"Ur a Freakin Goddess!": Examining Appearance Commentary on Instagram

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Frequent use of highly visual online platforms such as Instagram may be linked to greater body image concerns. One prominent feature of Instagram is the ability to receive feedback in the form of likes and comments. The goal of this cross-sectional study (conducted in laboratory and online) was to examine college students' receipt of appearance commentary on their most recent Instagram posts and how this relates to their self-reported body image concerns. The Instagram commentary that 337 students (M_{age} = 20.39) received on their posts was observationally coded for positivity and negativity. Receiving positive appearance commentary was common and linked to greater appearance-related social media consciousness and, weakly, to body surveillance. There were no associations with self-objectification, appearance-contingent self-worth, facial satisfaction, and body dissatisfaction. Negative appearance commentary was not associated with body image concerns. Photos depicting only the self were especially likely to elicit positive appearance commentary. Females received more positive appearance commentary compared to males, whereas males received more negative appearance commentary. Future research should examine long-term effects of receiving appearance comments via Instagram.

Public Policy Relevance Statement
Instagram is a highly visual online platform on which individuals can receive appearance-related comments. This study found that most appearance commentary is complimentary. However, receipt of this commentary is not necessarily linked to positive body image-related outcomes.

Keywords: Instagram, social media, appearance commentary, appearance feedback, body image

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The use of highly visual social networking site (SNS) platforms, such as Instagram, relates to greater body image concerns (Fardouly & Vartanian, 2016; Holland & Tiggemann, 2016). *How* users engage with SNSs appears to matter more for body image than *how much* time is spent on these platforms (Bell et al., 2018; Cohen et al., 2018; Modica, 2019). Instagram use may encourage objectification, as a central feature is to upload photos and elicit feedback via likes and comments (Tiggemann & Barbato, 2018). Appearance commentary often contains objectifying content (e.g., remarks on "hotness" or "sexiness"; Manago et al., 2008; Ringrose, 2011) and thus may be linked to greater body image concerns. The purpose of the current research was to observe and quantify college students' received appearance commentary (i.e., comments that evaluate one's appearance) via Instagram and to examine associations with preexisting body image concerns.

Objectification and Instagram

According to objectification theory, women are removed of their personhood and valued based on their body and physical appearance (Fredrickson & Roberts, 1997). Internalizing this process results in self-objectification and body surveillance, which involves women viewing and monitoring their bodies from the perspective of an observer (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996). Objectification theory has been applied to men's experiences as well, although key processes such as self-objectification and body surveillance occur at lower levels in men

(Davids et al., 2019; Moradi & Huang, 2008). Objectification is exacerbated by popular media, which often depicts unrealistic beauty ideals (Fredrickson & Roberts, 1997). SNSs may transform how these ideals are displayed (Nesi et al., 2018). For example, SNSs offer editing techniques such as appearance-enhancing filters (Fardouly & Vartanian, 2016; Yau & Reich, 2019). Users can also carefully select which photos to upload online and may only upload photos in which they look their best (Yau & Reich, 2019). Together, this may increase the amount of online content that depicts unrealistically attractive people.

Cross-sectional studies examining young adult women find that Instagram use correlates with self-objectification and body surveillance (Butkowski et al., 2019; Fardouly et al., 2018; Feltman & Szymanski, 2018). Notably, cross-sectional and observational studies examining adult women indicate that specific activities or experiences (e.g., selfie investment, uploading objectifying photos) appear to be more important for body image concerns than overall use (Bell et al., 2018; Cohen et al., 2018; Modica, 2019). The SNS audience may be one such crucial affordance, as it comprises individuals who can scrutinize users' physical appearance through their Instagram photos (de Vries & Peter, 2013). The awareness of this audience is conceptualized through the concept of appearance-related social media consciousness (ASMC) or the extent to which individuals are aware of how they would look to a social media audience (Choukas-Bradley et al., 2019, 2020). Cross-sectional research indicates that young adult women and adolescents (boys and girls) who report higher ASMC also report greater body image concerns, including body surveillance and self-objectification (Choukas-Bradley et al., 2019, 2020). Because this audience can provide feedback via likes and comments, it is of interest to examine how the receipt of this feedback relates to body image.

Appearance Commentary in Offline Contexts

Several studies have examined how appearance commentary occurs in offline settings, which may inform our understanding of online processes. One literature review indicates that receiving negative commentary (e.g., appearance teasing) is linked to maladaptive outcomes, including body dissatisfaction and problematic eating (Menzel et al., 2010). Associations with positive commentary are more complex. On the one hand, cross-sectional and ecological momentary assessment studies with adult women suggest that receiving positive appearance commentary is associated with lower body dissatisfaction (Fuller-Tyszkiewicz et al. 2019, Herbozo et al., 2013). On the other hand, receiving positive commentary may remind an individual that appearance is valued, encouraging greater attention to their appearance (Calogero et al., 2009; Herbozo & Thompson, 2006; Herbozo et al., 2017; Slater & Tiggemann, 2015). Indeed, cross-sectional research indicates that positive appearance commentary is linked to higher self-objectification and body surveillance in female adolescents (Slater & Tiggemann, 2015). Moreover, experimental evidence with young adult women suggests that receiving an appearance compliment increases body shame for those higher in trait self-objectification (Tiggemann & Boundy, 2008).

Appearance Commentary in Online Contexts

Qualitative studies with young adult women and adolescent boys and girls suggest that SNS feedback is valued (Baker et al., 2019; Chua & Chang, 2016; Yau & Reich, 2019). Receiving likes on a photo can signify approval of one's physical appearance, and not receiving enough likes could be interpreted that one looks unattractive (Baker et al., 2019; Chua & Chang, 2016). Users report taking special care in enhancing their physical appearance before uploading a post in anticipation of receiving audience feedback (Baker et al., 2019; Chua & Chang, 2016; Yau & Reich, 2019). No known studies have fully observed the content of appearance-oriented Instagram comments; however, general SNS commentary tends to be positive (Rideout & Fox, 2018), suggesting that appearance-oriented content is also likely positive.

Several cross-sectional studies have examined how self-reported online appearance commentary is linked to body image concerns. Adolescent boys and girls who engage in more Facebook appearance conversations report higher self-objectification (Trekels et al., 2018). For young adult women, receiving appearance commentary on SNSs was correlated with greater self-objectification and restrained eating (Niu et al., 2020). However, in a study with college women, receiving positive and negative appearance-related commentary on Instagram was not linked to self-objectification or body surveillance (Feltman & Szymanski, 2018). Likewise, in adolescent boys and girls, receiving negative SNS appearance commentary was not linked to self-objectification (Maes et al., 2019).

Methodologically, studies examining SNS commentary and associations with body image are limited to self-report assessments. In one exception, male and female college students' received comments on Facebook status updates were observationally coded for intensity of negativity (Hummel & Smith, 2015). Extreme comment negativity predicted greater body shape, weight, and eating concerns, but not eating restraint. To our knowledge, no studies have observationally coded the receipt of positive and negative appearance commentary on Instagram. Self-report assessments of SNS use are limited by issues such as common method variance and inaccurate recall (Sewall et al. 2020), problems that observationally coding content can avoid. Research is needed that uses more objective measures, including observational coding, to better assess the extent to which people receive appearance commentary on SNSs and to better understand associations with body image concerns.

The Current Research

In this study, observational coding was used to quantify the receipt of appearance commentary on college students' 10 most recent Instagram posts. We examined how this commentary was related to several measures of participants' self-reported body image. Assessments included key objectification processes, namely, self-objectification and body surveillance (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996). We also examined links to ASMC (Choukas-Bradley et al., 2019, 2020). We speculated that receiving comments would be associated with ASMC because users report that SNS feedback is an indicator of approval of one's physical appearance (Baker et al., 2019; Chua & Chang, 2016). In addition, we explored associations with appearance-contingent

self-worth, which is how much one's self-worth is dependent on their self-perceived physical attractiveness (Crocker et al., 2003). Previous research indicates that appearance-contingent self-worth is correlated with Facebook use (Modica, 2019), and we speculated that receipt of appearance commentary on Instagram may be linked to appearance-contingent self-worth, as those who receive this commentary may learn to base their self-worth on these comments. Finally, we examined participants' body and facial satisfaction to explore if the previously established links between (offline) positive and negative commentary with appearance satisfaction extend to observed Instagram comments.

For our primary hypotheses, we expected that positive comments would be more frequent than negative comments. In addition, we expected that receiving both positive and negative appearance comments on Instagram would be linked to greater self-objectification, body surveillance, ASMC, and appearance-contingent self-worth. Although we expected that receiving negative appearance commentary would be linked to lower body and facial satisfaction, hypotheses for positive appearance commentary were more exploratory. If receiving positive appearance commentary is potentially objectifying, then we would expect negative relations. However, receiving positive commentary has been linked to lower body dissatisfaction in offline settings (Fuller-Tyszkiewicz et al., 2019; Herbozo et al., 2013), and similar results could be observed for Instagram comments. Additionally, we coded for the extent to which participants received positive and negative nonappearance oriented commentary. Receipt of nonappearance oriented commentary was controlled for to determine if receiving appearance commentary is uniquely linked to body image concerns.

For our exploratory tests, we explored how post type (e.g., a post only depicting the participant vs. a post depicting the participant with others) may relate to received commentary. We also examined if males and females differed in received commentary and if the association between appearance commentary and body image concerns differed for males and females. Links between SNS use and body image may not be moderated by gender (Holland & Tiggemann, 2016). However, given the higher rates of objectification processes in women compared to men (Fredrickson & Roberts, 1997; Moradi & Huang, 2008), it is also possible that links between receiving appearance commentary and body image concerns would be stronger for females.

Method

Participants

Participants included 337 undergraduate Instagram users (M_{age} = 20.39, SD_{age} = 3.05; 74% female). The sample was ethnically diverse (48% Asian/Asian American, 21% White, 18% Hispanic/Latinx, 6% Black/African American, 7% multiracial/other). Posthoc sensitivity power analyses[1] conducted in G*Power suggest that this sample size is sufficient to detect small effects in linear regression. Students were participating in a larger study examining their exclusion experiences on Instagram. Thirteen students were not included in the current study's analyses because they did not have any Instagram posts (see online supplemental materials).

Procedure

Participants were recruited from the undergraduate psychology research pool at a large southwestern university. An advertisement for the study was available online that directed students to sign-up via an online portal for partial course credit. The advertisement described the study as one examining links between Instagram use and memory, as part of a cover story for additional aims of the study investigating Instagram exclusion experiences[2]. After providing consent, participants logged into their Instagram account without looking at their posts and were directed to a separate room to complete surveys. An undergraduate research assistant took screenshots of each participant's 10[3] most recent Instagram posts while the participants completed the surveys. If less than 10 posts were uploaded (29% of participants), all available posts were pulled. Any videos were skipped over, as we could only take still shots of participants' posts and could not accurately capture video content.

Data collection occurred in the Fall 2019 and Spring 2020 semesters. Study procedures were approved by the University of Texas at Dallas Institutional Review Board. Data collection during the Spring 2020 semester was interrupted by COVID-19, and 59 students participated in an online version of the study. The general procedure remained the same for these students, except that a research assistant instead followed the participant's Instagram account, then unfollowed the participant once all posts were pulled.

Measures

Self-Objectification

The Self-Objectification Questionnaire (Noll & Fredrickson, 1998) asks participants to rank 12 attributes in terms of how important each is to the participant's overall physical self-concept. Six attributes are appearance-based (e.g., "physical attractiveness," "weight") and six are competence-based (e.g., "health," "stamina"). Each set of attributes was summed, and then a difference score was computed between the two ranging from −36 to 36. Higher scores indicated greater self-objectification. The measure has demonstrated construct validity in college women (Noll & Fredrickson, 1998) and has previously been used in men (Fox & Rooney, 2015; Hallsworth et al., 2005; but also see the section *Limitations and Conclusions*).

Body Surveillance

Participants completed the eight-item Body Surveillance subscale of the Objectified Body Consciousness Scale (McKinley &

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[1] An a priori power analysis suggested 450 students were needed for adequate power for alternative aims of the study. Due to COVID-19, we could not achieve our desired sample size and instead report post-hoc sensitivity analyses. These demonstrate adequate power for the analyses presented in the current study.

[2] After participants completed the self-report surveys, they participated in an experimental study that manipulated their experiences with exclusion on Instagram. These data will be presented in future research.

[3] Ten posts were pulled because of the labor-intensive nature of coding. Based on the authors' previous experience coding digital content, 10 posts per participant was feasible given the number of coders and study timeframe.

Hyde, 1996). The measure uses a 6-point scale (1 = *strongly disagree*, 6 = *strongly agree*), and a sample item includes "During the day, I think about how I look many times" (α = .81; ω = .81; greatest lower bound [glb] = .87). The measure has shown construct validity and test–retest reliability in college and adult women (McKinley & Hyde, 1996) and convergent validity in adult men (Daniel et al., 2014).

Appearance-Related Social Media Consciousness

Participants completed the 13-item ASMC scale (Choukas-Bradley et al., 2020). The measure uses a 7-point scale (1 = *never*, 7 = *always*), and a sample item includes "When people take pictures of me, I think about how I will look if the pictures are posted on social media" (α = .94; ω = .94; glb = .95). Construct validity and test–retest reliability have been established in adolescent boys and girls (Choukas-Bradley et al., 2020).

Appearance-Contingent Self-Worth

Participants completed the appearance subscale of the Contingencies of Self-Worth Scale (Crocker et al., 2003). The measure uses a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*), and a sample item includes "When I think I look attractive, I feel good about myself" (α =.75; ω =.77; glb = .77). The measure has demonstrated construct validity and test–retest reliability in college students (Crocker et al., 2003).

Body Dissatisfaction

Participants answered, "What is your gender[4]?" using the options "Male," "Female," "Transgender" "Nonbinary/Queer," and "Agender." Participants who identified as female completed the nine-item Body Dissatisfaction subscale of the Eating Disorder Inventory (Garner et al., 1983). Although the measure was originally validated in a clinical sample, scholars have argued for its use in a nonclinical sample if the full range of scale options is used, rather than rescoring lower scale values to 0 (Schoemaker et al., 1994; but also see Limbert, 2004). Participants who identified as male completed the nine-item Male Body Dissatisfaction scale (Hallsworth et al., 2005), which has shown construct validity and test–retest reliability in adult men (Dakanalis et al., 2015). The measure parallels the more female-oriented Body Dissatisfaction subscale of the Eating Disorder Inventory (Hallsworth et al., 2005). Both measures use a 6-point scale (1 = *never*, 6 = *always*). A sample item from the Body Dissatisfaction subscale includes "I think that my stomach is too big" (α = .84; ω = .85; glb = .92), and a sample item from the Male Body Dissatisfaction scale includes "I think my chest is too small" (α = .77; ω = .78, glb = .91). The scales were combined for analyses into one overall Body Dissatisfaction scale. Because body dissatisfaction is qualitatively different in gender nonconforming individuals (Jones et al., 2016) and to our knowledge, a parallel, established measure for these individuals is not available, five nonbinary students did not complete an assessment of body dissatisfaction (no students identified as transgender or agender).

Facial Satisfaction

Participants completed the 10-item Facial Satisfaction subscale of the Body Parts Satisfaction scale (Berscheid et al., 1972; Frederick et al., 2014). The measure uses a 6-point scale (1 = *extremely dissatisfied*, 6 = *extremely satisfied*), with items preceded by the stem, "How satisfied are you with the way your body looks?" and sample items including "Hair" and "Eyes" (α = .84; ω = .85; glb = .87).

Instagram Comments

Prior to formal coding, the authors (all psychologists; two graduate students, one postdoctoral associate, and one senior researcher at the time of data collection) prepared a codebook with examples of positive and negative appearance and nonappearance commentary pulled from public Instagram posts, including how these examples would be scored. A team of four undergraduate coders practiced coding five sets of 10 posts, and the first author coded the same posts. Interrater reliability was established by computing intraclass correlations (ICCs) between the first author and the student coders, with a goal of exceeding .70 for the commentary variables. All students achieved this threshold in the initial round of training, although the final ICCs were slightly lower than desired.

Coders globally assessed the extent to which the comments on each Instagram post contained appearance and nonappearance commentary directed to the poster (i.e., the participant). The first author also coded 20% of all posts to ensure reliability. Coders used 5-point scales (1 = *none*, 5 = *extremely*) to assess the extent to which a post's comments contained (a) positive appearance commentary (ICC = .78), (b) negative appearance commentary (ICC = .62), (c) positive nonappearance commentary (ICC = .62), and (d) negative nonappearance commentary (ICC = .64). Scores were not assigned for posts with zero comments (17% of posts). Both quality (e.g., brief vs. elaborate) and quantity (i.e., number of unique comments) were considered when assigning a score. Lower scores on the scale reflect comments that were succinct and non-elaborate (e.g., positive appearance commentary: "cute," "pretty," fire emoji), whereas higher scores indicate more elaborate and specific comments (e.g., positive appearance commentary: "Your eyes look gorgeous"). Scales were chosen, rather than counting comments, to capture both detail and frequency of positive and negative comments. Counting comments would weigh brief, single-worded comments equally as elaborate comments; thus, the scales capture greater nuance in the comments themselves. In addition, counting comments could result in more problematically skewed variables as well as potential multicollinearity problems when controlling for proportion of posts with comments and nonappearance commentary (if also assessed by counting comments). It was reasoned that scales would mitigate these problems.

Positive appearance commentary quantified comments that complimented the poster's physical appearance. Negative appearance commentary quantified comments that criticized the poster's appearance, including comments made sarcastically. Positive nonappearance commentary quantified compliments and well wishes that were unrelated to appearance (e.g., "You are so smart!"). Negative nonappearance commentary quantified criticisms that were unrelated to appearance (e.g., "You're a bad friend").

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[4] As we asked participants about their gender, we describe our analyses assessing differences between males and females as testing for gender differences. As participants responded with 'male' and 'female' response options, we describe these differences using these terms instead of gendered terms (e.g., men versus women).

Post Information

Coders recorded the number of likes a post received (κ = .97), the number of comments a post received (κ = .88), and the number of comments made on the post by the poster (κ = .90). The number of poster comments was subtracted from total number of comments to obtain an assessment of comments made by others.

Type of Post

Coders recorded how many people were depicted in each image (κ = .94) and if the poster was present (κ = .94). From this information, the post was categorized as either a self post (only the poster present; 37% of posts), a group post (the poster present with at least one other person; 38% of posts), an others post (the poster not present but other people present; 6% of posts), or a no people post (20% of posts).

Covariates

Covariates included number of posts participants uploaded, proportion of posts that contained at least one comment, and body mass index (BMI; converted using self-reports of height and weight). In addition, the recency of which posts were uploaded varied tremendously, ranging from the day of study participation to 358 weeks prior (M = 49.91 weeks, SD = 58.90). Thus, the average amount of time since posts were uploaded was included as a covariate.

Analytic Plan

Analyses were run in SPSS Version 25. Missingness was low (ranging from 0% to 1% on key variables) and treated with listwise deletion. Skewed variables (likes, comments made by the poster, comments made by others, negative appearance commentary, negative nonappearance commentary) were square root transformed. Exploratory analyses examined if type of post (self, group, others, or no people) predicted received commentary. Due to the nested nature of the data (with posts nested within participants), multilevel modeling was used, with restricted maximum likelihood estimation and a random intercept included for nonindependence. Type of post was included as a categorical predictor, with the estimated marginal means obtained and pairwise comparisons inspected for differences between types of posts. Similar multilevel models were run to examine if gender predicted received feedback, with gender effects coded (-1 = $female$, 1 = $male$). For all analyses examining gender, participants who identified as nonbinary were excluded due to the low number (n = 5). In addition, a series of binomial logistic regressions using multilevel modeling were run to examine if the type of post (self, group, others, or no people) was predicted by participant gender. The type of post was dichotomized as the outcome, such that the post of interest received a score of "1" and all other posts received a score of "0."

For the central research questions examining appearance commentary predicting body image concerns, commentary was averaged across posts for each commentary variable. Hierarchical regressions were run with three steps. On the first step, covariates were entered: BMI, average length of time since posts were uploaded[5], proportion of posts that contained at least one comment[6], and total number of posts. On the second step, nonappearance commentary was entered. On the third step, appearance commentary was entered. Separate analyses were run for positive and negative commentary. To examine gender moderation, all continuous variables were grand-mean centered.

Gender (-1 = $female$, 1 = $male$) and the cross-product between gender and appearance commentary were added to the third step. In each hierarchical regression, multicollinearity, normality, heteroscedasticity, and influential observations were tested. Although no problems emerged in the full hierarchical regressions (our primary focus), negative appearance commentary remained skewed despite transformation and posed problems for normality and heteroscedasticity when covariates were omitted. Thus, analyses examining dichotomized negative appearance commentary (-1 = $received$ at $least$ one $negative$ $appearance$ $comment$; 1 = $received$ no $negative$ $appearance$ $comments$) were also run.

Results

Descriptive statistics and correlations between coding variables are in Table 1. Results for how type of post predicts feedback are in Table 2. Self posts received more likes, comments, and positive appearance commentary relative to the other types of posts and less negative nonappearance commentary compared to posts with no people. Group posts received the second-most likes, comments, and positive appearance commentary and received more positive nonappearance commentary compared to self posts. Results for gender differences are in Table 3. Females received more likes, comments, and positive appearance commentary, whereas males received more negative appearance and nonappearance commentary. Multilevel binomial logistic regressions also revealed a significant gender difference in self posts, b = .26, 95% confidence interval [.08, .44], SE = .09, p = .005, but no differences in the other types of posts (ps > .111). In all, 39% of posts were coded as self posts for females, and 29% were for males.

In support of hypotheses, positive appearance comments were much more frequent than negative comments. In all, 85% of participants received at least one positive appearance comment, and 93% received at least one positive nonappearance comment. In contrast, 16% received at least one negative appearance comment, and 45% received at least one negative nonappearance comment. Correlations and descriptive statistics for the body image variables are in Table 4. Receiving more likes was linked to greater body surveillance and ASMC, and lower body dissatisfaction and BMI. Receiving more comments was linked to greater body surveillance, ASMC, appearance-contingent self-worth, and lower BMI. Having a greater proportion of posts with comments was linked to greater self-objectification, body surveillance, ASMC, and lower BMI. Participants with a higher proportion of self posts reported greater self-objectification, body surveillance, ASMC, and appearance-contingent self-worth.

Regression results for positive commentary predicting body image concerns are in Table 5 and Figure 1. In partial support of hypotheses, receiving positive appearance commentary predicted

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[5] Analyses tested if average time since posting moderated links with body image concerns. BMI, posts, and proportion of posts with at least one comment were included in Step 1, nonappearance commentary in Step 2, and time, appearance commentary, and the interaction between time and appearance commentary in Step 3. These interactions were not significant for positive (ps > .219) or negative commentary (ps > .364).

[6] Posts that received zero comments were initially not scored for appearance commentary. Follow-up analyses assigned these posts a score of "1" on the commentary variables (as 1 represents no positive/negative commentary). Central analyses remained the same, except positive appearance commentary remained a significant predictor of body surveillance (p = .031) with self posts controlled.

Table 1

Descriptive Statistics and Zero-Order Correlations for Coding Variables

Variable	1	2	3	4	5	6	7
1. Likes	—						
2. Other comm	.66**	—					
3. Post comm	.52**	.71**	—				
4. PosAppear	.41**	.55**	.45**	—			
5. NegAppear	.03	.08**	.05*	.01	—		
6. PosNonAppear	.21**	.29**	.23**	.05*	−.01	—	
7. NegNonAppear	.02	.13**	.07**	−.09**	.05*	−.08**	—
Mean	127.29	4.62	2.19	2.05	1.04	2.34	1.22
SD	118.10	5.71	4.08	1.08	0.24	1.02	0.54

Note. Other Comm = Comments made by others; Post Comm = Comments made by poster; PosAppear = Positive appearance commentary; NegAppear = Negative appearance commentary; PosNonAppear = Positive nonappearance commentary; NegNonAppear = Negative nonappearance commentary. Likes, comments made by others, comments made by poster, negative appearance commentary, and negative nonappearance commentary were square root transformed for correlations. Untransformed means and standard deviations are reported.
* $p < .05$. ** $p < .01$.

ASMC and (weakly) body surveillance; no other associations were significant. Positive nonappearance commentary was unrelated to all outcomes. Inconsistent with hypotheses, negative appearance commentary did not predict any outcome ($ps > .173$; Figure 1 and Supplemental Table 1), including when negative appearance commentary was dichotomized ($ps > .162$). Negative nonappearance commentary was also not significant. Gender did not moderate associations for positive appearance commentary ($ps > .460$) or negative appearance commentary ($ps > .181$), including when negative commentary was dichotomized ($ps > .088$).

As self posts were particularly likely to elicit positive appearance commentary, links between positive appearance commentary and body image concerns may be explained by self posts. Analyses were rerun with proportion of self posts added to the second step of each model to account for this possibility (see online supplemental materials). Positive appearance commentary remained a significant predictor of ASMC ($p < .001$) and a marginal predictor of body surveillance ($p = .063$). Notably, the proportion of self posts predicted greater self-objectification ($p = .017$) and ASMC ($p = .045$).

Discussion

This study provides mixed evidence that receiving positive appearance commentary is linked to greater body image concerns. The only associations observed were with ASMC and (weakly)

with body surveillance. There is no evidence that receiving negative appearance commentary is linked to body image concerns.

Frequency of Appearance Commentary

As expected, this study found that receiving positive appearance (and nonappearance) commentary on Instagram is extremely common, whereas negative appearance (and nonappearance) commentary is rarer. This is in line with previous research suggesting that SNS feedback tends to be positive (Rideout & Fox, 2018).

Self posts, followed by group posts, were especially likely to elicit likes, comments, and positive appearance commentary. Images that depicted people other than the poster and images that depicted no people received the fewest number of likes, comments, and positive appearance commentary; these two types of posts did not differ from each other. This is in line with previous research suggesting that photos with faces receive more likes and comments on Instagram (Bakhshi et al., 2014) and that photos including the poster (vs. photos that do not include the poster) receive more likes (Greenfield et al., 2017). Group posts were more likely to elicit positive nonappearance commentary than self posts. The coding process suggested that group posts were more likely to elicit expressions of love and positive reminiscing; for example, photos depicting a social gathering were observed to contain comments from individuals featured in the photo noting how much fun they had with the poster at the gathering.

Table 2

Results of Multilevel Analyses Examining if Type of Post Predicts Feedback Received

Variable	Self	Group	Others	No people	Overall analysis
Likes	10.55[a]	10.26[b]	9.02[c]	8.69[c]	$F(3, 2,409) = 119.54, p < .001$
Other comments	2.17[a]	1.73[b]	1.30[c]	1.21[c]	$F(3, 2,743) = 111.26, p < .001$
Poster comments	1.27[a]	0.89[b]	0.58[c]	0.60[c]	$F(3, 2,762) = 72.38, p < .001$
PosAppear	2.41[a]	1.94[b]	1.27[c]	1.23[c]	$F(3, 2,233) = 130.33, p < .001$
NegAppear	1.02	1.02	1.01	1.00	$F(3, 1,838) = 2.44, p = .063$
PosNonAppear	2.25[a]	2.41[b]	2.38[a,b]	2.23[a,b]	$F(3, 2,235) = 4.97, p = .002$
NegNonAppear	1.07[a]	1.09[a,b]	1.07[a,b]	1.12[b]	$F(3, 2,232) = 3.58, p = .013$

Note. Other Comments = Comments made by others; Poster Comments = Comments made by poster; PosAppear = Positive appearance commentary; NegAppear = Negative appearance commentary; PosNonAppear = Positive nonappearance commentary; NegNonAppear = Negative nonappearance commentary. Marginal means are reported. Values in the same row that differ in superscripts significantly differed from each other at $p < .05$.

Table 3

Results of Multilevel Analyses Examining if Gender Predicts Feedback Received

Variable	Males	Females	Overall analysis
Likes	8.97	10.39	$F(1, 309) = 5.28, p = .022$
Other comments	1.54	1.84	$F(1, 308) = 5.36, p = .021$
Poster comments	0.65	1.06	$F(1, 307) = 13.54, p < .001$
PosAppear	1.53	2.15	$F(1, 314) = 52.03, p < .001$
NegAppear	1.03	1.01	$F(1, 316) = 12.74, p < .001$
PosNonAppear	2.20	2.36	$F(1, 308) = 3.52, p = .061$
NegNonAppear	1.15	1.07	$F(1, 312) = 23.02, p < .001$

Note. Other Comments = Comments made by others; Poster Comments = Comments made by poster; PosAppear = Positive appearance commentary; NegAppear = Negative appearance commentary; PosNonAppear = Positive nonappearance commentary; NegNonAppear = Negative nonappearance commentary. Marginal means are reported.

Instagram Feedback and Body Image

Receiving more likes on Instagram posts was correlated with greater body surveillance and ASMC and receiving more comments from others was associated with greater body surveillance, ASMC, and appearance-contingent self-worth. Receiving likes was also negatively correlated with body dissatisfaction. This suggests that receiving likes could serve as a signal of approval of one's appearance (Baker et al., 2019; Chua & Chang, 2016) and

extends previous research finding that (offline) positive appearance commentary is linked to lower body dissatisfaction (Fuller-Tyszkiewicz et al., 2019; Herbozo et al., 2013). However, the association with body surveillance also indicates that likes could simultaneously serve as a reminder that others are evaluating one's appearance, perhaps promoting body checking behaviors (Calogero et al., 2009; Herbozo & Thompson, 2006; Herbozo et al., 2017; Slater & Tiggemann, 2015). In addition, BMI was negatively correlated with receiving likes, comments, and both positive appearance and nonappearance commentary. Recent research suggests that Instagram images depicting men with lower body fat receive more likes and comments than images of men with higher body fat, perhaps because bodies exemplifying the beauty ideal receive greater social reward (Gültzow et al., 2020). The current study's results may also reflect this.

We expected that positive and negative appearance commentary would be linked to greater self-objectification, body surveillance, ASMC, and appearance-contingent self-worth and that negative appearance commentary would also be linked to body dissatisfaction and facial satisfaction. These hypotheses received little support, with only positive appearance commentary associated with greater body surveillance and ASMC. Receiving positive nonappearance commentary was not associated with body image concerns, which is line with previous research suggesting that appearance-related SNS activities may be more important for body image relative to nonappearance activities (Bell et al., 2018; Cohen et al., 2018; Modica, 2019).

Table 4

Descriptive Statistics and Zero-Order Correlations With Body Image Variables

Variable	13	14	15	16	17	18	19	20
1. Likes	.10	.15**	.25**	.10	.06	−.11*	−.30**	−.24**
2. Other comm	.10	.19**	.23**	.11*	−.02	−.08	−.30**	−.27**
3. Post comm	.06	.15**	.22**	.13*	.00	−.07	−.24**	−.23**
4. Prop comm	.12*	.16**	.17**	.10	.03	−.10	−.30**	−.24**
5. PosAppear	.08	.16**	.32**	.12*	−.01	−.05	−.25**	−.16**
6. NegAppear	.06	.01	−.07	−.01	.09	−.01	−.10	.02
7. PosNonAppear	−.05	.01	.10	−.04	−.01	−.06	−.11*	−.11*
8. NegNonAppear	.02	.08	−.05	.02	.08	.00	−.10	−.06
9. Self	.18**	.11*	.24**	.15**	.07	−.09	−.11	−.09
10. Group	−.02	.03	.03	−.02	−.01	.01	−.18**	−.09
11. Others	−.01	−.04	−.10	−.05	−.02	.07	.28**	.28**
12. No people	−.16**	−.13*	−.24**	−.12*	−.07	.07	.19**	.07
13. Self-object	—							
14. Body surveil	.58**	—						
15. ASMC	.48**	.61**	—					
16. ACOSW	.49**	.58**	.55**	—				
17. Face sat	−.27**	−.26**	−.30**	−.32**	—			
18. Body dissat	.29**	.33**	.26**	.28**	−.41**	—		
19. Age	−.14*	−.17**	−.21**	−.14*	.11*	−.07	—	
20. BMI	.08	.01	.01	.03	−.02	.34**	.27**	—
M (females)	−1.26[a]	3.96	3.64[a]	5.02[a]	4.32[a]	3.34	20.38	23.20[a]
SD (females)	17.25	0.90	1.39	1.16	0.81	1.03	3.12	4.35
M (males)	−7.16[b]	3.76	2.76[b]	4.47[b]	4.53[b]	3.25	20.47	24.50[b]
SD (males)	17.48	0.95	1.31	1.13	0.80	0.85	2.93	5.44

Note. Other comm = Comments made by others; Post comm = Comments made by poster; PosAppear = Positive appearance commentary; NegAppear = Negative appearance commentary; PosNonAppear = Positive nonappearance commentary; NegNonAppear = Negative nonappearance commentary; ASMC = appearance-related social media consciousness; ACOSW = appearance-contingent self-worth. Type of post (self, group, others, no people) is the proportion of each type of post to total posts. Prop comm represents the proportion of posts that has at least one comment. Differing subscripts for means between males and females indicate that means differed at $p < .05$ in *independent* sample *t* tests. Likes, comments, and commentary were averaged across participant posts.
* $p < .05$. ** $p < .01$.

Table 5

Hierarchical Regressions Examining Associations Between Positive Commentary and Body Image Concerns

Variable	b [95% confidence interval]	SE	Overall analysis
Self-objectification			
1. Time	−0.04 [−0.07, 0.00]	0.02	
Posts	0.10 [−0.63, 0.83]	0.37	
Prop with comm	12.24* [2.20, 22.28]	5.11	
Body mass index	0.48* [0.06, 0.90]	0.21	$F(4, 317) = 3.30$, $p = .011$, $R^2 = .04*$
2. Positive Non Appear	−2.25 [−5.07, 0.57]	1.43	$F(5, 316) = 3.09$, $p = .010$, $R^2 = .05$, $\Delta R^2 = .01$
3. Positive Appear	0.96 [−2.11, 4.03]	1.56	$F(6, 315) = 2.63$, $p = .017$, $R^2 = .05$, $\Delta R^2 = .001$
Body surveillance			
1. Time	0.00 [−0.002, 0.002]	0.001	
Posts	0.02 [−0.02, 0.06]	0.02	
Prop with comm	0.57* [0.04, 1.10]	0.27	
Body mass index	0.01 [−0.01, 0.03]	0.01	$F(4, 320) = 3.08$, $p = .016$, $R^2 = .04*$
2. Positive non appear	−0.06 [−0.21, 0.09]	0.08	$F(5, 319) = 2.50$, $p = .030$, $R^2 = .04$, $\Delta R^2 = .001$
3. Positive appear	0.17* [0.01, 0.33]	0.08	$F(6, 318) = 2.85$, $p = .010$, $R^2 = .05$, $\Delta R^2 = .01*$
ASMC			
1. Time	−0.002 [−0.004, 0.001]	0.001	
Posts	0.04 [−0.02, 0.09]	0.03	
Prop with comm	0.42 [−0.36, 1.19]	0.39	
Body mass index	0.02 [−0.01, 0.06]	0.02	$F(4, 320) = 4.44$, $p = .002$, $R^2 = .05**$
2. Positive non appear	0.02 [−0.20, 0.24]	0.11	$F(5, 319) = 3.74$, $p = .003$, $R^2 = .06$, $\Delta R^2 = .003$
3. Positive appear	0.56*** [0.32, 0.79]	0.12	$F(6, 318) = 6.97$, $p < .001$, $R^2 = .12$, $\Delta R^2 = .06***$
ACOSW			
1. Time	−0.001 [−0.003, 0.002]	0.001	
Posts	0.02 [−0.03, 0.07]	0.03	
Prop with comm	0.39 [−0.30, 1.07]	0.35	
Body mass index	0.02 [−0.01, 0.05]	0.01	$F(4, 320) = 1.40$, $p = .233$, $R^2 = .02$
2. Positive non appear	−0.13 [−0.32, 0.06]	0.10	$F(5, 319) = 1.34$, $p = .246$, $R^2 = .02$, $\Delta R^2 = .003$
3. Positive appear	0.19 [−0.01, 0.40]	0.11	$F(6, 318) = 1.69$, $p = .123$, $R^2 = .03$, $\Delta R^2 = .01$
Facial satisfaction			
1. Time	0.00 [−0.002, 0.002]	0.001	
Posts	0.01 [−0.03, 0.04]	0.02	
Prop with comm	0.22 [−0.26, 0.69]	0.24	
Body mass index	−0.01 [−0.03, 0.01]	0.01	$F(4, 320) = 0.21$, $p = .933$, $R^2 = .003$
2. Positive non appear	−0.02 [−0.15, 0.12]	0.07	$F(5, 319) = 0.20$, $p = .961$, $R^2 = .003$, $\Delta R^2 = .001$
3. Positive appear	−0.06 [−0.20, 0.09]	0.07	$F(6, 318) = 0.28$, $p = .948$, $R^2 = .005$, $\Delta R^2 = .002$
Body dissatisfaction			
1. Time	0.002 [0.000, 0.004]	0.001	
Posts	0.03 [−0.01, 0.07]	0.02	
Prop with comm	0.16 [−0.39, 0.70]	0.28	
Body mass index	0.07*** [0.05, 0.09]	0.01	$F(4, 315) = 11.09$, $p < .001$, $R^2 = .12***$
2. Positive non appear	−0.03 [−0.18, 0.13]	0.08	$F(5, 314) = 8.86$, $p < .001$, $R^2 = .12$, $\Delta R^2 = .00$
3. Positive appear	0.02 [−0.15, 0.19]	0.09	$F(6, 313) = 7.37$, $p < .001$, $R^2 = .12$, $\Delta R^2 = .00$

Note. Third step coefficients shown. Results under "Overall Analysis" depict analyses for each step. Step 1 = time, posts, proportion of posts with comments, and body mass index. Step 2 = positive nonappearance commentary. Step 3 = positive appearance commentary. ASMC = appearance-related social media consciousness; ACOSW = appearance-contingent self-worth.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Body surveillance is characterized by a preoccupation and monitoring of one's physical appearance (McKinley & Hyde, 1996). Receiving positive appearance commentary may fuel the perception that one's physical appearance is being evaluated, which may increase these monitoring behaviors. Likewise, ASMC is characterized by an investment in how attractive one looks in SNS photos (Choukas-Bradley et al., 2019, 2020). As feedback can serve as an indicator of one's attractiveness (Baker et al., 2019; Chua & Chang, 2016), users who often receive positive appearance commentary may internalize this feedback. These individuals may engage in thoughts and behaviors that prioritize their attractiveness on SNSs, perhaps to continue receiving this commentary due to the potential emotional benefits that it may have. Although receiving positive appearance commentary was not linked to other outcomes, ASMC was moderately to strongly correlated with the other indices of body

image concerns. Thus, future longitudinal research can test a mediation pathway, in which positive appearance commentary may indirectly relate to body image concerns through ASMC.

Importantly, those higher in body image concerns may upload specific types of content, and these types of content may elicit positive appearance commentary (e.g., self posts; also see Bell et al., 2018, who examined self-objectifying content, and Butkowski et al., 2019, who examined feminine selfies). We tested if these findings held when controlling for self posts. Although results held for ASMC, they were marginal for body surveillance, indicating that other SNS behaviors such as type of post may be more critical for body surveillance.

Although some research has found no relation between online negative appearance commentary and body image concerns (Feltman & Szymanski, 2018; Maes et al., 2019), the current study's null relations

Figure 1
Hierarchical Regression Results for Appearance Commentary Predicting Body Image Concerns
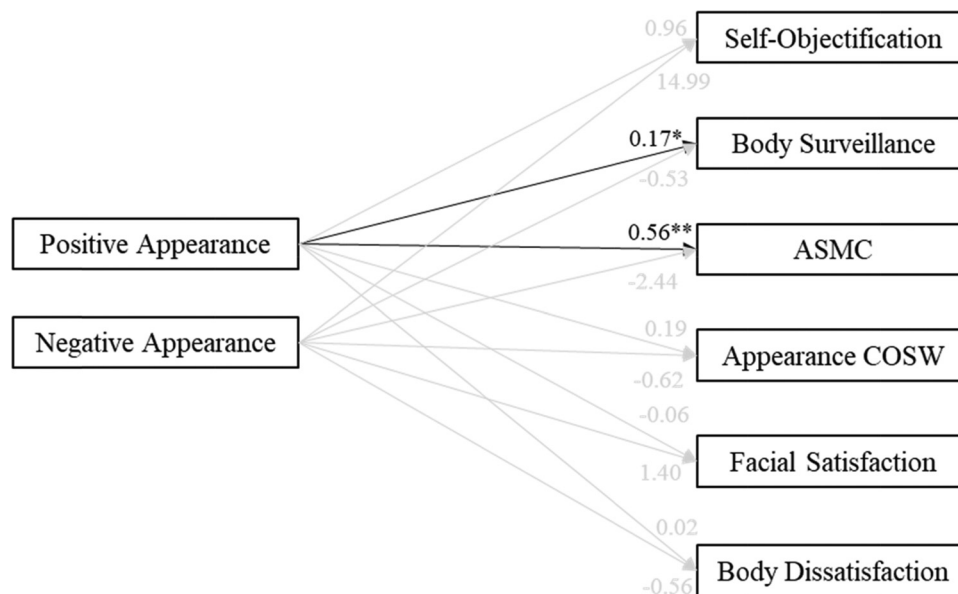
Note. Analyses were run separately for positive and negative commentary and for each outcome. Covariates include average time since posting, number of posts, proportion of posts with comments, body mass index, and nonappearance commentary. ASMC = Appearance-related social media consciousness; Appearance COSW = appearance-contingent self-worth.
* $p < .05$. ** $p < .01$.

appear to contradict previous research showing that appearance-related teasing is linked to body image concerns (Menzel et al., 2010). The coding process revealed that many negative comments, appearance-related or not, appeared sarcastic. For example, when one male participant posted a swimsuit photo of himself while lifeguarding, a male commenter remarks that the participant looks like he is "getting fat," despite the participant's clearly muscular figure. Sarcastic negative comments likely relate to body image concerns differently than genuine negative comments. As outside observers, we can never be completely certain if a comment is sarcastic or genuine, and therefore we could not confidently examine differential associations for sarcastic compared to genuinely negative comments. Future research could incorporate participants' perceptions of SNS comments (Griffioen et al., 2020) to better distinguish these potential differences. Users' perceptions and investment in feedback (e.g., how much they value feedback; whether they perceive negative feedback as genuine) may also be particularly important (Butkowski et al., 2019). Moreover, it is plausible that the lower variability of negative commentary diminished power to detect effects. Future research could recruit larger samples to assess these possible relations.

Gender Differences

Females received more likes, comments, and positive appearance commentary compared to males. Research on adolescents suggests that girls engage in more attempts to obtain likes and comments on SNSs compared to boys (Nesi & Prinstein, 2019); thus, these attempts may be successful for females. Males received more negative appearance and nonappearance commentary than

females. Perhaps males are more likely to elicit sarcastic comments, as shown in the aforementioned lifeguard example.

Males and females generally did not differ on types of posts uploaded, although females were more likely to upload photos classified as self posts. Some research examining adolescents and adults suggests that women take and post selfies on SNSs more than men (Dhir et al., 2016). Other research suggests that there are no gender differences in taking selfies that only feature the self, but that women take more selfies that include others than men (Koterba et al., 2020). Koterba and colleagues (2020) assessed photo-taking, whereas our study examined posted photos. Therefore, there may be key differences between taking photos and actually posting them. Moreover, the assessments used in the current study did not differentiate between self-taken photos (i.e., selfies) and photos taken by others, which may also be a key difference.

Gender did not moderate any associations between appearance commentary and body image concerns. Thus, although there may be key mean-level differences in the assessed variables, ultimately the receipt of appearance commentary may influence males and females in similar ways (cf. Holland & Tiggemann, 2016). If appearance commentary is objectifying, then these results could suggest that these objectification processes operate similarly in males and females. Importantly, however, scholars argue that objectification may be fundamentally different for males, as males do not experience the same societal disadvantages as females after being objectified (Davids et al., 2019). More research can incorporate other key tenets of objectification (e.g., assessing sexualized objectification) to see how these relations may vary for males.

Likewise, body image concerns and received appearance commentary may manifest differently in gender nonconforming individuals (Jones et al., 2016). The commentary for these individuals may be more geared toward sexualized body characteristics (e.g., breasts, facial hair), highlighting a need to critically examine the objectifying nature of appearance commentary along the gender spectrum and how this may hold distinct associations with body image concerns.

Limitations and Conclusions

Sample limitations include a primary focus on cisgender students. Only five nonbinary students completed the study and therefore were removed from gender moderation analyses. Moreover, these students did not complete a measure of body dissatisfaction. Future research should include a greater diversity of gender identity to examine how Instagram commentary may differ. In addition, the sample was overwhelmingly female and comprised college students. Although the sample's ethnic diversity was a strength, it was still skewed Asian/Asian American, reducing generalizability.

Methodological limitations include the cross-sectional design. Experimental and longitudinal studies are needed to determine temporality and potential bidirectional associations. Moreover, although we utilized theoretically relevant, established self-report measures, several validity limitations must be noted. The Facial Satisfaction subscale has not been validated independently of the Body Parts Satisfaction scale. The ASMC scale still requires full validation in college students, and there is debate regarding the validity of the Body Dissatisfaction subscale of the Eating Disorder Inventory in nonclinical samples (Limbert, 2004; Schoemaker et al., 1994). The Self-Objectification Questionnaire may not fully capture men's self-objectification experiences, and future research should use alternative measures (e.g., the Male Assessment of Self-Objectification; Daniel et al., 2014) to confirm how men's self-objectification may be linked to Instagram commentary.

Coding limitations include the high variability in the participants' posts. Students varied tremendously in how old their Instagram posts were. Comments received more recently may have stronger associations with body image, although exploratory analyses did not observe post recency as a significant moderator. In addition, nearly one third of participants did not have 10 posts. These students had fewer posts analyzed, introducing some discrepancy across participants, which we subsequently controlled for. Although this problem could have been mitigated by coding a fewer number of posts for all participants, we were concerned that this could introduce other challenges (e.g., reducing representativeness of posts). Thus, we elected to code the largest number of posts that we could with our available resources. We also did not code for appearance-related comments provided by the poster. The coding process revealed several instances in which posters would respond to positive appearance commentary by returning the compliment (e.g., responding "That's you!" when told "You're so pretty!"). Future research should code this content to assess how deflecting compliments may uniquely relate to body image. Finally, the reliability for several commentary variables was low, which may have introduced some error into the analyses.

The results of the current study suggest that receiving positive appearance commentary on Instagram is linked to greater ASMC

and (weakly) with body surveillance. These findings indicate that receiving positive appearance commentary, although likely well-intended, may instead reinforce the notion that physical attractiveness is valued (Calogero et al., 2009; Herbozo & Thompson, 2006; Herbozo et al., 2017; Slater & Tiggemann, 2015). Research should continue to examine real comments, what reactions they elicit, and their long-term effects.

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