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How Does Upward Social Comparison on Instagram Undermine Subjective Well-Being in South Korea: Mediating Role of Emotions and the Moderating Role of Attribution

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Abstract: *Recent findings indicate that engaging in upward social comparison on social media can have a detrimental impact on subjective well-being (SWB); however, how upward social comparison undermines SWB remains unclear. This research draws on attribution theory and Smith's typology of social comparison-based emotions to examine the mediating role of upward contrastive emotions and the moderating role of attribution for others' success in the association between upward social comparison SWB. Using the data collected from 318 Instagram users, The present study demonstrates that upward contrastive emotions serve as a mediator between upward social comparison and SWB. Moreover, the results reveal that the mediating effect of upward contrastive emotions in the relationship between upward social comparison on Instagram and SWB is moderated by attribution for others' success. Our findings suggest that when users compare themselves to someone they perceive as superior, they should try to attribute the success of that person to internal factors (e.g., effort) rather than external factors (e.g., luck), to mitigate the adverse impacts of upward social comparison. This study makes a contribution to the existing literature on social media by developing a moderated mediation model that places particular emphasis on the role of attribution in the relationship between upward social comparison and SWB.*

Keywords: Attribution Theory; Negative Emotions; Social Media; Subjective Well-Being; Upward Social Comparison

1. Introduction

The fundamental desire of most people is to be happy [1]. Many researchers have been trying to understand the factors that influence individual subjective well-being (i.e., happiness). Subjective well-being can be defined as a high level of life satisfaction, a high level of positive affect, and a low level of negative affect [2]. Life satisfaction can be considered an overall judgment of one's life, while positive and negative feelings represent positive and negative affective experiences, respectively [3]. In other words, subjective well-being can be defined as the cognitive and affective evaluations that individuals make of their lives [1]. Previous studies have focused on demographic characteristics such as level of education, age, gender, and as factors that can influence subjective well-being [3-5].

The increasing integration of social media into daily life has prompted scholarly interest in its role as a potential determinant of subjective well-being [6]. Some researchers have found that social media can enhance subjective well-being [7, 8]; for example, [9] showed that Facebook could reduce loneliness in users by helping them build social capital. On the other hand, others argue that social media has the potential to foster negative self-perception by prompting upward social comparison, which refers to comparing oneself with individuals or groups perceived to be superior [10]. This may be because social media users are likely to share positive aspects rather than the negative parts of their life [11]. If viewers see only such carefully curated posts on social media (e.g., famous attractions, luxury goods), they tend to develop a warped perception that other people have a great

life, and their own life is not good enough, or that they lack certain desirable qualities. Recent studies have demonstrated that social media can harm subjective well-being by inducing upward social comparison [12, 13].

Given the possible adverse effects of upward social comparison on social media on overall well-being, it is crucial to gain insight into how such comparison affects subjective well-being. It is plausible that emotions play a significant role in the relationship between upward social comparison and subjective well-being. According to [14], upward contrastive emotions often arise when people compare themselves with those who are perceived as socially superior in some way (i.e., when people experience upward social comparison); these include resentment/anger toward the target being compared; frustration with regards to themselves; and envy toward both the target and themselves. Thus, we first examine the potential mediating role of negative upward emotions in the relationship between upward social comparison on Instagram and subjective well-being.

The detrimental effects of upward social comparison on social media might be mitigated by certain factors. In accordance with the attribution theory, individuals tend to seek explanations for the occurrence of an event. Their interpretation of the underlying causes often influences their subsequent attitude and behavior towards the event [15]. For example, people tend to experience more negative feelings such as relative deprivation or resentment when they believe the success of another person is attributable to external factors, such as luck, rather than internal factors, such as effort [16, 17]. It suggests that how individuals attribute the success of others can play an important role in their subjective well-being when they experience negative emotions due to upward social comparison. Thus, we secondly investigate the moderating role of attribution for the success of others in the relationship between upward contrastive emotions and subjective well-being. Finally, we further explore whether attribution for the success of others moderates the indirect effect of upward social comparison on Instagram on subjective well-being via upward contrastive emotions.

2. Theoretical Background and Hypothesis Development

2.1 Instagram

Instagram has established itself as one of the most used social media services worldwide [18]. It has witnessed remarkable growth in many countries, including South Korea. As indicated by the Korea Media Panel Survey (2023), the proportion of users who identified Instagram as their most frequently utilized social media platform exhibited a marked increase from 0.4% in 2014 to 48.6% in 2023. Instagram is an image-based platform, unlike text-oriented platforms such as Twitter and Facebook [19, 20]. Instagram users are known to flaunt their fitness, wealth, and lifestyle to others by posting images or videos of their daily lives. They tend to upload only their ‘best’ moments, which have been carefully taken and selected to maximize attractiveness (e.g., those of luxury possessions, and splendid views of travel destinations) [21-23]. Further, as followers, they can easily look at what celebrities and influencers as well as friends post.

The unique features of Instagram may facilitate upward social comparison, a phenomenon characterized by individuals evaluating themselves against others whom they perceive to be more successful or accomplished. Such comparisons can lead to negative consequences for those who engage with the content. Recent empirical studies indicate that upward social comparison on social media can lower subjective well-being [12, 13]. What are, therefore, the underlying mechanisms through which upward social comparison leads to adverse outcomes??

2.2 Mediating Role of Upward Contrastive Emotions

Social comparison theory posits that individuals engage in self-evaluation by comparing themselves to others in order to ascertain their relative status [24]. There are two main types of social comparison: upward (comparing oneself with those perceived to be superior) and downward (comparing oneself with those perceived to be inferior). It has been shown that people predominantly tend to compare themselves with superior others in a contrasting manner [25].

Social comparisons can provoke a diverse array of emotional responses, both positive and negative, contingent upon the specific context. Smith (2000) [14] proposed a typology of emotions arising from social comparisons, indicating that the emotional outcomes associated with these comparisons may vary based on the direction of the comparison (upward versus downward) and the internal cognitive processes that are activated as a result of these comparisons (assimilation versus contrast). In alignment with [14], upward social comparison gives rise to two distinct types of upward comparison emotions: upward assimilative emotions and upward contrastive emotions. Upward assimilative emotions are a set of positive emotions, including inspiration

(toward others and oneself), optimism (toward oneself), and admiration (toward others). In contrast, upward contrastive emotions comprise a set of negative emotions including envy (an emotion felt toward both the target and oneself), frustration (an emotion directed toward oneself), and resentment/anger (an emotion directed toward a target). The social rank theory posits that social comparison represents a significant risk factor for mental health [26]. For instance, [27] identified social comparison on social media as a potential risk factor for depressive symptoms. Their findings indicate that the negative emotions elicited by the social comparison process can harm individuals' subjective well-being. In light of the above, the focus of this study is on the adverse emotions that result from upward social comparison (i.e., upward contrastive emotions).

On social media, likewise, the more users experience upward social comparison, the more they are likely to feel these negative feelings (i.e., resentment, frustration, and envy) at the same time. To be more specific, when users see other people being happier in their posts, they will be envious that other people have what they do not have; as a result, they will end up thinking they are falling short. Prior research has demonstrated that engaging in upward social comparison on social media can lead to feelings of envy [28, 29]. Lee (2014) [30] also revealed that such comparisons on Facebook correlates with an increase in negative affect. The findings indicate that engaging in upward social comparison on Instagram may elicit a range of negative emotions among users. Following the prior studies (e.g., [31]), we consider these emotions (i.e., resentment, frustration, and envy) as upward contrastive emotions.

The cognitive emotion theory posits that emotions directly lead to specific behaviors [32-34]. In other words, the nature of the emotion experienced has a significant influence on an individual's subsequent actions. In the context of social media, for instance, a person with upward contrastive feelings due to upward social comparison may prevent themselves from witnessing others' well-being by cutting off contact [35, 36]. For example, the stronger the upward contrastive emotions due to upward social comparison in Instagram users, the more likely they are to sever relations with others. The weakening of social bonds and withdrawal from human connection often result in a decline in their quality of life. Previous studies have proven that envy harms subjective well-being [37, 38]. Also, the more negative emotions users experience on Facebook, the more likely they are to feel unhappy with their lives [39]. Recent studies have indicated that feelings of envy triggered by upward social comparison may potentially contribute to the onset of depressive symptoms [28].

Based on the Smith's (2000) model and the literature on upward social comparison on social media, we expect that the more Instagram users compare their own lives with those of other Instagram users who appear to be doing better in life, the stronger the upward contrastive emotions they feel, which, in turn, make them unhappy. Consequently, we put forth the subsequent hypothesis.

H1. Upward contrastive emotions mediate the relationship between upward social comparison and subjective well-being.

2.3 Moderating Role of Attribution for the Success of Others

Engaging in upward social comparison on Instagram may induce negative upward emotions, resulting in a decrease in subjective well-being as suggested in Hypothesis 1. The negative consequences of upward social comparison, however, may not be the same for everyone [27, 28]. For example, [40] found that the negative effects are moderated by marital quality. Similarly, the impact of upward social comparison on Instagram on subjective well-being through upward contrastive emotions may be influenced by certain factors, such as individual mentality, and therefore requires further investigation. Exploring and identifying these moderating variables would be meaningful because it would help find a solution for mitigating the negative impacts of upward social comparison on Instagram or other similar social media applications.

The attribution theory posits that how people interpret an event can affect their attitude and behavior [15]. Previous literature has demonstrated that people felt more negative emotions such as relative deprivation and resentment when attributing others' success to external rather than internal factors [16, 17]. Tse et al. (2018) [41] also revealed that when people perceive the success of another person as unfair, they are likely to develop a hostile attitude towards that person, and consequently, are more likely to act in a manner that could harm that person. These findings indicate that individual emotion, attitude, and behavior can be influenced by how others' success is attributed.

In the context of social media such as Instagram, when users witness others' accomplishments (e.g., pictures of luxury cars), they will attempt to determine what made the accomplishment possible and accordingly attribute the success to a cause. However, individuals vary in the manner they view other people's success. For

example, some people tend to generally view others' success as the fruit of competence or efforts (internal attributions), while others tend to attribute it to factors such as family wealth or luck (external attributions). Those who tend to attribute others' success to external causes will perceive it as unfair and believe they cannot succeed as others do because they lack those external advantages. Previous research has indicated that upward social comparison led to more symptoms of depression when people with negative perspectives on life perceived that they could not achieve what others had achieved [28]. Therefore, if users attribute other people's success to external factors, the negative emotions triggered by upward social comparison will make them feel unhappy with their lives. In contrast, those who attribute it to internal factors will be able to fairly appreciate the success of others and hold a positive expectation that they too can achieve what others have achieved. Thus, upward contrastive emotions resulting from upward social comparison would not have a significant impact on their subjective well-being. Drawing upon attribution theory and the current body of literature, we put forth the following hypothesis.

H2: Attribution for the success of others moderates the relationship between upward contrastive emotions and subjective well-being.

Since the relationship between upward contrastive emotions and subjective well-being is moderated by how users see other people's positive postings, the indirect effect of upward social comparison on subjective well-being through upward contrastive emotions is expected to change accordingly. Specifically, if someone has a strong tendency to attribute the achievements of others to external factors, upward contrastive emotions triggered by upward social comparison may affect subjective well-being; however, if someone tends to attribute the success of others to internal factors, the indirect effect of upward social comparison on subjective well-being via upward contrastive emotions would not be significant. This is because upward contrastive emotions are not associated with subjective well-being when attributing the success of others to internal factors, as suggested in Hypothesis 2. Accordingly, we present the following hypothesis.

H3. Attribution for the success of others moderates the mediating effect of upward contrastive emotions in the association between upward social comparison on Instagram and subjective well-being.

Based on Smith's (2000) typology, the attribution theory, and prior studies, we put forward the moderated mediation model outlined in Figure 1.

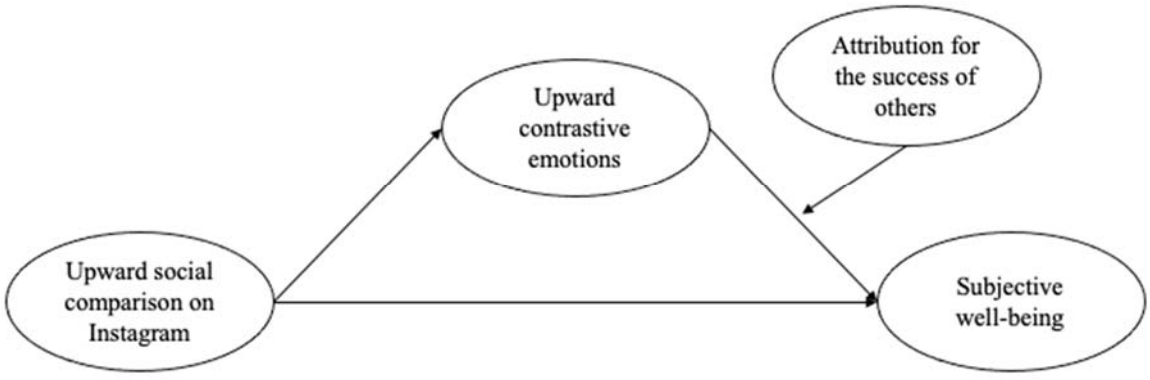

Figure 1. The proposed moderated mediation model

3. Research Methodology

3.1 Participants and Procedure

The participants were recruited by an online research firm in South Korea. Since this research targeted active users of Instagram, people who do not currently enjoy Instagram were excluded from the survey by using a screening question. All participants provided informed consent via an opt-in question in the survey. A total of 1,172 participants were selected from the panel using quota sampling methods that accounted for age and gender demographics. Ultimately, 318 completed questionnaires were obtained.

Unlike in the early days of social media, Instagram is now used by people of various age groups. Therefore, the phenomenon of upward social comparison on social media should not be seen as a problem limited to a specific age group [10]. Although it is necessary to consider different age groups when investigating the impacts of upward social comparison on social media, most previous studies have mainly focused on adolescents or students in their early twenties [28]. To address the limitations of generalization having existing studies, this study was designed for a wide range of age groups, including people in their 20s, 30s, and 40s. The final sample consisted of 318 individuals, of whom 162 were female (50.9%) and 156 were male (49.1%). The age range was 20 to 49 years, with a mean of 34.62 and a standard deviation of 7.87.

3.2 Instrument Development

Upward social comparison. We adopted the five items from [42] to measure upward social comparison on Instagram. One sample is “In my typical use of Instagram, I frequently engage in a process of comparison with individuals whose circumstances and experiences I perceive to be superior to my own.” The items are measured with a five-point Likert scale (1 = “strongly disagree” ~ 5 = “strongly agree.”). The scale scores are calculated by adding up and averaging the scores of all items. Higher scores represent a high amount of upward social comparison on Instagram. The Cronbach's α coefficient was 0.94.

Upward contrastive emotions. Upward contrastive emotions were measured as resentment/anger, frustration, and envy, adopted from [14]. The items are rated on a five-point Likert scale, ranging from 1 = “strongly disagree” to 5 = “strongly agree”. In particular, respondents are requested to indicate the extent to which they experience each emotion when utilising the Instagram platform. This may be exemplified by the statement, “When I utilise Instagram, I frequently experience feelings of envy.” The scale scores are calculated by adding up and averaging the scores of all items. The Cronbach's α coefficient for upward contrastive emotions was 0.91.

Attribution for the success of others. Individuals vary in the manner they view other people’s success. In other words, even if users see the same post that causes upward social comparison, they can attribute them differently. Thus, attribution for the success of others means subjective perceptions rather than objective perceptions. It was developed as a formative indicator, referring to the study of [17], and measured with a five-point Likert scale (1=“strongly disagree” ~ 5=“strongly agree”). A single question is asked—“When you see other people's achievements using Instagram, how do you think they achieved such things?” Four opinions are presented as response options: (1) They tried hard. (2) They are innately talented. (3) They received material/mental support from others. (4) They were simply lucky. While items 1 and 2 are internal attributions for success, items 3 and 4 are external attributions. In the current study, attribution for the success of others is calculated by subtracting the external attribution from the internal attribution; a higher score indicates more internal attribution for the success of others.

Subjective well-being. The term "subjective well-being" is used to describe an individual's overall assessment of their life satisfaction, taking into account various aspects such as relationships, work, health, meaning, and purpose [3]. As in previous research, subjective well-being was assessed by two measures. First, the life satisfaction (the cognitive dimension of subjective well-being) was measured by the Satisfaction with Life Scale [43]. It consists of five items including “In most ways, my life is close to my ideal.” Respondents indicated their agreement to these items on a five-point Likert scale, ranging from 1 = “strongly disagree” to 5 = “strongly agree”. In the current study, Cronbach’s α for life satisfaction was 0.88.

The second measure of subjective well-being was measured by a Korean short version of the Positive affective and Negative affective Scale (PANAS) [44, 45], used to assess the affective dimension of subjective well-being. The PA scale includes the three items—pleasant, happy, and comfortable. The NA scale also includes three items—irritated, negative, and helpless. Participants indicated their response on a five-point Likert scale ranging from 1=“never” to 5=“always”. Cronbach’s α for the PA and NA were 0.81 and 0.86, respectively. As in the preceding studies, subjective well-being was calculated by adding up the life satisfaction and the PA scores and then subtracting the NA score [46].

Control variables. As in previous studies, Instagram intensity and demographic characteristics, including gender, age, and income, were employed as control variables. Instagram intensity was measured by asking “How much do you use Instagram on average per day?” on a five-point scale (1=“less than 10 minutes” ~ 5=“more than 2 hours”). Income was measured by asking monthly income on a 6-point scale (1=“less than 1,000,000 won” ~ 6=“more than 5,000,000 won”). Sociodemographic factors have been shown to be associated with SWB [3].

Prior to hypothesis testing, a principal component factor analysis was conducted on the five variables with Varimax rotation, as detailed in Appendix B. A total of five factors exhibiting eigenvalues exceeding 1.0 were identified. Each item associated with the variables was successfully loaded onto its respective factor, collectively accounting for 75.7% of the total variance. Furthermore, all variables exhibited convergent validity, as evidenced by factor loadings surpassing 0.669. Upon comparison across various factors, the items exhibited the highest loadings on their corresponding factors, thereby demonstrating that the criteria for convergent validity were satisfied.

4. Results

Table 1 presents the descriptive statistics and correlation matrix. The results indicate a correlation between upward social comparison and a decrease in subjective well-being, as well as an increase in upward contrastive emotions. Additionally, upward contrastive emotions were found to be negatively correlated with subjective well-being.

Table 1. Descriptive statistics and correlations between variables

	M	S.D.	1	2	3	4	5
1	2.78	0.94	1				
2	2.15	0.86	.633**	1			
3	2.70	1.19	.072	.037	1		
4	0.23	1.79	-.087	-.140*	-.044	1	
5	3.73	1.48	-.214**	-.289**	.109	.145**	1

Notes: n=318; 1=upward social comparison; 2= upward contrastive emotions; 3=Instagram intensity; 4= attribution for the success of others; 5=subjective well-being; *p <.05, **p <.01.

4.1 Hypothesis Testing

4.1.1 Hypothesis 1

The PROCESS macro (Model 4) in SPSS [47] was employed to assess the mediating effect of upward contrastive emotions on the relationship between upward social comparison and subjective well-being. As Table 2 shows, the indirect effect of upward social comparison on subjective well-being via upward contrastive emotions was significant (b=-.26, BootSE=.07, 95% CI=[-.40, -.12]). The findings revealed that upward contrastive emotions serve as a mediating factor in the relationship between upward social comparison and subjective well-being. As a result, Hypothesis 1 was validated.

Table 2. Results of mediation analysis

	Model 1 (Subjective well-being)		Model 2 (Upward contrastive emotions)		Model 3 (Subjective well-being)	
	b	*t*	*b*	*t*	*b*	*t*
Gender	-.14	-.83	-.08	-1.06	-.18	-1.07
Age	-.02*	-1.98	.00	.32	-.02*	-1.96
Income	.13*	1.99	.01	.35	.14*	2.11
Instagram intensity	.14*	2.04	.00	.01	.14*	2.09
Upward social comparison	-.33***	-3.80	.58***	14.33	-.07	-.61
Upward contrastive emotions					-.45***	-3.81

F	5.54***	42.34***	7.23***	
R^2	.08	.40	.12	
The indirect effect of upward social comparison on subjective well-being via upward contrastive emotions	Effect	BootSE	95% CI	
			BootLLCI	BootULCI
	-.26	.07	-.40	-.12

Note: *p <.05, ***p <.001; Bootstrap sample size = 5000.

4.1.2 Hypothesis 2

We conducted a hierarchical regression analysis to test the moderating effect of attribution for the success of others in the relationship between upward contrastive emotions and subjective well-being. As shown in Table 3, the interaction between upward contrastive emotions and attribution for the success of others is significant (b=.14; p<.05). Additionally, following the recommendations by [48], the simple slope analysis was performed. As presented in Table 4, the results show that, for people with low levels of attribution for the success of others (i.e., external attribution), upward contrastive emotions negatively influence subjective well-being (simple slope =-.54; p<.001), whereas for people with high levels of attribution for the success of others (i.e., internal attribution), the negative impact of upward contrastive emotions on subjective well-being is weak and not significant (simple slope=-.22; n.s). Therefore, Hypothesis 2 was confirmed.

Table 3. Results of moderation analysis

	Model 1		Model 2		Model 3	
	b	*t*	*b*	*t*	*b*	*t*
Gender	-.14	-.83	-.10	-.61	-.12	-.73
Age	-.02*	-1.98	-.03*	-2.50	-.03**	-2.65
Income	.13*	1.99	.16*	2.41	.16*	2.51
Instagram intensity	.14*	2.05	.14*	2.04	.13*	2.01
Upward social comparison	-.33***	-3.80	-.07	-.61	-.07	-.67
Upward contrastive emotions (1)			-.41***	-3.49	-.38**	-3.20
Attribution for the success of others (2)			.11*	2.39	.10*	2.11
(1) * (2)					.14*	2.02
F	5.54***		7.11***		6.79***	
R^2	.08		.14		.15	
ΔR^2			.06***		.01*	

Note: *p <.05, **p <.01, ***p <.001.

Table 4. Conditional effects of upward contrastive emotions at values of attribution

Upward contrastive emotions	Attribution for the success of others	Effect	se	*t*	95% CI	
					LLCI	ULCI
	-1 SD (external)	-.54	.13	-4.04	-.80	-.28
	Mean	-.38	.12	-3.20	-.61	-.15
	+1 SD (internal)	-.22	.15	-1.46	-.52	.08

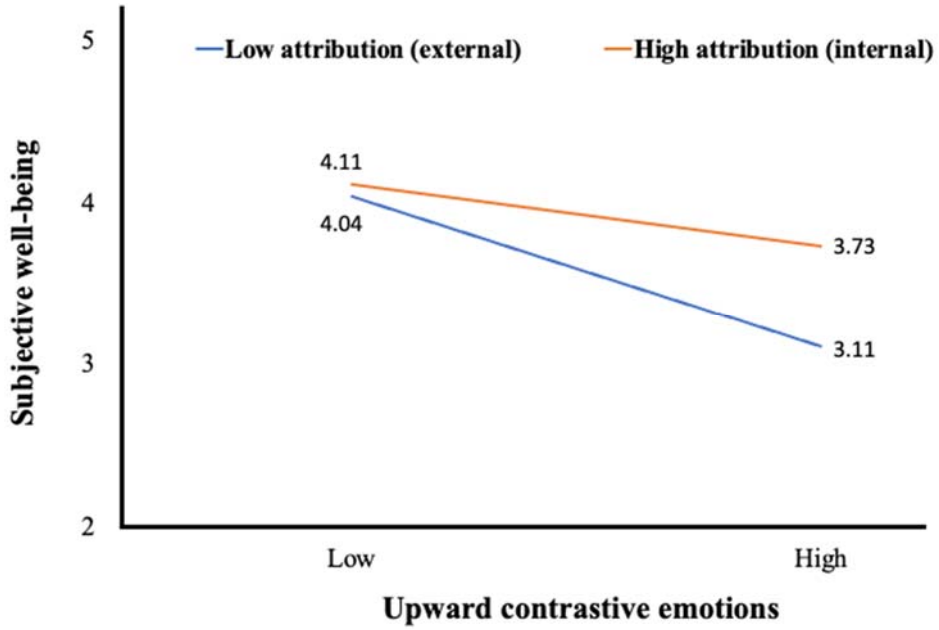

Figure 2. Plot of the relationship between upward contrastive emotions and subjective well-being at two levels of attribution.

4.1.3 Hypothesis 3

The PROCESS macro (Model 14) [47] was used to test the proposed moderated mediation model. We tested the conditional indirect effects of upward social comparison on subjective well-being through upward contrastive emotions for different levels of attribution for the success of others.

As indicated in Table 5, there was a significant main effect of upward social comparison on upward contrastive emotions in Model 1 (b=.58, p<.001). Model 2 demonstrated a significant effect of upward contrastive emotions on subjective well-being (b=-.38, p< .001).

Table 5. Results of moderated mediation analysis

	Model 1 (Upward contrastive emotions)		Model 2 (Subjective well-being)	
	b	*t*	*b*	*t*
Gender	-.08	-1.06	-.12	-.73
Age	.00	.32	-.03**	-2.65
Income	.01	.35	.16*	2.51
Instagram intensity	.00	.01	.13*	2.01
Upward social comparison	.58***	14.33	-.07	-.67
Upward contrastive emotions (1)			-.40***	-3.40
Attribution for the success of others (2)			-.09	-.85
(1) * (2)			.09*	2.02
F	42.34***		6.79***	
R^2	.40		.15	

Note: *p <.05, **p <.01, ***p <.001.

As Table 6 shows, for individuals who attribute others' success to external factors (-1SD), the indirect effect of upward social comparison on subjective well-being via upward contrastive emotions was significant; whereas for individuals who attribute others' success to internal factors (+1SD), the indirect effect of upward social comparison on subjective well-being via upward contrastive emotions was not significant. The results suggest that the mediating effect of upward contrast emotions in the association between upward comparison and subjective well-being on Instagram can vary depending on how individuals attribute the success of others (i.e., internal or external). Thus, Hypothesis 3 was supported.

Table 6. Results for conditional indirect effect analysis

Upward contrastive emotions	Attribution for the success of others	Effect	BootSE	95% CI	
				BootLLCI	BootULCI
	-1 SD (External)	-.31	.09	-.49	-.13
	Mean	-.22	.07	-.36	-.09
	+1 SD (Internal)	-.13	.10	-.34	.04

Note: Bootstrap sample size = 5000.

5. Discussion

5.1 Discussion of Findings

This study builds upon the attribution theory and Smith's (2000) typology of emotions for social comparison to develop a moderated mediation model that extends previous literature on the impacts of upward social comparison on social media. Additionally, it contributes to the ongoing debate on the impacts of social media on subjective well-being by providing further evidence of the potential negative impact of social media due to upward social comparison.

First, we find that the psychological mechanism that underlies the relationship between upward social comparison on Instagram and subjective well-being is the experience of upward contrastive emotions. Specifically, an increase in comparisons with others considered superior triggers more upward contrastive emotions (e.g., envy, frustration, resentment/anger) among Instagram users, which, in turn, leads to lower subjective well-being. This finding suggests that upward social comparison on Instagram may pose a risk to an individual's well-being, thus supporting previous findings that social media has a high potential to harm subjective well-being by causing upward social comparison [12, 13].

Our research focuses on the negative effects of upward social comparison on Instagram, but upward social comparison on Instagram may have a positive impact on users. For example, upward social comparison on Instagram can increase subjective well-being via upward assimilative emotions including inspiration, optimism, and admiration [49]. It is worthy of examining these relationships in future studies.

Second, we find that attribution for the success of others moderates the indirect effect of upward social comparison on Instagram on subjective well-being via upward contrastive emotions. Specifically, if others' accomplishments are attributed to external factors such as luck, upward contrastive emotions caused by upward social comparison negatively affect subjective well-being. In contrast, when the success of others is attributed to internal factors such as their effort or ability, the indirect effect of upward social comparison on subjective well-being through upward contrastive emotions is not significant; this is because an individual's attitude and behavior are determined by how the individual sees other people's accomplishments [41]. People attempt to find reasons as to why others appear better off than themselves [15]. Those who are inclined to find the cause of others' success in their endeavors (i.e., internal attributions) expect that they will be able to succeed as well; therefore, even if they experience upward contrastive emotions due to upward social comparison, these negative emotions may not lead to a decrease in their quality of life. However, those who believe that others' success is simply due to luck or because they were born with silver spoons in their mouths (i.e., external attributions), undergo a decline in well-being due to upward contrastive emotions triggered by upward social comparison.

5.2 Limitations and Future Research Directions

It must be acknowledged that this study is not without limitations, which may provide guidance for future research endeavors. First, while we have revealed that attribution for the success of others plays an important role in upward social comparison affecting subjective well-being through upward contrastive emotions, there may be other factors that influence this mechanism (e.g., the duration of Instagram usage). For instance, it may be important to know whose posts users mainly see on Instagram [50]. Since users who mainly view acquaintances' posts are aware of what their real life is like, they can recognize it when their posts are exaggerated. Therefore, users would not be affected much by this type of comparison. This may be a meaningful avenue for future research.

Second, a significant area of investigation is the examination of the factors that moderate the relationship between upward social comparison and upward contrastive emotions (or subjective well-being). This is because not all individuals experience upward contrastive emotions as a result of upward social comparison. For example, people with high self-efficacy or an optimistic view of life, even when they experience upward social comparison on social media, may not be envious of people who are better off than themselves [27, 28].

Lastly, our study only dealt with upward social comparison that mostly occurs on social media platforms; however, some users will likely seek to compare themselves to people who appear to be inferior (downward comparison) or similar (similar social comparison) [28]. Therefore, in future studies, looking at the phenomenon of other social comparisons (e.g., downward or similar social comparison) may also carry significant implications.

5.3 Implications for Research and Practice

The present study contributes to the literature on upward social comparison impacts on social media in several ways. First, drawing on the attribution theory, we develop a moderated mediation model that emphasizes the role of attribution in social media outcomes (e.g., subjective well-being). Although social media researchers have investigated the relationship between upward social comparison on social media and subjective well-being, there is a lack of studies that identify the moderating variables on the relationship [51]. Few studies considered personality factors as the moderating variables, such as optimism [27], personal growth initiative [52], and self-esteem [53]. Thus, this study contributes to the existing literature by showing that attribution for the success of others plays a significant moderating role between upward social comparison and subjective well-being in the context of social media. Researchers who study social comparison in the context of social media can provide more meaningful implications by considering the attribution.

Second, unlike previous studies [31], we consider all the upward contrastive emotions as suggested by [14] by adding resentment, an other-focused emotion. Resentment is an important emotion for users in the context of upward social comparison on social media as it can negatively affect their well-being. Social media makes users angry, and one of the reasons may be social comparison. However, previous studies have not included resentment while exploring the mediating role of negative emotions in the relationship between upward social comparison and subjective well-being, focusing on only envy among the upward contrastive emotions. Resentment, like envy, can be seen as a negative emotion caused by upward social comparison [14]; thus, future studies investigating the role of negative emotions in the relationship between upward social comparison and outcomes need to consider it.

Third, our findings indicate that the adverse impact of upward social comparison is prevalent across a diverse range of age groups, including individuals in their 20s, 30s, and 40s. Although upward social comparison on social media should not be seen as a problem limited to a specific age group [10], the majority of previous studies have concentrated on adolescents or students in their early twenties [27]. The present study advances the current understanding of upward social comparison on social media by addressing the limitations of generalization based on existing studies. Finally, this study was conducted on the Instagram platform, which differs from the context of most prior research, which has focused on Facebook. The present study offers empirical evidence indicating that upward social comparison on Instagram may also have a detrimental impact on individual well-being.

Practically, our findings provide some implications for social media users who may be unhappy due to the upward social comparison they inevitably experience while using social media, especially Instagram. We suggest that Instagram users should try to attribute the success of others to internal factors rather than external factors when they compare themselves to others who appear to be superior. If users attribute other people's

achievements to their efforts rather than luck, users' subjective well-being is less likely to be undermined by the upward contrastive emotions resulting from upward social comparison.

6. Conclusion

This study contributes broadly to the social media literature and narrowly to the social media impacts literature. Recently, Instagram's user base has been showing exponential growth around the world. Its popularity has increased so much that a new word, "Instagrammable" has been coined, that is used for visually attractive scenes worthy of being photographed and posted on Instagram. The word reflects the enthusiasm for posting striking pictures on Instagram to attract viewers and get likes. In keeping with this trend, many users post only their best, often airbrushed, pictures and moments on the platform, creating the illusion of a perfect life. Users who see these posts often fail to look through the illusion and develop a sense of inadequacy and dissatisfaction, leading to unhappiness. To help manage this widespread social problem, our study proposes a way to mitigate the negative consequences of upward social comparison by looking at the attribution for the success of others, which has not been considered in previous studies. It is our hope that this paper will serve as a catalyst for discourse on this nascent social issue, which has the potential to cause significant harm to individuals. Furthermore, we believe it can serve as an excellent foundation for a more comprehensive understanding of the social comparison phenomenon on social media.

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References

[1] E. Diener, "Subjective well-being: The science of happiness and a proposal for a national index," American Psychologist, vol. 55, no. 1, pp. 34-43, Jan. 2000, doi: https://doi.org/10.1037//0003-066X.55.1.34.

[2] E. Diener, "Subjective well-being," Psychological Bulletin, vol. 95, pp. 542-575, Sep. 1984, doi: https://doi.org/10.1037//0033-2909.95.3.542.

[3] E. Diener and K. Ryan, "Subjective well-being: A general overview," South African Journal of Psychology, vol. 39, no. 4, pp. 391-406, Dec. 2009, doi: https://doi.org/10.1177/008124630903900402.

[4] J. F. Helliwell, H. Huang, and S. Wang, "The geography of world happiness," World Happiness Report, pp. 12-41, Apr. 2015.

[5] P. A. La Barbera and Z. Gürhan, "The role of materialism, religiosity, and demographics in subjective well-being," Psychology and Marketing, vol. 14, no. 1, pp. 71-97, Jan. 1997, doi: https://doi.org/10.1002/(SICI)1520-6793(199701)14:1<71::AID-MAR5>3.3.CO;2-V.

[6] Z. Shah, U. Ghani, F. Asmi, L. Wei, and S. Qaisar, "Exposure to terrorism-related information on SNSs and life dissatisfaction: The mediating role of depression and moderation effect of social support," Technology in Society, vol. 64, p. 101503, Feb. 2021, doi: https://doi.org/10.1016/j.techsoc.2020.101503.

[7] V. Apaolaza, P. Hartmann, E. Medina, J. M. Barrutia, and C. Echebarria, "The relationship between socializing on the Spanish online networking site Tuenti and teenagers' subjective well-being: The roles of self-esteem and loneliness," Computers in Human Behavior, vol. 29, no. 4, pp. 1282-1289, Jul. 2013, doi: https://doi.org/10.1016/j.chb.2013.01.002.

[8] S. Valenzuela, N. Park, and K. F. Kee, "Is there social capital in a social network site? Facebook use and college student's life satisfaction, trust, and participation," Journal of Computer-Mediated Communication, vol. 14, pp. 875-901, Jul. 2009, doi: https://doi.org/10.1111/j.1083-6101.2009.01474.x.

[9] M. Burke, C. Marlow, and T. Lento, "Social network activity and social well-being," in Proc. SIGCHI Conf. Human Factors Comput. Syst., Atlanta, GA, USA, Apr. 2010, pp. 1909-1912, doi: https://doi.org/10.1145/1753326.1753613.

[10] D. Schmuck, K. Karsay, J. Matthes, and A. Stevic, "'Looking up and feeling down': The influence of mobile social networking site use on upward social comparison, self-esteem, and well-being of adult smartphone users," Telematics and Informatics, vol. 42, p. 101240, Jul, 2019, doi: https://doi.org/10.1016/j.tele.2019.101240.

[11] P. Verduyn, D. S. Lee, J. Park, H. Shablack, A. Orvell, J. Bayer, O. Ybarra, J. Jonides, and E. Kross, "Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence," Journal of Experimental Psychology: General, vol. 144, no. 2, pp. 480-488, Feb. 2015, doi: https://doi.org/10.1037/xge0000057.

[12] X. Fan, N. Deng, X. Dong, Y. Lin, and J. Wang, "Do others' self-presentation on social media influence individual's subjective well-being? A moderated mediation model," Telematics and Informatics, vol. 41, pp. 86-102, Feb. 2019, doi: https://doi.org/10.1016/j.tele.2019.04.001.

[13] J. L. Wang, H. Z. Wang, J. Gaskin, and S. Hawk, "The mediating roles of upward social comparison and self-esteem

and the moderating role of social comparison orientation in the association between social networking site usage and subjective well-being," Frontiers in Psychology, vol. 8, p. 771, May. 2017, doi: https://doi.org/10.3389/fpsyg.2017.00771.

[14] R. H. Smith, "Assimilative and contrastive emotional reactions to upward and downward social comparisons," in Handbook of Social Comparison, J. Suls and L. Wheller, Eds. New York, NY, USA: Plenum, pp. 173-200, 2000, doi: https://doi.org/10.1007/978-1-4615-4237-7_10.

[15] B. Weiner, "An attributional theory of achievement motivation and emotion," Psychological Review, vol. 92, no. 4, pp. 548-573, Oct. 1985, doi: https://doi.org/10.1037//0033-295X.92.4.548.

[16] N. T. Feather and R. Sherman, "Envy, resentment, schadenfreude, and sympathy: Reactions to deserved and undeserved achievement and subsequent failure," Personality and Social Psychology Bulletin, vol. 28, no. 7, pp. 953-961, Jul. 2002, doi: https://doi.org/10.1177/01467202028007008.

[17] H. S. Yang, "When does a viewer feel relative deprivation? Examining the effects of drama characters and viewer traits on emotional reactions associated with upward social comparisons," Korean Journal of Broadcasting and Telecommunication Studies, vol. 29, no. 6, pp. 137-171, Dec. 2015.

[18] Statista, "Number of monthly active Instagram users from 2013 to 2021 (in millions)," 2021. [Online]. Available: https://www.statista.com/statistics/253577/number-of-monthly-active-instagram-users/

[19] S. Alhabash and M. Ma, "A tale of four platforms: Motivations and uses of Facebook, Twitter, Instagram, and Snapchat among college students," Social Media + Society, vol. 3, no. 1, pp. 1-13, Jan. 2017, doi: https://doi.org/10.1177/2056305117691544.

[20] C. Shane-Simpson, A. Manago, N. Gaggi, and K. Gillespie-Lynch, "Why do college students prefer Facebook, Twitter, or Instagram? Site affordances, tensions between privacy and self-expression, and implications for social capital," Computers in Human Behavior, vol. 86, pp. 276-288, Sep. 2018, doi: https://doi.org/10.1016/j.chb.2018.04.041.

[21] T. H. H. Chua and L. Chang, "Follow me and like my beautiful selfies: Singapore teenage girls' engagement in self-presentation and peer comparison on social media," Computers in Human Behavior, vol. 55, pp. 190-197, May. 2016, doi: https://doi.org/10.1016/j.chb.2015.09.011.

[22] T. M. Dumas, M. Maxwell-Smith, J. P. Davis, and P. A. Giulietti, "Lying or longing for likes? Narcissism, peer belonging, loneliness and normative versus deceptive like-seeking on Instagram in emerging adulthood," Computers in Human Behavior, vol. 71, pp. 1-10, Jun. 2017, doi: https://doi.org/10.1016/j.chb.2017.01.037.

[23] M. Tiggemann and I. Anderberg, "Social media is not real: The effect of 'Instagram vs reality' images on women's social comparison and body image," New Media & Society, vol. 22, no. 12, pp. 2183-2199, Dec. 2020, doi: https://doi.org/10.1177/1461444819888720.

[24] L. Festinger, "A theory of social comparison processes," Human Relations, vol. 7, no. 2, pp. 117-140, May. 1954, doi: https://doi.org/10.1177/001872675400700202.

[25] J. P. Gerber, L. Wheeler, and J. Suls, "A social comparison theory meta-analysis 60+ years on," Psychological Bulletin, vol. 144, no. 2, pp. 177-197, Feb. 2018, doi: https://doi.org/10.1037/bul0000127.

[26] L. Sloman, P. Gilbert, and G. Hasey, "Evolved mechanisms in depression: The role and interaction of attachment and social rank in depression," Journal of Affective Disorders, vol. 74, no. 2, pp. 107-121, Feb. 2003, doi: https://doi.org/10.1016/S0165-0327(02)00116-7.

[27] Q. Q. Liu, Z. K. Zhou, X. J. Yang, G. F. Niu, Y. Tian, and C. Y. Fan, "Upward social comparison on social network sites and depressive symptoms: A moderated mediation model of self-esteem and optimism," Personality and Individual Differences, vol. 113, pp. 223-228, Nov. 2017, doi: https://doi.org/10.1016/j.paid.2017.03.037.

[28] Y. Li, "Upward social comparison and depression in social network settings: The roles of envy and self-efficacy," Internet Research, vol. 29, no. 1, pp. 46-59, Jan. 2019, doi: https://doi.org/10.1108/IntR-09-2017-0358.

[29] M. Lim and Y. Yang, "Upward social comparison and Facebook users' grandiosity," Online Information Review, vol. 43, no. 4, pp. 635-652, Jul. 2019, doi: https://doi.org/10.1108/OIR-04-2017-0137.

[30] S. Y. Lee, "How do people compare themselves with others on social network sites?: The case of Facebook," Computers in Human Behavior, vol. 32, pp. 253-260, Mar. 2014, doi: https://doi.org/10.1016/j.chb.2013.12.009.

[31] S. Y. Park and Y. M. Baek, "Two faces of social comparison on Facebook: The interplay between social comparison orientation, emotions, and psychological well-being," Computers in Human Behavior, vol. 79, pp. 83-93, Mar. 2018, doi: https://doi.org/10.1016/j.chb.2017.10.028.

[32] N. H. Frijda, P. Kuipers, and E. ter Schure, "Relations among emotion, appraisal and emotional action readiness," Journal of Personality and Social Psychology, vol. 57, no. 2, pp. 212-228, Aug. 1989, doi: https://doi.org/10.1037//0022-3514.57.2.212.

[33] S. Romani, S. Grappi, and D. Dalli, "Emotions that drive consumers away from brands: Measuring negative emotions toward brands and their behavioral effects," International Journal of Research in Marketing, vol. 29, no. 1, pp. 55-67, Mar. 2012, doi: https://doi.org/10.1016/j.ijresmar.2011.07.001.

[34] T. Verhagen and W. Van Dolen, "The influence of online store beliefs on consumer online impulse buying: A model and empirical application," Information & Management, vol. 48, no. 8, pp. 320-327, Dec. 2011, doi:

https://doi.org/10.1016/j.im.2011.08.001.
[35] K. J. Cha and E. M. Lee, "An empirical study of discontinuous use intention on SNS: From a perspective of society comparison theory," Journal of Society for e-Business Studies, vol. 20, no. 3, pp. 1-15, Sep. 2015, doi: https://doi.org/10.7838/jsebs.2015.20.3.059.
[36] J. Park, B. Kim, and S. Park, "Understanding the behavioral consequences of upward social comparison on social networking sites: The mediating role of emotions," Sustainability, vol. 13, no. 11, p. 5781, Jun. 2021, doi: https://doi.org/10.3390/su13115781.
[37] Y. Cohen-Charash, "Episodic envy," Journal of Applied Social Psychology, vol. 39, no. 9, pp. 2128-2173, Sep. 2009, doi: https://doi.org/10.1111/j.1559-1816.2009.00519.x.
[38] R. H. Smith, W. G. Parrott, E. F. Diener, R. H. Hoyle, and S. H. Kim, "Dispositional envy," Personality and Social Psychology Bulletin, vol. 25, no. 8, pp. 1007-1020, Aug. 1999, doi: https://doi.org/10.1177/01461672992511008.
[39] E. Frison and S. Eggermont, "'Harder, better, faster, stronger': Negative comparison on Facebook and adolescents' life satisfaction are reciprocally related," Cyberpsychology, Behavior, and Social Networking, vol. 19, no. 3, pp. 158-164, Mar. 2016, doi: https://doi.org/10.1089/cyber.2015.0296.
[40] W. Wang, M. Wang, Q. Hu, P. Wang, L. Lei, and S. Jiang, "Upward social comparison on mobile social media and depression: The mediating role of envy and the moderating role of marital quality," Journal of Affective Disorders, vol. 270, pp. 143-149, Mar. 2020, doi: https://doi.org/10.1016/j.jad.2020.03.173.
[41] H. H. Tse, C. K. Lam, J. Gu, and X. S. Lin, "Examining the interpersonal process and consequence of leader-member exchange comparison: The role of procedural justice climate," Journal of Organizational Behavior, vol. 39, no. 8, pp. 922-940, Oct. 2018, doi: https://doi.org/10.1002/job.2268.
[42] X. J. Bai, X. Liu, and Z. J. Liu, "The mediating effects of social comparison on the relationship between achievement goal and academic self-efficacy: Evidence from junior high school students," Journal of Psychological Science, vol. 36, no. 6, pp. 1413-1420, Jun. 2013.
[43] E. D. Diener, R. A. Emmons, R. J. Larsen, and S. Griffin, "The satisfaction with life scale," Journal of Personality Assessment, vol. 49, no. 1, pp. 71-75, Feb. 1985, doi: https://doi.org/10.1207/s15327752jpa4901_13.
[44] D. Watson, L. A. Clark, and A. Tellegen, "Development and validation of brief measures of positive and negative affect: The PANAS scales," Journal of Personality and Social Psychology, vol. 54, no. 6, pp. 1063-1070, Jun. 1988, doi: https://doi.org/10.1037//0022-3514.54.6.1063.
[45] E. K. Suh and J. S. Koo, "A concise measure of subjective well-being (COMOSWB): Scale development and validation," Korean Journal of Social and Personality Psychology, vol. 25, no. 1, pp. 95-113, Mar. 2011, doi: https://doi.org/10.21193/kjspp.2011.25.1.006.
[46] W. Chen, C. Y. Fan, Q. X. Liu, Z. K. Zhou, and X. C. Xie, "Passive social network site use and subjective well-being: A moderated mediation model," Computers in Human Behavior, vol. 64, pp. 507-514, Nov. 2016, doi: https://doi.org/10.1016/j.chb.2016.04.038.
[47] A. F. Hayes, Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach, 2nd ed. New York, NY, USA: Guilford Publications, 2017.
[48] L. S. Aiken, S. G. West, and R. R. Reno, Multiple Regression: Testing and Interpreting Interactions, Thousand Oaks, CA, USA: Sage, 1991.
[49] A. Meier, A. Gilbert, S. Börner, and D. Possler, "Instagram inspiration: How upward comparison on social network sites can contribute to well-being," Journal of Communication, vol. 70, no. 5, pp. 721-743, Oct. 2020, doi: https://doi.org/10.1093/joc/jqaa025.
[50] K. Lup, L. Trub, and L. Rosenthal, "Instagram# instasad?: Exploring associations among Instagram use, depressive symptoms, negative social comparison, and strangers followed," Cyberpsychology, Behavior, and Social Networking, vol. 18, no. 5, pp. 247-252, May 2015, doi: https://doi.org/10.1089/cyber.2014.0560.
[51] B. Keles, N. McCrae, and A. Grealish, "A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents," International Journal of Adolescence and Youth, vol. 25, no. 1, pp. 79-93, Jan. 2020, doi: https://doi.org/10.1080/02673843.2019.1590851.
[52] Z. Weiguo, D. Wen, L. Qingtian, W. Xinning, and Z. Ming, "Compared with him or her, I am not good enough: How to alleviate depression due to upward social comparison?" The Journal of Psychology, vol. 156, no. 7, pp. 512-534, July 2022, doi: https://doi.org/10.1080/00223980.2022.2101421.
[53] G. F. Niu, Y. J. Luo, X. J. Sun, Z. K. Zhou, F. Yu, S. L. Yang, and L. Zhao, "Qzone use and depression among Chinese adolescents: A moderated mediation model," Journal of Affective Disorders, vol. 231, pp. 58-62, Feb. 2018, doi: https://doi.org/10.1016/j.jad.2018.01.013.
[54] P. M. Podsakoff, S. B. MacKenzie, J. Lee, and N. P. Podsakoff, "Common method biases in behavioral research: a critical review of the literature and recommended remedies," Journal of Applied Psychology, vol. 88, no. 5, pp. 879-903, 2003.
[55] P. M. Podsakoff and D. W. Organ, "Self-reports in organizational research: Problems and prospects," Journal of Management, vol. 12, no. 4, pp. 531-544, 1986.

Appendix A. Measurement Items

Construct	Items	
Upward social comparison	USC1	On Instagram, I compare myself with others who perform better than me.
	USC2	On Instagram, I compare myself with others who experience the wonderful daily life than my daily life.
	USC3	On Instagram, I compare myself with others who have good appearance and body than me.
	USC4	On Instagram, I sometimes compare myself with others who have accomplished more in life than I have.
	USC5	Generally, when I use Instagram, I often compare myself with people who have better lives than I do.
Life satisfaction	SAT1	In most ways, my life is close to my ideal.
	SAT2	The conditions of my life are excellent.
	SAT3	I am satisfied with my life.
	SAT4	So far, I have gotten the important things I want in life.
	SAT5	If I could live my life over, I would change almost nothing.
Upward contrastive emotions	UCE1	When I use Instagram I often feel envy.
	UCE2	When I use Instagram I often get depressed.
	UCE3	When I use Instagram I often get frustrated.
	UCE4	When I use Instagram I often feel inferior.
	UCE5	When I use Instagram I often feel angry.
Negative affective	How frequently you have experienced each of the following emotions (1 = “never” to 5 = “always”)	
	NA1	pleasant
	NA2	happy
	NA3	comfortable
Positive affective	How frequently you have experienced each of the following emotions (1 = “never” to 5 = “always”)	
	PA1	irritated
	PA2	negative
	PA3	helpless

Appendix B. Factor Analysis Results

Construct	Items	1	2	3	4	5
Upward social comparison	USC4	**0.876**	-0.029	0.228	0.124	0.048
	USC 5	**0.868**	-0.055	0.258	0.132	0.021
	USC 2	**0.864**	-0.046	0.23	0.11	0.013
	USC 3	**0.852**	0.036	0.199	0.115	0.033
	USC 1	**0.822**	0.056	0.237	0.179	-0.033
Life satisfaction	SAT3	-0.041	**0.838**	-0.033	-0.111	0.21
	SAT 2	-0.013	**0.82**	0.021	-0.059	0.162
	SAT 5	0.032	**0.805**	0.123	0.079	0.113

	SAT 4	0.032	**0.797**	-0.056	-0.04	0.195
	SAT 1	-0.038	**0.78**	0.085	0.008	0.162
Upward contrastive emotions	UCE4	0.222	0.099	**0.839**	0.247	-0.006
	UCE 5	0.174	0.001	**0.819**	0.201	0.05
	UCE 2	0.366	0.012	**0.781**	0.169	-0.122
	UCE 3	0.501	-0.043	**0.682**	0.205	-0.08
	UCE 1	0.431	0.127	**0.669**	0.186	-0.031
Negative affective	NA1	0.144	-0.014	0.187	**0.869**	0.052
	NA2	0.187	-0.019	0.311	**0.841**	-0.013
	NA3	0.259	-0.096	0.265	**0.752**	-0.148
Positive affective	PA2	-0.008	0.271	0.002	0.002	**0.834**
	PA3	-0.005	0.215	-0.024	-0.002	**0.814**
	PA1	0.071	0.309	-0.075	-0.079	**0.781**
Eigenvalue		7.242	4.363	1.855	1.391	1.057
% of variance		34.484	20.775	8.832	6.623	5.033
Cumulative %		34.484	55.258	64.09	70.713	75.746
Note. Item loadings were obtained using principal component analysis with Varimax rotation.						

Appendix C. Addressing Common Method Bias

To address the issue of common method bias, we took several steps. First, we conducted a Harman's single-factor test [54]. The Harman's single-factor test indicates the presence of problematic common method bias if an exploratory factor analysis with all variables included in this study produces eigenvalues suggesting that the first factor accounts for more than 50% of the variance among variables [55]. The results demonstrated that no single factor emerged, and no single general factor accounted for the majority of the covariance among the latent factors. In fact, factor 1 accounted for only 34.75% of the variance. Second, although this study should not have raised concerns about social desirability, we assured participants that their responses would be analyzed anonymously and that there were no "correct" or "incorrect" answers. In addition, we asked participants to answer spontaneously and honestly. While we cannot eliminate the possibility of common method bias in our data, these steps gave us confidence that it should not be a major issue in this study.