeness when predicting self-evaluations did give evidence to the proposed relationships. However, the results may indicate another factor at play that is influencing how these relationships interact, which could involve the relevance of the of comparison. It is possible that during these browsing sessions, participants are less aware of how the content of the more popular domains influences their present state given that they view them as less important. Furthermore, we did not collect data on traits like social comparison orientation or self-esteem, both of which have been shown to exacerbate the negative effects of social comparisons on evaluations (Gibbons & Buunk, 1999; Midgley et al., 2021).

This study's findings should be viewed in light of its limitations and advantages. One major advantage of this study was the way in which social comparison data were retrieved. Past research has heavily relied on retrospective reports which may over-represent the number of upward comparisons made if they are more salient (Midgley et al., 2021). Another method commonly used in social comparison research is global accounts of social comparison processes that may be less accurate when measuring the degree that individuals engage in social comparison activities. Having our study participants report immediately after making a social comparison reduces the likelihood of potential bias in recall. Another methodological strength from this study was the social comparison training. This training increased confidence in participants by providing

detailed descriptions of what exactly a social comparison was and were able to practice identifying social comparisons in sample scenarios.

Our results also may not be generalized to other social media platforms. Instagram is unique in its presentation of almost exclusively image-based content. Greater exposure to curated images of attractive others has been shown to have negative impacts on well-being and perceptions of body image (Kohler et al., 2021). Furthermore, the type of accounts followed and presented on one's newsfeed could be different from what is viewed on another platform such as Facebook or Twitter (Binns, 2014). Unlike Facebook, Instagram's structure is asymmetric meaning "if a user *A* follows *B*, *B* need not follow *A* back" (page 596, Hu et al., 2014). This type of structure allows Instagram users the opportunity to follow others who do not need to reciprocate and can have their content viewed if their profile is public. Results also may not generalize to male Instagram users females are known to engage more with Instagram compared to males and engage more intensely with the platform (Trifiro, 2018). Additionally, a common finding within the body image literature involves how women are negatively impacted by making social comparisons with social media targets within the domain of appearance (Haferkamp & Krämer, 2011; Tiggemann & Zaccardo, 2015). Future research would nonetheless benefit from examining how men are impacted by social comparisons on social media, especially looking at the domains in which men make comparisons. Research is also sorely needed on interventions to make social media less harmful to its female users. Implications for designing interventions has been discussed by Nabi et al. (2014) that include focusing on audience education in the form of awareness of how social comparisons impact emotional responses. Instagram is one of many new platforms

being integrated into the literature on social media and comparisons with other platforms are needed to understand where there are commonalities and which platform features lead to unique differences in users' experience.

3. 5 Conclusion

In summary, the results from two studies highlight the ample opportunities to engage in upward social comparisons with celebrities and strangers while on social media and their detrimental effects. Notably, self-evaluations were negatively impacted after browsing Instagram for approximately 10 minutes. Given high daily use of Instagram and other social media platforms (Auxier & Anderson, 2021) research is needed that identifies how users can reap the positive benefits of social connection while avoiding detrimental social comparisons. Learning ways in which we can coexist in a world heavily influenced by social media should be at the forefront of future researchers' agendas in order to mitigate the harmful effects on its users and potenitally leveraging its positive impacts.

CHAPTER 4

TABLES AND FIGURES

Table 1.

Study 1 number of comparisons made on Instagram across domains and importance ratings

Comparison Domain	N (%)	Importance Ratings M (SD)
Looks / attractiveness	388 (25.9%)	3.34 (0.89)
Vacation / leisure activities / lifestyle	218 (14.6 %)	3.03 (1.03)
Social / friendships / popularity	162 (10.8 %)	3.38 (1.00)
Health / physical fitness / mental health	156 (10.4%)	4.09 (0.75)
Skills / abilities	114 (7.6 %)	3.91 (0.76)
Academics / career	73 (4.9 %)	4.16 (0.78)
Dating / romantic relationships	71 (4.7 %)	2.93 (1.06)
Multiple	71 (4.7 %)	--
Wealth / finances / possessions	67 (4.5 %)	3.16 (1.03)
Personality / morality	54 (3.6 %)	4.45 (0.71)
Attitudes / feelings /opinions	48 (3.2 %)	4.03 (0.86)
Number of likes / comments	32 (2.1 %)	1.99 (0.95)
Family	25 (1.7 %)	4.15 (0.96)
Other	17 (1.1 %)	--

Note. Importance ratings were measured on a 5-point scale (1= *not at all important*, 5 = *very important*).

Table 2.

Study 1 Subsample (n = 59) comparison target categories

Target	Number of comparisons made (Percentage)
Famous person	186 (34.1%)
Stranger	134 (24.5%)
Acquaintance	119 (21.8%)
Close Friend	64 (11.7%)
Family member/relative	14 (2.6%)
Oneself	11 (2.0%)
Imaginary person	7 (1.3%)
Other	11 (2.0%)

Table 3.

Study 1 Estimates for Multilevel Model of Self-Evaluations as a Function of Upward Comparisons and Similarity.

					CI 95	
Fixed effects (Intercept, slopes)	Estimate	(SE)	*t*	*p*	Lower	Upper
Intercept γ_{00}	-0.28	0.05	-5.55	<.001	-0.39	-0.18
Upward	-0.32	0.02	-16.55	<.001	-0.36	-0.28
Similarity	0.17	0.02	9.94	<.001	0.14	0.21
Upward*Similarity	0.02	0.01	1.86	.063	-0.00	0.05

					CI 95	
Random Effects ([co-]variances)	Estimate	(SE)	*z*	*p*	Lower	Upper
Level 2 (between-person)						
Intercept	0.30					
Intercept and within conflict	-.00					
Level 1 (within-person)						
Residual	.82					

Table 4.

Study 1 Main effects and interaction between Upward Comparisons and Perceived Similarity Predicting Post-Session Outcomes

	State Self-Esteem			Positive Affect			Depressive Symptoms			Well-being			Self-evaluations		
M (*SD*)	3.33 (0.78)			1.52 (0.42)			19.93 (10.81)[1]			4.24 (1.33)			-0.32 (0.65)		
	b	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Upward	-0.14	0.09	.124	-0.04	0.05	.369	2.36	1.27	.065	-0.30	0.15	.056	-0.15	0.07	.036
Similarity	0.07	0.07	.345	0.11	0.04	.002	-1.73	0.10	.070	0.33	0.11	.004	0.21	0.05	<.001
Upward*Similarity	-0.25	0.09	.006	-0.11	0.05	.023	2.13	1.25	.090	-0.08	0.15	.584	0.16	0.07	.024

Note. [1] Sum score reported for depressive symptoms.

Table 5.

Study 2 number of comparisons made on Instagram across domains and importance ratings

(*N* = 2,967)

Comparison Domain	**N (%)**	**Importance Ratings M (SD)**
Looks / attractiveness	679 (22.9%)	3.33 (0.94)
Vacation / leisure activities / lifestyle	451 (15.2%)	3.14 (1.09)
Health / physical fitness / mental health	361 (12.2%)	3.83 (0.91)
Social / friendships / popularity	349 (11.8%)	3.06 (1.07)
Skills / abilities	273 (9.2%)	3.86 (0.87)
Wealth / finances / possessions	179 (6.0%)	3.12 (1.09)
Personality / morality	173 (5.8%)	4.23 (0.83)
Academics / career	132 (4.5%)	3.63 (1.03)
Family	108 (3.6%)	3.83 (1.11)
Dating / romantic relationships	96 (3.2%)	3.32 (1.12)
Number of likes / comments	64 (2.2%)	2.10 (1.14)
Attitudes / feelings /opinions	60 (2.0%)	3.93 (0.88)
Multiple	18 (0.6%)	--
Other	16 (0.5%)	--

Note. Importance ratings were measured on a 5-point scale (1= *not at all important*, 5 = *very important*).

Table 6.

Study 2 Comparison Target Categories and Instagram Post Subjects

	Comparison Targets[1]	Instagram Post Subjects[2]
Non-Celebrity/Stranger	N (%)	N (%)
Acquaintance	532 (18.0)	921 (14.8)
Close Friend	423 (14.3)	646 (10.4)
Family member/relative	203 (6.9)	403 (6.5)
Oneself	128 (4.3)	286 (4.6)
Other	38 (1.3)	529 (8.5)
	Comparison Targets[1]	Instagram Post Subjects[2]
Celebrity/Stranger	N (%)	N (%)
Stranger	494 (16.7)	992 (15.9)
Influencer	490 (16.6)	894 (14.3)
Famous person (celebrity/public figure/ athlete)	378 (12.8)	826 (13.3)
Model (ad)	156 (5.3)	503 (8.1)
Imaginary person	118 (4.0)	231 (3.7)

Note. [1] Total number of comparisons reported (N = 2,960); [2] Total number of Instagram posts viewed (N = 6,231).

Figure 1

Upward Social Comparison Pathways and Outcomes

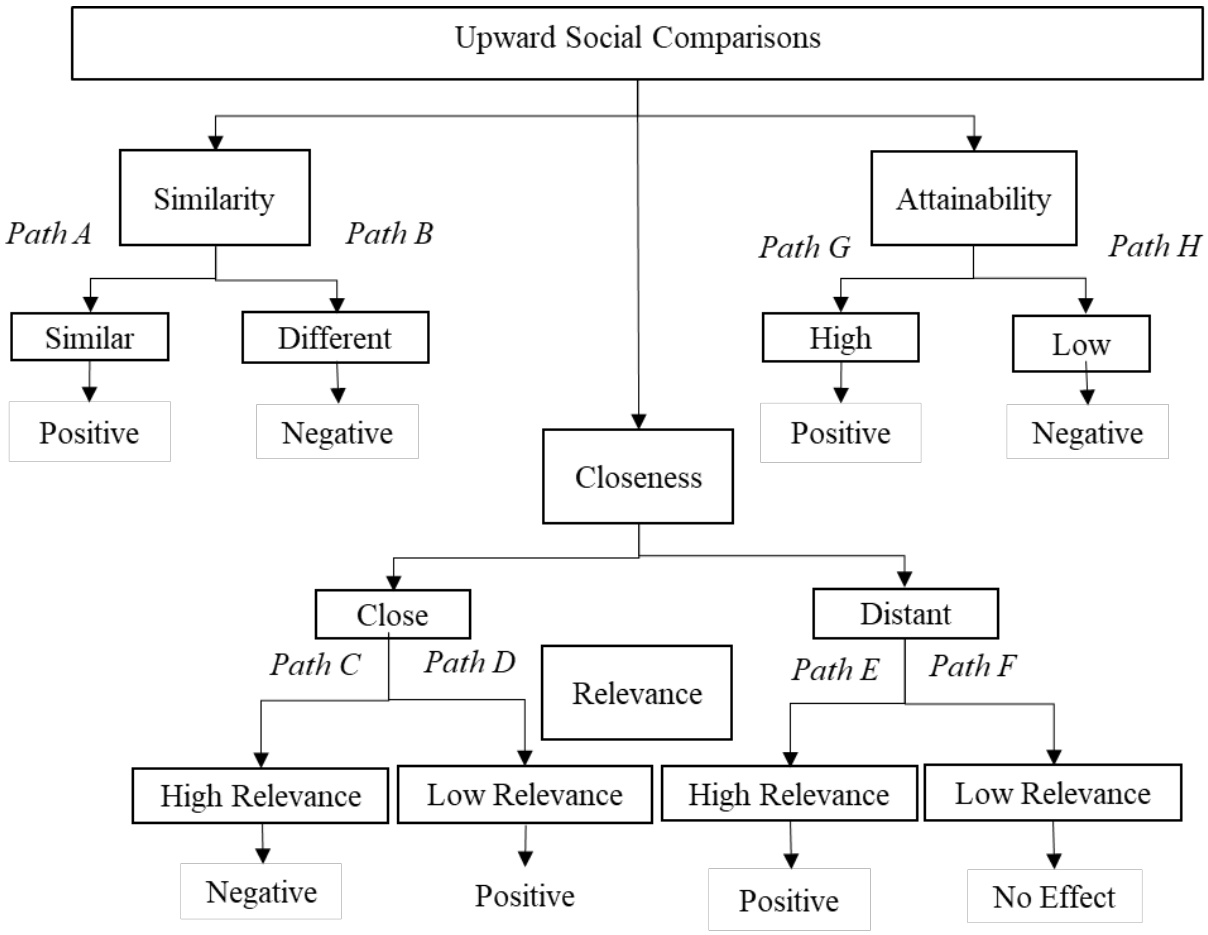


Figure 2.

Upward by Similarity Interaction Predicting State Self-Esteem

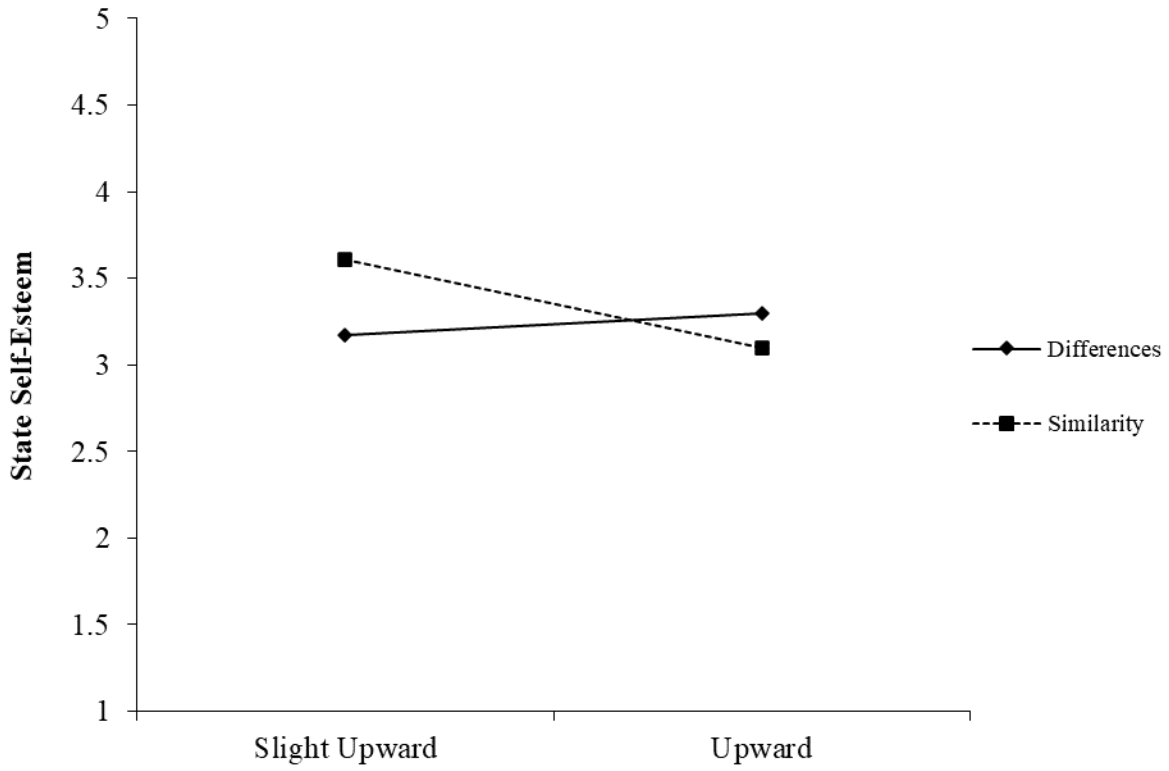
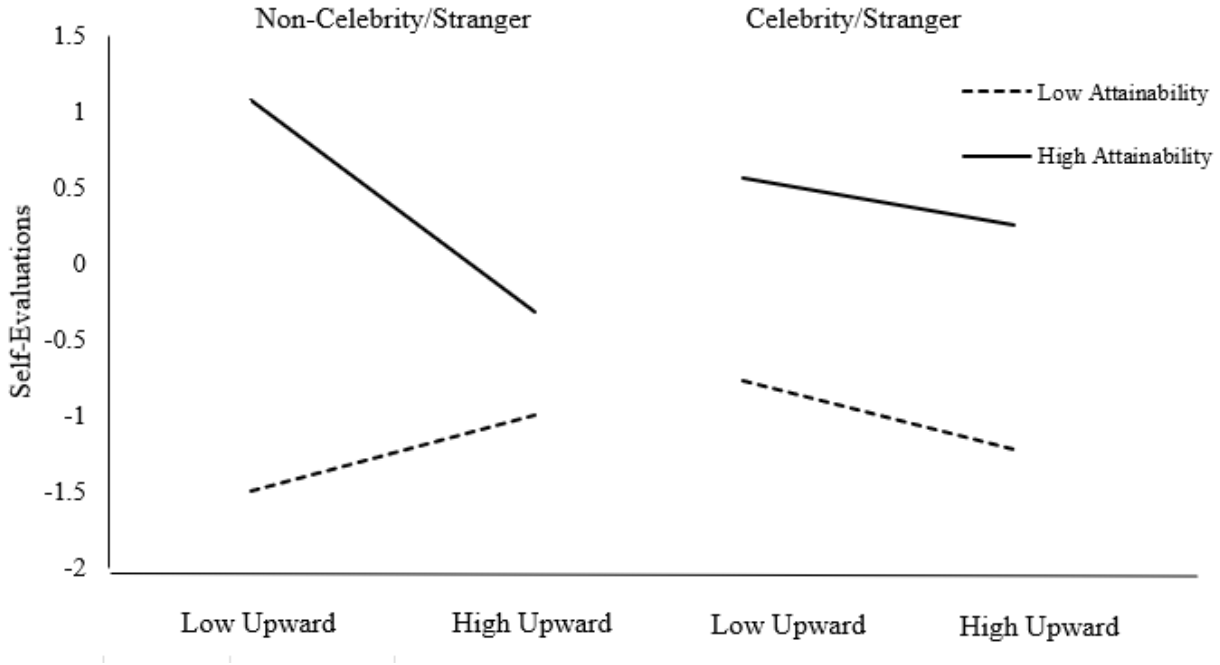


Figure 3.

Study 2 Upward by Attainability by Comparison Target Predicting Self-Evaluations



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