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Do You 'Like' My Photo? Facebook Use Maintains Eating Disorder Risk

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Abstract

Objective: Social media sites, such as Facebook, merge two factors that influence risk for eating disorders: media and peers. Previous work has identified cross-sectional and temporal associations between Facebook use and disordered eating. This study sought to replicate and extend these findings using an experimental design. **Methods:** In Study 1, 1,960 women completed self-report surveys regarding Facebook use and disordered eating. In Study 2, 84 women were randomly assigned to use Facebook or to use an alternate internet site for 20 minutes. **Results:** More frequent Facebook use was associated with greater disordered eating in a cross-sectional survey. Facebook use was associated with the maintenance of weight/shape concerns and state anxiety compared to an alternate internet activity. **Discussion:** Facebook use may contribute to disordered eating by maintaining risk for eating pathology. As such, targeting Facebook use may be helpful in intervention and prevention programs.

Word Count = 142

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Do You 'Like' My Photo? Facebook Use Maintains Eating Disorder Risk

With 655 million daily users,¹ Facebook represents a ubiquitous merging of two social influences linked to risk for developing eating disorders through reinforcement of the thin ideal: media and peers (for recent review, see Keel & Forney, 2013).² Traditional media, such as movies, television, and magazines, portray an unrealistically thin ideal for female beauty.³⁻⁵ Exposure to this ideal leaves many adolescent girls and women with body dissatisfaction,⁶⁻⁸ which increases risk for disordered eating over time.^{9,10} Peers influence risk for body dissatisfaction and eating pathology,¹¹⁻¹³ in part, by endorsing the thin ideal¹³. Today, college students use Facebook an average of 100 minutes per day, interacting with peers primarily by posting and viewing photos.¹⁴ The ability to post carefully selected photos that may be digitally altered using online tools, such as "Plump & Skinny Booth,"¹⁵ allow Facebook users to present and view images that adhere to unrealistic beauty ideals. Further, social media may reinforce the thin ideal by the posts, "likes," and comments of idealized images. Thus, it is important to understand if and how the use of this common social media platform may influence risk for eating pathology.

Previous work has established small but significant associations between social media use and thin ideal internalization, body dissatisfaction, and eating pathology. Having a Facebook account was associated with greater thin ideal internalization, body surveillance, and drive for thinness in a large sample of adolescent girls.¹⁶ Among those with Facebook accounts, number of "friends" and time spent on social media were significantly associated with increased body image disturbance.¹⁶ Smith and colleagues¹⁷ conducted a longitudinal study in college women in which they measured "maladaptive" Facebook use and changes in eating pathology over four weeks. Smith et al.¹⁷ found that maladaptive Facebook use at baseline, defined as the tendency to seek out negative evaluations and/or engage in social comparisons, prospectively predicted greater eating pathology at follow-up. This effect was partially mediated by body dissatisfaction, suggesting that Facebook use may impact eating pathology via body

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dissatisfaction. Importantly, both maladaptive Facebook use and increases in disordered eating may be caused by an underlying third variable. Thus, an experimental design is needed to establish causation.

Study 1 aimed to replicate correlations between greater Facebook use and increased eating pathology.¹⁶ Study 2 examined whether Facebook use causes temporal changes in eating disorder risk factors, specifically weight/shape concerns and anxiety,^{18,19} and behavioral manifestation of concerns.^{20,21} We hypothesized a positive correlation between higher Facebook use and higher disordered eating and that Facebook use would cause momentary increases in body dissatisfaction, anxiety, and urges to exercise. We focused on state anxiety because of its robust association with eating disorders.^{22,23}

Study 1

Participants and Procedure

Nine hundred-sixty female college students completed a large screening instrument for a southeastern state university psychology subject pool in fall ($n = 626$) and spring ($n = 334$) semesters. Participants in the fall were significantly younger ($M (SD) = 18.44 (.85)$ years) than in the spring ($M (SD) = 19.10 (1.11)$ years), $t(958) = 10.34, p < .001$, reflecting the passage of time. Across semesters, participants did not differ in ethnicity (18.45% Hispanic, $X^2(1) = .03, p = .87$) or race (86.45% White, $X^2(3) = 2.14, p = .54$). Participants received course credit. The university's institutional review board approved the study; informed consent was given prior to participation.

Measures

*Eating Attitudes Test-26 (EAT-26)*²⁴ assessed disordered eating attitudes and behaviors on a six-point scale from "Always" to "Never." The nonclinical scoring was used to ensure adequate sensitivity to individual differences.²⁵ Higher scores indicate greater disordered eating. The EAT-26 distinguishes between eating disorder cases and non-cases,²⁶ and exhibits good convergent validity.²⁷ Due to limited space on the screening instrument, 19 items of the EAT-26 comprising

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the Dieting and Bulimia/Food Preoccupation subscales were used. Typical items include “I eat diet foods” and “I give too much time and thought to food.” We used total scores from these subscales as a global measure of eating pathology, referred to as the EAT-19. Internal consistency of the EAT-19 was .92 in both the fall and the spring.

Duration of Facebook Use was assessed with the question “How much time do you spend on Facebook per week?” Response options were 1=“0 min,” 2=“<30 min,” 3=“30 min - < 1 hr,” 4=“1 - <2 hrs,” 5=“2 - <4 hrs,” 6=“4 – 7 hrs,” and 7=“> 7 hrs.”

Results

The vast majority of women endorsed using Facebook on at least a weekly basis (97% in fall and 95.5% in spring). Mean (*SD*) scores for duration of Facebook use were 4.58 (1.52) in the fall and 4.74 (1.57) in the spring, reflecting approximately 2 hours of Facebook use each week, with no significant difference in use between semesters, $t(958) = 1.53, p = .13$. A small but significant positive correlation was observed between duration of Facebook use and disordered eating for participants in fall, $r(623) = .11, p < .01$, and spring, $r(334) = .16, p < .01$.

Study 2

Participants

Women ($N = 84$) included in Study 1 who endorsed Facebook use on a weekly basis (Facebook use ≥ 2) were recruited to participate in Study 2. Sociodemographic variables did not differ significantly between Study 1 and Study 2 participants. Participants identified as Caucasian (77.4%; $n = 65$), Hispanic (15.5%; $n = 13$), and African-American (7.1%, $n = 6$) and reported a mean (*SD*) age of 18.39 (.69) years. To ensure an adequate range of disordered eating, we used an enriched sampling design that balanced representation of individuals with low, medium, and high EAT-19 scores from Study 1 screens. Stratified randomization to the experimental and control groups was used to match disordered eating levels between conditions. EAT-26 scores from Study 2 did not differ between those randomly assigned to the

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experimental condition ($M = 63.81$; $SD = 20.57$) and the control condition ($M = 63.25$; $SD = 18.81$), $t(81) = -.13$, $p = .90$.

Procedure

After providing informed consent, participants completed a demographic survey, Visual Analog Scales (VAS; described below), and the State Trait Anxiety Inventory (STAI) State scale. Participants in the experimental group were instructed to log onto their Facebook account and spend 20 minutes on the site. Participants in the control group were instructed to use the internet for 20 minutes on Wikipedia researching the ocelot, a neutral rainforest animal, and on YouTube watching a preselected ocelot video. The control condition was designed to match the experimental condition on exposure to text versus images while eliminating any images related to the human body. Participants were asked to remain on the assigned website(s) and not to use any links to connect to other sites to minimize risk of viral infections. This ensured that participants spent the entire 20 minutes in their assigned condition rather than connecting to another website. Participants were instructed to otherwise use the sites as they normally would. After 20 minutes of internet use, participants completed a second questionnaire packet, consisting of VAS, a STAI State scale, questions regarding their Facebook use, and the EAT-26 (described below). Following internet use, the researcher cleared Internet browser history while the participant watched to ensure confidentiality of participants' personal information and compliance with study procedures. Upon completion, participants were debriefed and given class credit. The university's institutional review board approved this study.

Measures

Demographic information was collected with a brief survey that included questions about age, race, and ethnicity.

VAS ratings measured momentary experiences by having participants their level of "preoccupation with weight," "preoccupation with shape," and "urge to exercise," "RIGHT NOW" by placing a vertical line on a 100 mm horizontal line, anchored from "None at all" to

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“Extremely.” The VAS is more sensitive to changes than Likert scale responses, as the latter may be influenced by recall of baseline answers.²⁸ Additional items probed for more serious disordered eating urges (e.g., “urge to vomit”). However, due to the small sample size and low base rate of these behaviors in a non-clinical sample, variance was too low to permit meaningful analyses. Preliminary analyses demonstrated significant robust correlations between responses on the VAS scales of “preoccupation with weight” and “preoccupation with shape” (Time 1 $r(75) = .89, p < .001$; Time 2 $r(75) = .95, p < .001$). Thus, these VAS items were averaged into a single “preoccupation with weight/shape” variable at Time 1 and Time 2 for analyses. VAS have successfully been used in other experimental studies examining changes in mood and body image over similar time frames.²⁹⁻³¹

*Eating Attitudes Test (EAT-26)*²⁴ In Study 2, participants completed the full EAT-26. Test-retest reliability from the 19 items administered in Study 1 and Study 2 was high, $r(83) = .90, p < .001$. Cronbach’s alpha for the EAT-26 was .91 in Study 2.

*State Trait Anxiety Inventory (STAI)*³² The STAI State subscale measured current anxiety before and after internet use. This questionnaire assesses responses to questions such as “I feel nervous” on a four-point scale ranging from “almost never” to “almost always.” Internal consistency was high (Time 1 $\alpha = .92$; Time 2 $\alpha = .93$).

Facebook Survey Questions were developed to understand the amount of time spent using Facebook, participants’ activities on Facebook (e.g., viewing photos of friends, posting updates), importance of Facebook features (e.g., receiving comments or “likes” on their photos and posts), and access to Facebook (e.g., via a smartphone). Survey items are included in the Appendix. For participants assigned to the Facebook condition, an additional question evaluated how similar the 20 minutes of use was to their typical use of Facebook, with responses on a five-point scale ranging from “Not at all” to “Completely.” Participants in the experimental condition indicated that their Facebook use was “Moderately” to “Very” representative of their typical use ($M = 3.52$; $SD = 1.19$). To evaluate how participants used Facebook, items were

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analyzed individually, and a Facebook score was created from items 9, 10, 11, 12, 13, 14, 16, and 17. Facebook score reflects the importance and frequency of using Facebook features posited to heighten weight/shape concerns. Internal consistency of the Facebook score was good, $\alpha = .85$.

Data Analyses

Correlations examined the association between disordered eating and both Facebook items and Facebook score. Repeated measures ANOVA assessed the effect of experimentally manipulated Facebook use as a between-subjects variable on within-subject changes in momentary ratings of “preoccupation with weight/shape,” state anxiety, and “urge to exercise.” Significant Group X Time interaction effects were followed by post-hoc comparisons.

Results

In Study 2, a similar effect size was found for the association between time spent on Facebook and EAT-26 score; however, due to the smaller sample size of Study 2, this association was not statistically significant, $r(83) = .09$, $p = .44$. Among the 84 participants in Study 2, mean (*SD*) time reported per Facebook session was 20.06 (17.75) minutes, while mean (*SD*) total time per day on the site was 76.28 (68.70) minutes. Most participants used Facebook daily ($M = 6.46$; $SD = 1.22$). The majority (91.7%; $n = 77$) of participants endorsed having a smart phone; 94.8% ($n = 73$) of those with a smartphone endorsed using a Facebook application. Among Facebook activities, 66.7% ($n = 56$) answered that they choose to look at photos over other activities.

EAT-26 scores were significantly associated with scores on several of the individual Facebook items used to create the Facebook score. Participants with greater disordered eating endorsed greater importance of receiving comments on their status ($r(83) = .32$, $p < .01$) and photos ($r(83) = .29$, $p = .01$), and greater importance of receiving “likes” on their status ($r(83) = .29$, $p < .01$). Those with greater eating pathology reported untagging photos of themselves more often ($r(83) = .34$, $p < .01$) and endorsed comparing their photos to their female friends’

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photos more often ($r(83) = .22, p = .04$). Disordered eating was not associated with the importance of “likes” on photos ($r(83) = .16, p = .16$), nor with the frequency of changing profile pictures ($r(83) = -.15, p = .18$). Consistent with study hypotheses, those with the greatest disordered eating had higher Facebook scores, $r(83) = .38, p < .001$.

To understand the causal effects of Facebook use, comparisons were made between the experimental and control condition over time in weight/shape concerns, state anxiety, and urge to exercise (see Table 1). Participants in both conditions endorsed a decrease in their preoccupation with weight and shape from immediately before to immediately after spending 20 minutes on the internet, $p < .001, d = .30$. A significant group by time interaction ($p = .04$) indicates that the effect of time depended upon condition. Specifically, participants in the control group demonstrated a greater decline in weight/shape preoccupation than did participants who spent 20 minutes on Facebook. Post-hoc comparisons supported a significant decrease in weight/shape preoccupation in controls ($F(1,36) = 21.29, p < .001, d = .42$) and a less robust decline in experimental participants ($F(1,37) = 4.34, p = .04, d = .13$). Weight/shape preoccupation did not significantly differ between conditions at Time 1 ($F(1,73) = .001, p = .97, d = .01$) or Time 2 ($F(1,73) = .86, p = .35, d = -.22$). The significant interaction effect remained after controlling for EAT-26 scores, suggesting that Facebook use maintains a preoccupation with weight and shape compared to an internet control condition (see Figure 1).

Across conditions, state anxiety was maintained over time ($p = .82$). However, the effect of time varied by condition ($p < .01$). Specifically, participants in the control condition endorsed a significant decrease in anxiety ($F(1,35) = 6.04, p = .02, d = .56$) while participants in the experimental condition endorsed a non-significant increase in anxiety ($F(1,37) = 2.57, p = .12, d = -.13$). Post hoc comparisons supported no significant differences between experimental and control participants at Time 1 ($F(1,72) = 3.72, p = .06, d = .44$) or at Time 2 ($F(1,72) = .28, p = .60, d = .12$). The significant interaction effect, which remained once controlling for EAT-26

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scores, suggests that Facebook use maintains state anxiety compared to an alternative internet activity.

Urge to exercise decreased after spending 20 minutes on the Internet ($p < .001$, $d = .26$). The effect of time did not depend on condition ($p = .46$), suggesting that general internet use, not Facebook use specifically, is associated with the decrease.

Discussion

Before the advent of social media sites, women were confronted with unrealistically thin images of beauty from magazines, films, and television. Women also engaged with peers who represented a full range of expected body weights and shapes in their immediate environment but could reinforce the thin ideal through discussions and behaviors. Now, women have a constant and active space to engage in social comparison with peers who may simultaneously portray and reinforce the thin ideal. Replicating previous research,¹⁶ we found a significant but small association between Facebook use and disordered eating levels in two large samples of college-aged women. In addition, how women use Facebook (reflected by higher Facebook score) was associated with greater disordered eating. While previous longitudinal findings¹⁷ reinforce that maladaptive patterns of Facebook use precede increases in disordered eating, our experimental design indicates that typical Facebook use may contribute to maintenance of weight/shape concerns and state anxiety, both of which are established eating disorder risk factors.^{18,19} To the extent that these effects could be discerned after only 20 minutes of typical Facebook use in a laboratory setting raises concerns about how use of the site throughout the day may impact eating disorder risk.

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Of interest, in our experimental design, internet use, regardless of condition, was associated with decreases in weight and shape preoccupation and urge to exercise. Such state changes may negatively reinforce internet use, explaining the widespread use of the internet for entertainment. Facebook users may not be aware of this cost because the overall experience may be positive. Without a non-internet control condition, it is unclear if the observed main

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effects are specifically due to internet use or the passage of time more generally. Therefore, future research should seek to replicate these effects using a non-internet control condition.

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Women with greater eating pathology not only reported spending more time on Facebook in Study 1, but also reported engaging in appearance-focused behaviors, such as comparing their appearance to friends' pictures and untagging photographs of themselves, perhaps in order to remove unflattering photographs and minimize opportunities to become the target of downward social comparison. In line with self-reported behaviors on Facebook, those who placed greater importance on the responses elicited by their Facebook content reported greater eating pathology. Specific aspects of use (e.g. social comparison to photos of peers) should be examined as potential mediators of the relationship between Facebook use and the maintenance of eating disorder risk. Alternatively, tendencies towards social comparison may serve as a moderator of the influence of Facebook use on eating disorder risk. Replication in larger samples would help to untangle these potential associations between individual and social risk factors.

Pending replication of these and other findings,¹⁷ Facebook could be targeted as a maintenance factor in prevention programs. For example, interventions could address the implications of appearance-focused comments such as "you look so thin" or "I wish I had your abs," in perpetuating the thin ideal on Facebook, much as "fat talk" perpetuates this ideal in everyday conversations. An adaption of the "Fat Talk Free" campaign³⁵ as well as adaptations of media literacy programs^{36,37} could encourage girls and women in the responsible use of social media sites. Similarly, if research finds that photo-enhancing technology is common, advocacy may be effective in reducing the use of photo-enhancing technology to promote unrealistic ideals.

The current studies benefited from a large college sample and measures with good psychometric properties. Our sampling approach ensured a range of disordered eating levels, allowing greater generalizability. Participants were representative of other college samples

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studied, as evidenced by comparable estimates of reported time on Facebook.¹⁴ However, results should be interpreted with limitations in mind. We cannot rule out the possibility that our results reflect demand characteristics. Importantly, such effects should have prevented our observation that Facebook use was associated with decreases in both weight/shape concerns and urges to exercise, suggesting that changes (or the lack thereof) did not represent participants' efforts to unconsciously support our hypotheses. However, the opposite may be true; our findings may underestimate the effect of Facebook use on maintaining weight/shape concerns. Our control condition allows inferences about Facebook use compared to one other internet activity and may not generalize to other activities. Specifically, the interaction effects observed in this study were driven, in part, by an observed decrease in weight and shape concerns in the control condition. This decrease over time may not be observed in naturalistic environments. An ecological momentary design³⁸ may better capture natural changes in affect as well as weight and shape preoccupation in relation to Facebook use. Our study does not address if Facebook use influences eating disorder risk above and beyond other social or media influences. Future research should compare face-to-face social interaction to Facebook use. Additionally, the use of interviews about eating and Facebook use in future research would enhance understanding of the observed associations. As we measured momentary changes in risk factors, our results do not address whether Facebook use may contribute to actual eating disorders. However, the maintenance of risk is important to identify for prevention efforts.

Advances in technology may be impacting the nature of risk factors for disordered eating pathology in women. While the overall use of Facebook has a small but significant association with disordered eating, specific aspects of use demonstrate more robust associations with disordered eating. In addition, we found evidence that Facebook use may maintain preoccupation of weight and shape and state anxiety, both well-replicated risk factors for eating pathology. Future longitudinal research using ecological momentary assessment³⁸ in both at-risk and eating disordered populations would allow better understanding of the effects of

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Facebook use over time in a natural setting. As technology continues to change, more research is needed to understand the effects of social media in maintaining risk for eating disorders and other psychological problems.

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Appendix

Facebook Questions

1. What is the average amount of time you spend on Facebook for each session?

2. How much overall time do you spend on Facebook each day? _____
3. How many days a week do you use Facebook? _____
4. Do you have a smart phone? Y N
If so, do you use the Facebook application? Y N
5. If you were asked to use your Facebook in the lab, how representative was the session just now of how you normally use Facebook?
 - 1) Not at all
 - 2) Somewhat
 - 3) Moderately
 - 4) Very
 - 5) Completely
6. When using Facebook, which do you do the most? (Rank from 1-13, where 1 is the HIGHEST and 13 is the LOWEST.)
 - 1) Look at photos _____
 - 2) Comment on or "like" status updates _____
 - 3) Comment on or "like" friend's photos _____
 - 4) Use notes _____
 - 5) Use events _____
 - 6) Use chat or send messages _____
 - 7) Post your own photos _____
 - 8) Post your own status updates _____
 - 9) Find friends _____
 - 10) Look at business/company pages _____
 - 11) Use apps and games _____
 - 12) Use check-ins _____
 - 13) View or post in groups _____

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7. On Facebook, what do you find to be the most interesting if you had to choose **only one**? (Please circle only one.)
 - 1) Look at photos
 - 2) Comment on or "like" status updates
 - 3) Comment on or "like" friend's photos
 - 4) Use notes
 - 5) Use events
 - 6) Use chat or send messages
 - 7) Post your own photos
 - 8) Post your own status updates
 - 9) Find friends
 - 10) Look at business/company pages
 - 11) Use apps and games
 - 12) Use check-ins
 - 13) View or post in groups

8. If you were asked to use your Facebook in the lab, how long ago did you use Facebook before this session? _____

9. How often do you compare your photos to photos of your female friends?
 - 1) Never
 - 2) Rarely
 - 3) Sometimes
 - 4) Usually
 - 5) Always

10. How important is it to you to have more likes or comments on your photos than your other female friends?
 - 1) Not at all
 - 2) Somewhat
 - 3) Moderately
 - 4) Very
 - 5) Extremely

11. How important is it to you that people "like" your photos?
 - 1) Not at all
 - 2) Somewhat
 - 3) Moderately
 - 4) Very
 - 5) Extremely

12. How important is it to you that people "like" your status updates?
 - 1) Not at all
 - 2) Somewhat
 - 3) Moderately
 - 4) Very
 - 5) Extremely

FACEBOOK USE MAINTAINS RISK

13. How important is it to you that people comment on your photos?
 - 1) Not at all
 - 2) Somewhat
 - 3) Moderately
 - 4) Very
 - 5) Extremely

14. How important is it to you that people comment on your status updates?
 - 1) Not at all
 - 2) Somewhat
 - 3) Moderately
 - 4) Very
 - 5) Extremely

15. How often do you change your profile picture?
 - 1) Never
 - 2) Once every 3 months
 - 3) Once a month
 - 4) Twice a month
 - 5) Once a week
 - 6) More than once per week
 - 7) Daily

16. How often do you take photos in public for the main purpose of posting them on Facebook?
 - 1) Never
 - 2) Rarely
 - 3) Sometimes
 - 4) Usually
 - 5) Always

17. How often do you untag your photos?
 - 1) Never
 - 2) Rarely
 - 3) Sometimes
 - 4) Usually
 - 5) Always

18. Why do you untag your photos?
 - 1) Unflattering
 - 2) Inappropriate for family/co-workers
 - 3) Not representative of who I am/what I am really like
 - 4) No longer dating person in photo
 - 5) No longer friends with person in photo
 - 6) Other (please specify: _____)