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“Let Me Take Another Selfie”: Further Examination of the Relation Between Narcissism, Self-Perception, and Instagram Posts

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The present study sought to replicate and extend recent research on the association between posting self-photographs (“selfies”) and self-perception, particularly narcissism. This study also considered the link between self-perception and photos of oneself that were not selfies (“posies”) to determine if there were intrapersonal implications of selfies versus other self-displays on the popular social media platform, Instagram. Participants with both self-report and observational data were 100 (20 males, 80 female) undergraduates. Selfies and posies were coded according to their frequency relative to participants’ posts that did not include their own image and according to themes (i.e., physical appearance, event/activity/location, affiliation with others, collage, other/undifferentiated). Overall, such posts were not associated with narcissism or self-esteem, with some specific themes showing small correlations with narcissism and concerns regarding societal attitudes about appearance. Some aspects of participants’ Instagram activity (i.e., number of likes for selfies and posies; number of followers) were significantly correlated with posting posies. The implications of these findings for research methodology on social media behavior and in the connection between self-perception and photo sharing on social media are discussed.

Public Policy Relevance Statement

Social media applications have become an important forum through which individuals engage in self-expression and perceive others. One such expression is posting self-photographs (e.g., selfies). The overall findings indicate that such displays are not inherently indicative of a narcissistic self-perception, but further work is needed on how posting self-photos on social media might be perceived by others and thus might have interpersonal implications.

Keywords: social media, selfies, narcissism, self-esteem

A concurrent rise in social media platforms and self-displays sent to the masses through photographic posts on those platforms has led some to decry our present-day “selfie culture” (Rosenblum, 2016). The popular press has provided no shortage of discussion about the pre-

sumed psychological meaning of social media activity, with some activities, such as self-photography (i.e., “selfies”) garnering a great deal of media attention (Bennett, 2014; Huffington Post, 2013). Indeed, an entire industry has emerged (e.g., “selfie sticks,” photo filters on phone applications) that appears devoted to enhancing the ability and desire of users to take and post selfies. Empirical research on social media behavior, despite its tremendous growth, still lags substantially behind the advances in the formats, features, and potential uses of social media applications. This work is also plagued by a reliance on self-report methodology in trying to draw conclusions about the intra- and interpersonal factors that play a role

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in both adaptive and maladaptive social media behavior.

Without adequate data to substantiate the claim and under the guise of science (Barakat, 2014; Chamorro-Premuzic, 2014), many in the popular media have adopted the position that selfies are inherently narcissistic, as narcissism involves a grandiose self-presentation, vanity, and strong desire for positive feedback from others or as an indicator of low self-esteem and a desire for confidence-boosting appraisals from others. Still, others in the popular press acknowledge the selfie's capacity to engender self-exploration and identity formation (Rutledge, 2013). Some celebrate how selfies may undercut idealistic notions of female beauty (Guedes, 2015) and empower young women (Simmons, 2013), whereas others lambast selfies as a so-called "cry for help" (Ryan, 2013). Given the notion that posting selfies has become commonplace, it is uncertain whether such an activity is indicative of the attributes of the individuals making the displays, is tied to a larger societal shift toward more self-centeredness, or is more reflective of a popular use of social media, which is not necessarily reflective of specific individual or societal factors.

The purpose of the present study was to replicate and extend previous empirical work on the association between posting selfies and self-perception (i.e., Barry, Doucette, Loflin, Rivera-Hudson, & Herrington, 2017). Specifically, the present study includes both inventory-based assessment of self-perception along with naturalistic observation of social media posts on the popular photo sharing social media application, Instagram. This study sought to extend previous research in meaningful ways that include examining the role of nonselfie posts of one's image (i.e., "posies"). In addition, although the focus was on narcissism and self-esteem, posting selfies remains a poorly understood phenomenon that warrants examination of potential motivating factors in the frequency of self-displays on social media. To this end, the present study also considered physical appearance concerns and fear of missing out (FoMO). Finally, this study examined other parameters of photo-sharing behaviors such as number of users connected to participants, feedback from others (i.e., "likes"), and the use of hashtags as they relate to self-perception.

Social media applications present the opportunity for feedback on one's self-presentation from a wide-reaching social network, thus aligning with the aspects of narcissism associated with a desire for a large audience from which to gain attention (Barry et al., 2017; Bergman, Fearington, Davenport, & Bergman, 2011). Photo sharing applications, such as Instagram, also offer a chance for the individual to exercise more control over the image presented to his or her "followers" or "friends," while simultaneously allowing the opportunity for engagement with a broader social media community through the use of hashtags or location tags (Sheldon & Bryant, 2016), as well as permitting to the individual to decide whether to have a public or private account. The image presented to others, and the feedback received from them, presumably take on particular importance, as the perceivers of the image likely have some connection or similar interests to the person posting on social media.

Overall, previous findings indicate that methodology may be an important factor in understanding the empirical relation between personality factors, including narcissism, and specific social media behaviors, such as posting of selfies. In addition, photographic images on social media and what they imply about self-perception could have more to do with the theme or content rather than whether the person posting the image actually took the photo him/herself. That is, an intent to display one's physical appearance or one's affiliations may be more relevant to narcissism than who is credited for taking the photo in the first place (i.e., selfie vs. nonselfie). In short, because social media behaviors and motives behind those behaviors are presumably quite complex, the present study sought to reflect that complexity. It has become increasingly apparent that social media are a common way to convey ideas about oneself and to form perceptions of others; consequently, there are many ideas as to whether social media behaviors are a social adaptation or are a signal of psychosocial maladjustment. Therefore, empirical studies on the factors that are involved in actual observations of social media activities are essential.

Narcissism, Self-Esteem, and Selfies

Still in its infancy, empirical research on how self-perception and personality traits, particu-

larly narcissism, relate to the sharing of selfies on social media has yielded mixed results. Self-reported frequency of selfie posts has shown small associations with higher self-reported narcissism (Fox & Rooney, 2015; Halpern, Valenzuela, & Katz, 2016; McCain et al., 2016), as well as with facets of nonpathological narcissism (Weiser, 2015). However, these relations do not appear to apply to observed posts of selfies (Barry et al., 2017). Instead, the themes depicted in selfies have shown some relevance for self-perception (e.g., selfies highlighting one's physical appearance were positively correlated with vulnerable narcissism; selfies depicting one's affiliations with others were negatively correlated with grandiose narcissism; Barry et al., 2017). Nevertheless, it should be noted that the correlations were relatively weak in magnitude.

Findings from Re and colleagues (Re, Wang, He, & Rule, 2016) provide more context on how selfies relate to self-perception and personality attributes. The more selfies their participants reported taking in the past week, the more favorably they perceived their selfies relative to the photos of themselves taken by an experimenter in the lab. However, participants were perceived to be more narcissistic, less likable, and less attractive when external judges viewed their selfies, compared with the nonselfies taken by the experimenters. These findings were interpreted as indicative of self-favoring bias among selfie takers that may also allude to their perceived superiority, particularly if such photos are "liked" by others on social media. Still, there were no differences in self-reported narcissism between regular selfie-takers and non-selfie takers, suggesting that the assumption that selfies are indicative of narcissism may be most relevant to viewers of the selfie, not the sharers themselves (Re et al., 2016). The comparable degrees of narcissism between regular and non-regular selfie-takers also suggest a need to examine other self-displays on social media (e.g., photos of oneself taken by others), as well as the role of feedback (i.e., "likes") to gain a more comprehensive view of the relation between self-perception and photo sharing on social media.

The disparate findings on the relation between narcissism and selfie-sharing behavior may also be an artifact of the complex, multi-dimensional nature of narcissism and its varied

psychosocial correlates (Barry et al., 2017). Nonpathological narcissism includes vanity, a willingness to exploit others, promoting oneself as a good leader, and portraying oneself as superior to others (Miller & Campbell, 2011) and is positively related to self-esteem (Barry & Kauten, 2014). In contrast, research on pathological narcissism has delineated between grandiose and vulnerable features. In short, grandiose narcissism involves exploitation of others for personal gain while simultaneously exuding beneficence and being invested in fostering a superior self-image. Vulnerable narcissism encompasses a dependence on positive appraisals from others, hypervigilance to rejection, self-esteem that fluctuates based on others' appraisals, and a strong motivation to conceal one's perceived weaknesses (Besser & Priel, 2010; Lukowitsky & Pincus, 2013). Social media platforms may appeal to individuals with each of these variants of narcissism by providing a safe and simple venue to confidently exhibit themselves, for instance by sharing selfies, to an audience willing to provide positive feedback (Barry et al., 2017).

Consistent with the rationale that selfies involve an exhibitionistic need for positive feedback from others, grandiose narcissism, assessed via the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988) and deemed non-pathological narcissism in previous work in this area (Barry et al., 2017), was associated with self-reports of taking and posting more selfies, as well as with self-reported experience of positive affect while posting selfies (McCain et al., 2016). Grandiose narcissism was also associated with having more followers and receiving more likes. In contrast, vulnerable narcissism was positively associated with self-reports of taking selfies featuring only oneself but not the number of selfies overall (McCain et al., 2016), which may reflect an attempt to exert self-confidence. Importantly, vulnerable narcissism was associated with self-reported experience of negative affect while posting selfies and was unassociated with number of likes or any observer-rated characteristics, indicating that vulnerable narcissism is not connected to perceived benefits of selfie-sharing (McCain et al., 2016).

The relations of grandiose and nonpathological narcissism with posts of selfies (and posies) may actually be more evident among individuals with a higher number of followers. At least

one primary motivation for posting selfies appears to be attention-seeking (Sung, Lee, Kim, & Choi, 2016), and posting selfies may engender narcissism (Halpern et al., 2016). Therefore, individuals with higher levels of more grandiose, exhibitionistic elements of narcissism may be especially motivated to post self-images to elicit feedback or recognition when they have a larger potential audience. However, for vulnerable narcissism, no such motivation may exist, as these features would suggest a reluctance to display oneself because of its associated negative affect (McCain et al., 2016) or for fear of negative, or a lack of, social feedback.

Gender may play an additional role in selfie-posting behavior, as a series of studies demonstrated that women shared more selfies of all types relative to men and that women's selfie-posting behavior was generally unrelated to narcissism, whereas men's selfie posting behavior was associated with overall narcissism, as well as vanity, leadership, and admiration demand (Sorokowski et al., 2015). Further, women's self-reported selfie frequency, but not objectively observed frequency, was positively associated with overall narcissism. Complementing these findings, the leadership/authority facet of narcissism was shown to more strongly relate to self-reported selfie posting among women than men, but the entitlement/exploitativeness facet predicted selfie posting among men but not women (Weiser, 2015). In all, these findings indicate that men and women may have somewhat different motives for self-reported selfie sharing. They also further underscore some concerns with using self-reported methods (e.g., "how often do you share selfies?") to determine social media behavior, as results using self-report methodology have generally not been replicated through observational approaches.

Unlike narcissism, self-esteem has been uncorrelated with observed selfies, although individuals with fragile, or contingent, self-esteem were less likely to share selfies on Instagram (Barry et al., 2017), and self-report research does not draw clear conclusions about a relation between self-esteem and selfie-taking (Sorokowska et al., 2016). In addition, evidence suggests that individuals with lower self-esteem report experiencing relatively more negative affect while sharing selfies (McCain et al., 2016). Therefore, self-esteem may be more relevant to one's subjective experience while sharing self-

ies than the act of sharing selfies itself. Given the mixed findings in the existing research, self-esteem was also examined as a correlate of selfie or posie posts in the present study.

Social Preoccupations and Selfies

Concern regarding audience perception and feedback may be a factor in the extent to which individuals post photos of themselves on social media and in the content of those photos. Indeed, in light of its association with experiencing negative affect while posting selfies, McCain and colleagues (2016) suggested that "vulnerable narcissism is not ideally suited for social media" (p.132). However, other self-perception constructs may be uniquely tied to a person's tendency or reluctance to post self-images, including selfies.

Some aspects of social media use in general and posting photos in particular may be based on a desire to stay informed about what happens in one's social circle or an aversion to missing out. Exclusion has been shown to be a motivating factor in computer-mediated communication, and the need for belonging has predicted Facebook use (Knowles, Haycock, & Shaikh, 2015). A construct that might be related to such processes in social media activity is known as fear of missing out (FoMO). FoMO has been described as "pervasive apprehension that others might be having rewarding experiences from which one is absent" and is further manifested as "the desire to stay continually connected with what others are doing" (Przybylski, Murayama, DeHaan, & Gladwell, 2013, p. 1841). FoMO appears particularly salient among youth, and individuals higher in FoMO report feeling less connected with others. FoMO also appears to mediate the negative relations between increased social media use and overall life satisfaction and general mood (Przybylski et al., 2013). Therefore, FoMO may play a role in the display of self-images on social media based on motives to elicit and participate in interactions with others and to portray oneself as more connected.

Furthermore, some research suggests that a self-focus on one's physical appearance, indexed broadly by narcissism, is also involved in sharing photos on social media. Facebook users also report not posting unflattering images of themselves and untagging or requesting that a

photo to be deleted as a means of impression management (Strano & Queen, 2012), and self-reported narcissism has been associated with highlighting one's physical attractiveness or personality when selecting Facebook profile pictures (Kapidzic, 2013). The internalization of sociocultural attitudes toward physical appearance standards and the related pressure regarding appearance from peers, family, and the media have been implicated in lower self-esteem among college students and adolescent girls (Schaefer, Harriger, Heinberg, Soderberg, & Thompson, 2016). Individuals higher on these concerns may be less likely to share selfies on social media given their vulnerability to negative feedback regarding their appearance. In contrast, individuals who are satisfied with their bodies report sharing more selfies on Instagram (Ridgway & Clayton, 2016), although support for this relation does not extend to self-reports of editing one's selfies (Chae, 2017).

Preoccupations with one's physical appearance or societal standards of appearance and FoMO have not yet been specifically investigated in relation to observed posts of one's self-image on social media. It may be that self-images in general, regardless of whether they are actually selfies, may reflect lower concerns about physical appearance but greater efforts to appear engaged with others in real-life and to not miss out on opportunities for online connections with others. These possibilities were examined in this study.

Current Study

The purpose of the present study was to further address the self-perception correlates of selfie posting behavior by attempting to replicate and extend prior research on the relation between narcissism and posts of selfies on a popular social media application, as well as to expand the variables considered in this line of inquiry. Such an investigation is important given the increasingly pervasive presence of social media and its implications for interpersonal interactions. The preponderance of prior research has relied on self-report methodology. To address these methodological limitations, the present study implemented a mixed methods approach to integrate observational and self-report approaches. As noted above, although the primary focus was on narcissism, the present

study widened its scope of self-perception variables to include self-esteem, concerns about physical appearance, and FoMO as potential factors in selfie posts. Moreover, the present study considered whether these relations differed for photos that are posted on an individual's Instagram account but that are not selfies per se (i.e., posed photos taken by someone else but include the participant in the photo or "posies"). Lastly, we collected additional data from participants' Instagram pages (i.e., whether the account was public or private, the number of likes per each selfie or posie, the number of hashtags per such post, the proportion of times a participant liked his or her own self-image post, the number of users following and being followed by the participants) to provide further opportunity to explore how individuals might approach this particular form of social media.

Hypotheses

Hypothesis 1: Consistent with prior research (Barry et al., 2017), the proportion of total posts that were physical appearance selfies was expected to be positively correlated with vulnerable narcissism and nonpathological narcissism.

Hypothesis 2: Selfie collages were hypothesized to also show positive correlations with vulnerable and nonpathological narcissism based on the findings of Barry and colleagues (2017).

Hypothesis 3: Selfies highlighting one's affiliations with others were expected to be negatively correlated with grandiose narcissism.

Hypothesis 4: Physical appearance selfies were hypothesized to be negatively correlated with physical appearance concerns.

Hypothesis 5: It was hypothesized that FoMO would be positively correlated with the frequency of selfie posts across themes.

Hypothesis 6: The same patterns of correlations were expected for nonselfie posts that depict participants (i.e., posies; *Hypothesis 5*) as predicted in *Hypotheses 1–4* for selfies.

Hypothesis 7: The number of likes received for selfies/posies and the number of

participants' Instagram followers were each expected to moderate the relations of grandiose and nonpathological narcissism with selfie and posie posts. That is, grandiose and nonpathological narcissism were each expected to be related to selfie and posie posts for individuals who tended to receive a higher number of likes for such posts and for those who had a relatively high number of Instagram followers.

Additional Research Questions

Research Question 1: Self-esteem has not shown consistent relations with selfies in prior research in such a way that would inform a specific directional hypothesis. However, the present study considered: Is self-esteem related to posting of selfies or other photos of oneself, including specific themes of such posts?

Research Question 2: It is unclear whether a higher number of followers would be tied to more posts of self-photos among individuals high in vulnerable narcissism in the same way as expected for grandiose and nonpathological narcissism (*Hypothesis 7*). Thus, an additional research question was: Does the number of followers moderate the relation between vulnerable narcissism and posts of selfies or posies?

Research Question 3: Although not part of the central hypotheses of the present study, we were also interested in examining whether observed (rather than self-reported) parameters of Instagram use were related to self-reported narcissism, self-esteem, FoMO, and physical appearance concerns. Thus, the final research question was: Are general parameters of Instagram use (e.g., number of followers, number of users being followed, number of likes received on selfies/posies, number of hashtags used) related to self-perception, FoMO, and physical appearance concerns?

Method

Participants

One hundred-ten undergraduate students (22 males, 88 females) from a public university in

the northwestern United States completed the questionnaire and 30-day Instagram observation portions of the study (see below). However, 10 individuals who ended the study with fewer Instagram posts than when the study began were excluded, as it could not be determined which types of posts had been deleted in proportion to overall posts. Thus, the final sample consisted of 100 participants (20 males, 80 females), ranging in age from 18 to 25 ($M = 19.93$, $SD = 1.35$). The racial/ethnic composition of the sample was as follows: 77 participants identified as White/Caucasian, 13 identified as Asian, 11 identified as Black/African American, 5 as American Indian/Alaskan Native, 3 as Native Hawaiian/Pacific Islander, and 1 did not provide information on racial/ethnic background.

Based on the time since participants' first Instagram post, participants had been active on the observed Instagram accounts for an average of 156.25 weeks (~ 3 years), $SD = 54.29$ weeks, $range = 4-237$ weeks, and had made an average of 179.9 overall posts at the outset of the study, $SD = 189.66$, $range = 4-1,094$. Fifty-three percent (53%) of the participants had a public Instagram account, whereas the remaining 47% had their accounts set to private. Participants were following an average of 492.67 other Instagram users ($SD = 456.10$, $range = 50-3,594$) and were followed by an average of 578.79 other users ($SD = 512.54$, $range = 22-3,535$). Thus, the sample demonstrated good variability in their engagement with Instagram according to these metrics.

Measures

Coding. The procedure for coding participants' Instagram posts followed that employed by Barry and colleagues (2017). Specifically, participants provided their Instagram account username and consented to have their account observed for 30 days. Immediately upon following participants, four independent coders, who were blind to participants' ratings on self-report measures, recorded specific parameters of participants' Instagram accounts (i.e., the length of time since the participant's first Instagram post, the number of posts at the start of the study, the number of followers the participant had, and the number of users they follow). At the end of this time period, the four coders recorded additional parameters of participants' Instagram accounts

(i.e., the total number of posts after the 30-day observation period, the number of followers, and the number of users followed). In addition, each post was coded as (a) a selfie, (b) a non-selfie photo of the participant (posie), or (c) an image that did not include the participant. For the former two categories, themes depicted in the image were then coded. The coding scheme was identical to that used by Barry and colleagues (2017) for selfies and included themes of (a) physical appearance, (b) affiliation with others, (c) event/activity/location/accomplishment, (d) collage, or (e) other/undifferentiated. Contextual information accompanying each image (e.g., captions, hashtags, location tags) aided coders in determining the theme of each photo. The category "other/undifferentiated" was coded if the theme was not explicitly clear (e.g., no caption provided, ambiguous caption). If more than one theme seemed to be depicted, the more specific category was selected (e.g., event/activity instead of affiliation if the participant was depicted at a particular event or activity with a group of friends; physical appearance for such posts if explicit reference was made to an aspect of one's physical appearance).

To establish interrater reliability, the four raters all coded the initial 25 posts from eight participants (i.e., 200 photos). The intraclass correlation coefficient (ICC) for whether a photograph from this group was a selfie or posie versus not depicting the participant was .99. Coders then categorized each selfie or posie. The ICC for the specific category code across selfies and posies was .93. Following that procedure, each coder rated a unique 25% of the participants.

Pathological Narcissism Inventory. The Pathological Narcissism Inventory (PNI) is a 52-item self-report inventory that captures grandiose and vulnerable dimensions of narcissism (Pincus et al., 2009). Responses to items (e.g., "I am disappointed when people don't notice me") are made on a 6-point scale ranging from 1 (*not at all like me*) to 6 (*very much like me*). The Grandiose Narcissism scale of the PNI includes Grandiose Fantasy, Self-Sacrificing Self-Enhancement, and Exploitativeness subscales, whereas the Vulnerable Narcissism scale includes the Contingent Self-Esteem, Devaluing Others/Need for Others, Hiding the Self, and Entitlement Rage subscales (Pincus et al., 2009;

Roche, Pincus, Lukowitsky, Ménard, & Conroy, 2013). In the present sample, the internal consistency of scores on the Grandiose Narcissism scale was $\alpha = .87$, and the internal consistency for Vulnerable Narcissism scores was $\alpha = .93$.

Narcissistic Personality Inventory. The NPI is a 40-item inventory that measures non-pathological narcissism (Miller & Campbell, 2011) and that has been widely used in research with adults (Raskin & Terry, 1988). For each item (e.g., "I try not to show off" vs. "I am apt to show off if given the chance"), respondents choose one of the two statements, with higher scores reflecting a tendency to endorse relatively higher numbers of narcissistic statements across items. In the present sample, the NPI had an overall internal consistency of $\alpha = .82$.

Rosenberg Self-Esteem Scale. The Rosenberg Self-Esteem Scale (RSES) was used to assess self-esteem (Rosenberg, 1965). This measure is widely used in research and consists of 10 items (e.g., "I am able to do most things as well as other people"), to which responses are made on a 4-point scale from *strongly disagree* to *strongly agree*. In the present sample, responses on the RSES had an internal consistency of $\alpha = .89$.

Physical Appearance Comparison Scale. The Physical Appearance Comparison Scale (PACS) consists of five items (e.g., "At parties or other social events, I compare my physical appearance to the physical appearance of others") that assess an individual's preoccupation with physical appearance relative to others, particularly in social situations (Thompson, Heinberg, & Tantleff-Dunn, 1991). Responses are made on a 5-point scale from *Never* to *Always*. In the present study, the PACS total score had modest internal consistency, $\alpha = .60$.

Sociocultural Attitudes Toward Appearance Scale-3. The Sociocultural Attitudes Toward Appearance Scale-3 (SATAQ-3) is a 30-item scale that evaluates the extent to which the respondent is concerned about how society, including through media, views an ideal physical image (e.g., "I've felt pressure from TV or magazines to change my appearance"; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). The internal consistency of the SATAQ-3 in the present sample was $\alpha = .97$.

Fear of Missing Out Survey. The Fear of Missing Out Survey (FoMOS) consists of 10

items (e.g., “I get anxious when I don’t know what my friends are up to”) that assess one’s preoccupation with missing events within one’s social circle, including through social media connections (Przybylski, Murayama, DeHaan, & Gladwell, 2013). Responses are made on a 5-point scale from *not at all true of me* to *extremely true of me*. Scores on the FoMOS have demonstrated a negative correlation with age and have been associated with higher engagement in social media and lower life satisfaction in a sample of adults ages 22 to 65 (Przybylski et al., 2013). The internal consistency of the FoMOS in the present study was $\alpha = .85$.

Procedure

This Institutional Review Board (IRB) at the authors’ affiliated university approved this study prior to data collection. Participants were enrolled in a psychology course at the time of the study and received research credit or extra credit for participating in the questionnaire portion of the study. Individuals who consented to participate completed the self-report inventories (i.e., PNI, NPI, RSES, PACS, SATAQ-3, FoMO) and a demographic form online.

Participants provided their Instagram account name so that they could be “followed” (observed) for 30 days by an Instagram account accessed only by the authors of this study. Participants were allowed to opt-out of the Instagram portion of the study or to withdraw at any time. Those participants who remained in the

study for the 30-day observation period were entered into a drawing for one of the five \$20 gift cards. The researchers’ Instagram account was private; thus, participants and other Instagram users were unable to “follow” the account so as to help keep participation in the study confidential. Participants’ Instagram pages and posts were coded as described above.

Results

Descriptive Statistics and Correlations Among Types of Instagram Posts

All analyses were conducted using SPSS Statistics, Version 23 and the PROCESS for SPSS 2.15 macro (Hayes, 2013). Descriptive statistics for the personality scales and for selfies and posies are shown in Table 1. As shown in Table 1, there was considerable range in the total number of selfies posted by participants. Two participants posted a total number of selfies that was $>4 SD$ above the sample mean, and one participant had a total number of posts that was $>4 SD$ above the sample mean. Excluding these participants from analyses did not change the results. Therefore, the results reported include all 100 participants with complete data. Females tended to endorse more concerns regarding societal attitudes about appearance, $t(98) 2.99, p = .003 (m_{females} = 90.95, SD = 23.33, m_{males} = 74.05, SD = 19.17)$, and there was a trend toward a gender difference on non-pathological narcissism with males scoring

Table 1
Descriptive Statistics for Main Variables of Interest

Variable	<i>M</i>	<i>SD</i>	Range	Skewness
Number of total posts	179.88	189.66	4–1,094	2.22
Number of selfies	40.89	59.23	0–385	3.01
Number of posies	71.71	79.45	0–347	1.71
Selfies/total posts	0.21	0.15	0.00–0.73	1.18
Posies/total posts	0.44	0.28	0.00–0.95	0.05
Vulnerable Narcissism	3.35	0.71	1.48–4.94	–0.09
Grandiose Narcissism	3.90	0.65	2.11–5.63	0.04
Nonpathological Narcissism	16.18	6.55	3–36	0.28
Self-Esteem	19.40	5.05	8–30	–0.09
Physical Appearance Concerns	14.71	3.38	8–24	0.33
Concern of Societal Attitudes on Appearance	57.57	23.48	9–111	0.11
FoMO	17.01	7.11	3–38	0.32

Note. FoMO = fear of missing out. Scores for Vulnerable Narcissism and Grandiose Narcissism are based on mean item scores.

higher, $t(98) = 1.95, p = .05$ ($m_{females} = 15.55, SD = 6.85, m_{males} = 18.70, SD = 4.50$). However, because there were no significant gender differences regarding the criterion variables of interest (i.e., proportion of posts that were selfies or posies; proportion of selfies or posies that conveyed specific themes), gender was not controlled for in subsequent analyses.

Correlations among the narcissism dimensions, self-esteem, physical appearance concerns, and FoMO are shown in Table 2. Grandiose narcissism was significantly related to both vulnerable and nonpathological narcissism. Physical appearance concerns were positively correlated with grandiose and vulnerable narcissism and negatively associated with self-esteem. Concerns regarding societal attitudes on appearance were significantly related to all three dimensions of narcissism, lower self-esteem, and higher general physical appearance concerns. FoMO was negatively related to self-esteem but positively correlated with all other self-report variables in this study, including each of the dimensions of narcissism.

Table 2 also shows correlations of the proportion of selfies to total posts and posies to total posts with these self-perception variables. Initial analyses for selfies and posies were based on proportions of total Instagram posts, rather than raw numbers, as the raw number of selfies and posies would be substantially tied to how active participants were on Instagram in general or for how long their Instagram accounts had been active. As shown in Table 2, the proportion of total posts that were selfies was negatively correlated with the proportion of total

posts that were posies. That is, the greater percentage of Instagram posts that were selfies for a given individual, the lower the percentage that were of the individual but not taken by the individual, which may be expected for variables that are both proportions of the same total. Similar to previous observational research (Barry et al., 2017), the overall proportion of selfies was unrelated to any of the self-perception variables assessed in this study.

The correlational analyses reported in Table 2 were repeated using the raw number of selfies, posies, and total Instagram posts instead of proportional variables. The number of selfies and posies were significantly interrelated, $r = .41, p < .001$, and each was significantly related to the total number of Instagram posts, $r = .82, p < .001$, and, $r = .68, p < .001$, respectively. However, none of these values were significantly correlated with any of the self-report variables. Thus, although participants who posted a higher volume of Instagram posts tended to post more selfies and posies specifically, and although individuals who posted selfies also tended to post other images of themselves, doing so was not related to narcissism, self-esteem, FoMO, or preoccupation with physical appearance standards.

Additionally, we considered participants' combined selfie and posie posts as an indicator of how much of their Instagram pages were devoted to images of themselves. To do so, we calculated both the sum of selfies and posies as well as the proportion of total posts that were either selfies or posies. In short, none of the

Table 2
Correlations Among Selfie Proportions, Posies, Narcissism Dimensions, and Self-Esteem

Variable	1	2	3	4	5	6	7	8	9
1. Selfies/total posts	—								
2. Posies/total posts	-.24*	—							
3. Grandiose narcissism	.09	.06	—						
4. Vulnerable narcissism	-.05	.14	.60***	—					
5. Nonpathological narcissism	.03	.16	.38***	.19	—				
6. Self-esteem	-.04	.00	-.14	-.54***	.17	—			
7. Physical appearance concerns	-.02	.06	.24*	.37***	.08	-.40***	—		
8. Concern of societal attitudes on appearance	-.10	.22*	.36***	.34**	.13	-.35***	.62***	—	
9. FoMO	-.12	.11	.38***	.56***	.23*	-.46***	.28**	.35***	—

Note. Selfies/total posts = the proportion of a participant's total posts on Instagram that were selfies; Posies/total posts = the proportion of a participants total posts that depicted the participant but were not selfies. FoMO = fear of missing out. * $p < .05$. ** $p < .01$. *** $p < .001$.

self-report variables were significantly correlated with these two indices.

Descriptive statistics for the categories of selfies (i.e., physical appearance, affiliation, event/activity/accomplishment, collage, other/undifferentiated) as a proportion of the total number of posts are shown in Table 3 (the same information for posie categories is displayed in Table 4). Most of the proportions for selfie categories were positively skewed, using the cut-off of ± 2 to denote significant skew (Gravetter & Wallnau, 2014), indicating that most participants displayed a relatively low percentage of such specific themes as a function of their overall Instagram posts.

Correlations Between Selfie Themes and Self-Report Variables (*Hypotheses 1–5; Research Question 1*)

To test *Hypotheses 1–4*, additional correlational analyses were conducted concerning the proportion of total posts represented by each selfie category. These correlations are displayed in Table 5. *Hypothesis 1* that physical appearance selfies would be positively correlated with vulnerable and with nonpathological narcissism was not supported. As shown in Table 5, and contrary to *Hypothesis 2*, collage selfies were negatively, rather than positively, correlated with nonpathological narcissism. *Hypothesis 3* predicted that selfies highlighting affiliations with others would be negatively correlated with grandiose narcissism was not supported. Physical appearance selfies were expected to be negatively related with physical appearance concerns, but no such relation emerged; thus, *Hypothesis 4* was not supported. In addition, *Hypothesis 5* (i.e., that FoMO would be positively correlated with posting selfies across themes) was not supported. In response to *Re-*

search Question 1, self-esteem showed no significant correlations with selfie themes.

Correlations Between Posies and Self-Report Variables (*Hypothesis 6*)

The overall proportion of posies was only positively correlated with concerns regarding societal attitudes on appearance, assessed by the SATAQ-3 (see Table 2). Descriptive statistics for posie categories are displayed in Table 4 and demonstrate that the distributions of the posie categories were not significantly skewed, suggesting that the various posie themes were relatively normally distributed in our sample. Correlations between categories of posies and self-perception variables are shown in Table 5. Specifically, affiliation posies were positively correlated with vulnerable narcissism, event/activity/accomplishment posies were related to nonpathological narcissism and to concerns with societal attitudes toward appearance, and posie collages were negatively correlated with nonpathological narcissism. *Hypothesis 6* predicted analogous relations for posies that were proposed in *Hypotheses 1–5* for selfies. However, none of these relations were apparent in the present sample (see Table 5).

Moderation Analyses (*Hypothesis 7 and Research Question 2*)

Multiple regression analyses were conducted to test *Hypothesis 7* that the number of likes for self-image posts and the number of Instagram followers would moderate the associations of grandiose and nonpathological narcissism with posts of selfies/posies. Specifically, 12 models were analyzed: 3 predictors (i.e., grandiose, nonpathological narcissism, vulnerable) \times 2 moderators (i.e., number of likes, number of

Table 3
Descriptive Statistics for Selfie Categories

Variable	<i>M</i>	<i>SD</i>	Range	Skewness
Physical appearance/total posts	0.03	0.05	0.00–0.23	2.20
Affiliation/total posts	0.04	0.05	0.00–36	3.27
Event or activity/total posts	0.07	0.06	0.00–26	0.98
Collages/total posts	0.02	0.03	0.00–0.11	1.88
Other/total posts	0.04	0.05	0.00–0.31	2.66

Note. Data represent proportions of total Instagram posts that were selfies of each theme.

Table 4
Descriptive Statistics for Posie Categories

Variable	<i>M</i>	<i>SD</i>	Range	Skewness
Physical appearance/total posts	0.02	0.03	0.00–0.12	1.20
Affiliation/total posts	0.09	0.09	0.00–0.41	1.22
Event or activity/total posts	0.24	0.17	0.00–0.64	0.42
Collages/total posts	0.04	0.04	0.00–0.22	1.42
Other/total posts	0.04	0.05	0.00–0.20	1.38

Note. Data represent proportions of total Instagram posts that were posies of each theme.

followers) × 2 dependent variables (i.e., selfies as a proportion of total posts, posies as a proportion of total posts) with the predictor and moderator entered into the first step and the interaction between the predictor and moderator added into the second step. Based on the number of models and the potential for family wise error, effects were only considered significant at the $p < .004$ level of alpha. In the models using number of likes as a moderator, there was a significant main effect for number of likes in each of the three models predicting posies. Otherwise, no main effects or interaction terms were significant for the models using number of likes as a moderator.

For the models with the number of followers as the moderator, none of the interaction terms were significant for predicting the proportion of selfies posted. However, for posies, there was a significant interaction between nonpathological narcissism and number of followers. Specifically, in the first step of the model, there was a main effect for number of followers, $\beta = .34$,

$p = .01$, R^2 for the model = .14, $p < .001$, although this main effect was not significant at the corrected level of alpha ($p < .004$). The addition of the interaction term in the second model resulted in a significant additional proportion of variance in posies being accounted for, $\beta = 1.84$, $p = .002$, R^2 change = .07. Thus, Hypothesis 7 was partially supported. The interaction was then plotted according to the procedures recommended by Hayes (2013) such that points at ± 1 *SD* from the sample mean on both number of followers and nonpathological narcissism were plotted. The interaction is displayed in Figure 1 and shows that the connection between number of followers and the proportion of posts that were posies was strengthened in the presence of high levels of narcissism. On the other hand, individuals with relatively high nonpathological narcissism tended to post fewer posies if they had a relatively low number of followers. When outliers on number of followers (defined as > 4 *SD* above the sample mean) were excluded ($n = 5$),

Table 5
Correlations of Self-Perception With Selfie and Posie Categories

Variable	Grandiose narcissism	Vulnerable narcissism	Nonpathological narcissism	Self-esteem	Physical appearance concerns	Concern with societal appearance attitudes	FoMO
Physical appearance (Selfie)	.02	-.01	.00	-.16	-.02	-.13	.07
Affiliation (Selfie)	.07	.05	.14	.02	-.03	-.02	.03
Event/activity (Selfie)	.25*	-.04	.11	.02	.01	.02	-.12
Collage (Selfie)	-.04	-.10	-.26**	-.17	.01	.02	-.06
Physical appearance (Posie)	.02	.00	.12	-.02	.03	.12	.05
Affiliation (Posie)	.11	.26*	.10	-.07	.00	.12	.04
Event/activity (Posie)	.05	.11	.20*	.03	.09	.21*	.14
Collage (Posie)	-.18	-.19	-.20*	.08	.03	-.06	-.05

Note. Categories represent the proportion of selfies or posies coded for a category out of an individual’s total number of Instagram posts. FoMO = fear of missing out.

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

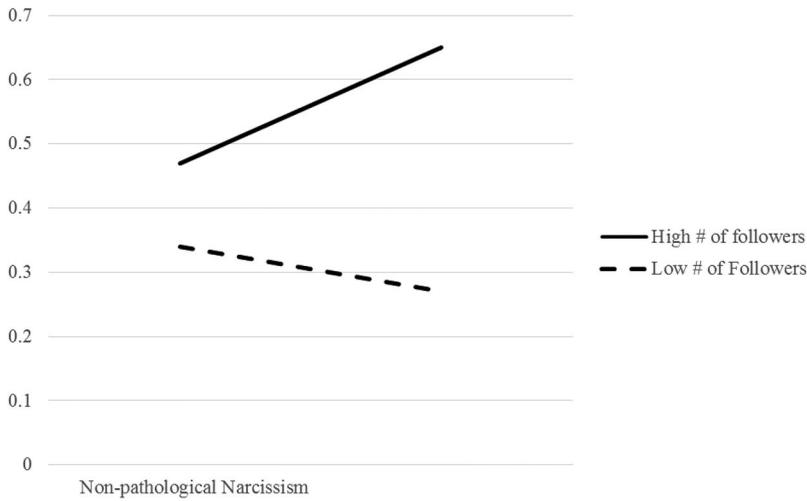


Figure 1. Interaction between nonpathological narcissism and number of Instagram followers for predicting posies. The y-axis represents the predicted proportion of posies out of total Instagram posts at ± 1 *SD* from the sample mean on nonpathological narcissism and on number of Instagram followers. High number of followers: $b = .01$, $SE = .005$, $p = .004$. Low number of followers: $b = -.005$, $SE = .006$, $p = .34$.

the interaction was no longer significant. Because number of likes was initially hypothesized as a moderator in the relation between narcissism and self-image posts, we investigated whether the nonpathological narcissism by number of followers interaction for predicting posies was further qualified by the number of likes participants tended to receive. This three-way interaction effect was not significant.

Correlations Between Other Parameters of Instagram Use and Self-Report Variables (Research Question 3)

Finally, parameters of participants' Instagram use were examined as potential correlates of self-perception and posts of one's self-image. These parameters included the number of participants' followers, the number of other users participants were following (both coded at the end of the 30-day observation period), whether the participant's account was public or private, the number of hashtags used per selfie or posie, the number of likes received per selfie or posie, and the number of times a participant liked his or her own selfie or posie per such post. These correlations are shown in Table 6.¹ The proportion of posies was significantly correlated with a participants' number of followers,

with having a private account, and with the number of likes received per self-image post, suggesting a social component for posies. The number of hashtags per self-image post was positively correlated with posting selfies and negatively correlated with posting posies. Grandiose narcissism was also positively correlated with the use of hashtags in self-images. Liking one's own self-image posts was associated with lower self-esteem, higher physical appearance concerns, and FoMO. Consistent with what might be expected, FoMO was also positively associated with having a higher number of followers and following a higher number of other users, as well as with using a higher number of hashtags per self-image post.

¹ Because the number following and number of followers were each significantly skewed (5.16 and 3.11, respectively), these correlations were repeated excluding outliers ($n = 5$) for each variable. Posies remained significantly correlated with the number of followers, $r = .56$, $p < .001$, but also demonstrated a significant association with the number following, $r = .38$, $p < .001$. FoMO remained significantly associated with the number following, and concerns regarding societal appearance attitudes were positively correlated with number following with outliers excluded, $r = .25$, $p = .02$. However, self-esteem was no longer significantly correlated with number following.

Table 6
Correlations Between Self-Perception Variables, Selfies, Posies, and Parameters of Instagram Use

Variable	Number following	Number of followers	Number of likes/self posts	Number of self-likes/self posts	Number of hashtags/self posts	Private account
Selfies/total posts	.18	.06	-.15	-.03	.24*	-.07
Posies/total posts	.06	.34**	.65***	.18	-.25*	.24*
Grandiose narcissism	.12	.00	-.02	.02	.23*	-.12
Vulnerable narcissism	.03	-.05	-.05	.18	.10	.02
Nonpathological narcissism	.04	.04	.16	.08	-.05	.01
Self-Esteem	-.21*	-.09	.08	-.23*	-.14	.06
Physical appearance concerns	.13	.04	-.03	.25*	.13	.13
Concern with societal appearance attitudes	.24*	.16	.07	.01	.17	.05
FoMO	.39***	.24*	.04	.21*	.30**	.17

Note. Results include outliers on number following ($n = 5$) and number of followers ($n = 5$); number of likes/self posts, number of self likes/self posts, and number of hastags/self posts = the number of times each of these was observed for each participant per the sum total of selfies and posies for that participant. Private account was coded dichotomously such that public = 0, private = 1. FoMO = fear of missing out.

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

Discussion

The present study, and others like it, have the potential to provide clarity on the self-perception correlates of social media displays (e.g., selfies) that seem to have become a part of everyday life for some individuals. The findings of this study are largely consistent with other research (Barry et al., 2017) that employed observational methods in that narcissism was generally unrelated to posting self-images on Instagram. This pattern is generally in contrast to studies that involved self-reports of both of narcissism and selfie posting behavior. The primary conclusion from the present study is that posting selfies, which appears to be a fairly common social media behavior and certainly one that has captured a great deal of popular culture attention, is not necessarily indicative of narcissism. The discrepancies in findings based on methodology (i.e., observational vs. self-reports of social media activity; observer vs. self-report of narcissistic features) begs the question as to why narcissism might be related to self-reported use of selfies on social media, even though such an association is not observationally apparent. It may be that self-reports reveal an intent associated with posting selfies that is narcissistic for some individuals (who also report higher narcissism). Self-report methodology may also be susceptible to poor esti-

mations of the frequency with which one engages in various social media behaviors.

One of the significant relations in the present study (i.e., the negative correlation between posting collages that included more than one selfie and nonpathological narcissism) was the opposite pattern from previous work (Barry et al., 2017). These discrepant findings may signal a spurious relation or could speak to continuing changes in the social media behavior of young adults. Specifically, whereas collages may have previously provided an opportunity to post more images of oneself in a smaller virtual space, they may now be used to convey a variety of themes including affiliations with others on special occasions such as friends' birthdays, as opposed to simply highlighting one's own image. This possibility is speculative but may speak to a broader issue of the ever-changing social media landscape and thus some potential shifts in how self-perception is or is not connected to posting self-images.

The scope of the present study was widened to consider posts that depicted participants but were not selfies. Overall, these photos (described as "posies") were only significantly related to concerns regarding societal attitudes toward physical appearance. Thus, a high proportion of such self-image posts could be tied to a desire/need to get audience feedback on one's

image. However, physical appearance-focused posies were not tied to such physical appearance concerns, so the factors involved in this relation are not entirely clear.

Some significant relations were also evident when considering themes of posies. Similar to the finding for selfies, posie collages were negatively correlated with nonpathological narcissism. Furthermore, vulnerable narcissism was associated with a tendency to post images of oneself that highlighted affiliations with others. This relation may speak to an attempt to present oneself as well-connected to others, even though some individuals posting such images may not actually feel secure or stable in these relationships. Posies that highlighted events/activities/accomplishments were positively related to nonpathological narcissism and with societal concerns regarding physical appearance. These results, although not hypothesized, indicate a fairly logical connection between displaying one's activities or accomplishments and the aspect of narcissism focused on displays of superiority. They may also indicate a tendency to promote one's activities without potentially facing criticism (or lack of positive feedback) for posts that are overtly focused on one's own appearance. That concerns over societal physical appearance standards were also correlated with following more users on Instagram may indicate that such concerns are associated with a desire to connect with others or alternatively that ideas of physical appearance standards come, in part, from observing others' social media posts.

Despite these specific correlations, the key overall finding was that observed social media posts of one's own image, whether a selfie or taken by someone else, were not uniformly associated with narcissism or other forms of self-perception, contrary to some self-report evidence and nonempirical speculation. More specific contextual factors in posts of one's self-image, including the theme or communicative intent, or the feedback received by others may provide a more clear indication of the circumstances under which those relations do exist. Nevertheless, the relatively weak magnitude of the correlations evident in this study underscore that many other factors besides narcissism and self-esteem are connected to this particular social media behavior. One potential variable is the extent to which one feels pressure to con-

form to certain societal standards of appearance. Still, more research is needed as to how social media posts may be a way to for an individual to cope with such pressures.

The present study was also one of the first known studies to examine FoMO as it relates to observations of specific social media behavior. As might be expected, FoMO was associated with an apparently higher engagement with Instagram in the present sample, as individuals higher in FoMO were observed to have relatively more connections on Instagram and relatively higher use of hashtags, perhaps in an attempt to forge more connections with other users. Of note, individuals who reported higher FoMO as well as higher physical appearance concerns and lower self-esteem were more likely to like their own self-image posts. This behavior could represent an attempt to boost the apparent connectedness and popularity of the individual sharing the image who may otherwise be concerned about how he or she fits into the social landscape. Similarly, the self-perception (i.e., vulnerable narcissism, non-pathological narcissism, lower self-esteem, physical appearance concerns) correlates of FoMO also indicate that the social media behaviors associated with FoMO may indeed be borne out of insecurity or a need for self-enhancement through connections to others. This possibility is indirectly connected to evidence linking narcissism with higher social media activity (Buffardi & Campbell, 2008) and common motives for use of social media (see Nadkarni & Hofmann, 2012). However, as research on FoMO as a motivation toward social media activity is in its infancy, further research should be conducted on its personality and behavioral correlates using a wider range of intrapersonal constructs and forms of social media engagement.

Lastly, posting posies was associated with many other aspects of Instagram use, including having a private account, having more followers, and receiving more likes on self-image posts. Thus, based on the present findings, observed posts of one's self-image may be more closely connected to reinforcing aspects of social media feedback from a (largely) familiar audience under the user's control rather than clearly emblematic of self-perception. Nevertheless, narcissism may still play a motivational role. In the present study, the larger the potential

audience (i.e., number of followers), the more likely individuals with high levels of nonpathological narcissism were to post posies. Interestingly, narcissism was uncorrelated with observed number of Instagram followers, unlike previous findings for narcissism and self-reports of these variables (McCain et al., 2016). Thus, indirectly, more engagement in social media vis à vis having a higher number of connections/followers may assist a narcissist in reaching social goals such as positive attention or feedback from others, but individuals with narcissism may be poor at self-reporting just how engaged they are with others. Therefore, the nature of the relations between personality and presumed social feedback in the clearly complex and multidetermined realm of social media behavior warrants further empirical attention.

This study had several limitations that should be considered. First, the sample was small and consisted of mostly female undergraduates from one public university, so the results may not generalize to the general population of social media users. The predominantly female sample is consistent with previous work in this area as well as data on gender differences in social media activity (McAndrew & Jeong, 2012). Moreover, the small magnitudes of effects in the present study indicate that the general lack of statistically significant findings was not simply due to low power. Still, more research is clearly needed on larger samples from a variety of sources that are more gender-balanced. Second, many of the photos coded in the present study predated the completion of self-report questionnaires; thus, the relations among variables may have been different if the scope of the investigation had been on concurrent relations between social media posts and self-perception. Despite this limitation, the current approach allowed for a more complete consideration of participants' social media posts (rather than a time-limited or small sampling) and was also based on the idea that the self-report constructs examined were likely relatively stable for young adults. Research considering the relations of personality and social media behavior within and across different periods of development and in larger, more diverse samples is needed.

In addition, most analyses of relations between self-perception and self-images posted on Instagram involved examination of bivariate

correlations. Because this area of research and the methodology have a limited foundation in prior work, the analyses were largely exploratory. Further advancements in methodology and widening the net of parameters of social media behaviors considered may help capture the complexity of continually evolving social media behaviors. Lastly, the coding scheme utilized for this study may need further investigation and revision. Indeed, there may be particular types of images posted on social media and not coded in this study that are more specifically tied to attributes such as narcissism, self-esteem, or physical appearance concerns.

The present findings indicate that self-reported narcissism and observed posts of self-images on a popular social media application are not closely connected, despite some suppositions to the contrary. What is apparent is that many individuals, independent of their level of narcissism or their self-perception in other domains, may simply post selfies as a way to conform to what has become a cultural norm in some contexts (i.e., emerging adulthood, within photo sharing applications). Moreover, the work of McCain and colleagues (2016) indicates that a critical link between narcissism and displays of selfies may be in the eye of the beholder. This perception of narcissism based on social media behavior deserves closer attention in that narcissistic posts may carry some negative interpersonal consequences (Kauten, Lui, Stary, & Barry, 2015). Thus, in light of the apparently increasing importance of social media interactions, an important area for future research is to consider not only the motivations behind certain social media posts but also how they are perceived by others, as well as how these responses translate to social adjustment in general. More comprehensive research designs will likely continue to attempt to mirror the ever-growing and complex nature of social media activity and interactions with others via social media. Selfies are only one specific aspect of social media behavior, albeit one that has garnered much popular culture attention. Data-driven conclusions about the psychosocial implications of such specific social media behaviors will then inform how what is conveyed and perceived on social media might be adaptive or maladaptive for the individual and society at large.

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