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Brief Exposure To Images Of Friends Via Social Media Leads To Higher Momentary Risk For Eating Psychopathology Among College Women Who Internalize The Thin Ideal

Erin Elizabeth Murtha-Berg

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BRIEF EXPOSURE TO IMAGES OF FRIENDS VIA SOCIAL MEDIA LEADS TO HIGHER
MOMENTARY RISK FOR EATING PSYCHOPATHOLOGY AMONG COLLEGE
WOMEN WHO INTERNALIZE THE THIN IDEAL

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A Dissertation

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

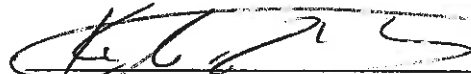
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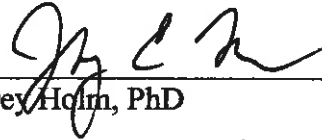
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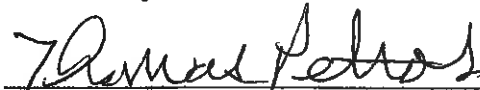
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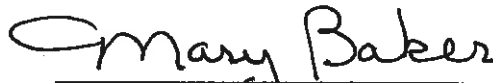
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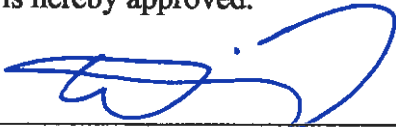


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Title Brief Exposure to Images of Friends via Social Media Leads to Higher Momentary Risk for Eating Psychopathology Among College Women Who Internalize the Thin Ideal

Department Psychology

Degree Doctor of Philosophy

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To the many young girls and women who struggle with their body image

ABSTRACT

This study examined the causal effects of brief exposure to images of friends via social media on state body image satisfaction and momentary desires to engage in weight-loss behaviors among college women and the moderating influence of trait thin-ideal internalization, appearance comparison, body satisfaction, and eating psychopathology on these effects. This was a 2-phase study. Participants ($N=183$) completed baseline measures online before attending a laboratory appointment. During the laboratory appointment, participants completed an exercise to identify the one similar-aged, female Facebook friend with whom they engaged in the most photo-related activity recently. Participants completed measures of state body image satisfaction and desires to engage in weight-loss behaviors before being randomly assigned to the Facebook friend photo condition or the appearance-neutral control condition. They then viewed either photos from their Facebook friend's profile page or photos from the Pottery Barn Facebook page for 15 minutes. Afterward, participants completed measures of state body image satisfaction and desires to engage in weight-loss behaviors. There was a main effect of condition on extreme weight-loss behaviors desire but not for state body image satisfaction or exercise and diet desire. Exposure to images of friends via Facebook led to lower levels of state body image satisfaction and higher levels of extreme weight-loss behaviors desire compared to exposure to appearance-neutral photos for participants with high thin-ideal internalization. These findings suggest that increased momentary risk for eating psychopathology after viewing images of friends on social media may be specific to women who have internalized the thin ideal.

CHAPTER I

INTRODUCTION

Social media use has increased dramatically over the past decade (Perrin, 2015). Social media includes websites and applications, such as Facebook, Instagram, Pinterest, and Twitter, which allow users to share information, including comments, ideas, opinions, and images within self-created social networks (“Social media”). Approximately 90% of young adults use social media websites (Perrin, 2015), and Facebook is the most popular among them (Duggan & Smith, 2014). Social media differs from traditional mass media, such as television and magazines, in that it allows users to interact with content that is generated primarily by one’s social network, which often includes peers with whom users have an established relationship (Holland & Tiggemann, 2016). A body of research suggests that exposure to thin-idealized images of models and celebrities depicted via mass media negatively impacts body image among women (Grabe, Ward, & Hyde, 2008), an effect that appears to be stronger for those already at risk for body image concerns (Ferguson, 2013; Groesz, Levine, & Murnen, 2002). Social media provides a platform in which users are exposed to potentially idealized images of their friends, who may be particularly relevant targets for appearance-focused comparisons (Strahan, Wilson, Cressman, & Buote, 2006). Indeed, social media creates an environment where users can present their “ideal” identity through selectively posting images of themselves (Mehdizadeh, 2010), which can be further edited through the use of increasingly popular smartphone photo editor applications that allow users to slim and reshape their faces and bodies (e.g., Skinny Body, Spring Effect, Make

Me Slim, Body Plastic Surgery, etc.). Research that investigates whether and for whom viewing such images on social media negatively affects the way users think and feel about their bodies is important in its own right. It is also important because body dissatisfaction is a robust risk factor for eating psychopathology (Stice, 2002) and, therefore, important in informing eating disorder prevention and treatment. Further, research examining whether exposure to such images on social media impacts other indicators of eating psychopathology is needed, including desire to engage in potentially dangerous weight-loss behaviors like self-induced vomiting, laxative, and diuretic use, which are symptoms of eating disorders (American Psychiatric Association, 2013) and associated with serious physical health complications (Forney, Buchman-Schmitt, Keel, & Frank, 2016).

Previous Research

Images of and In Vivo Exposure to Peers

Prior to the rise of social media, a number of experimental studies examined the impact of images of and in vivo exposure to peers and body image concerns among young women. Cash, Cash, and Butters (1983) found that college women rated themselves as less attractive after viewing an image of an attractive female peer compared to an image of an unattractive peer or attractive model. A more recent study found that exposure to an image of a female peer whose body size had been digitally altered to appear very thin led to a reduction in self-reported body satisfaction among college women; however, no effects on body satisfaction were found following exposure to an image of that same female peer whose body size was digitally altered to appear much larger or a no-photo control condition (Lin & Kulik, 2002). Krones, Stice, Batres, and Orjada (2005) found that exposure to a confederate whose body conformed to the thin ideal resulted in an increase in body dissatisfaction among college women compared to a confederate

whose body was consistent with the average body dimensions of women. Another study found that in vivo exposure to a physically-fit, female peer during exercise resulted in a decrease in body satisfaction among college women while exposure to a non-physically fit peer or no peer did not result in a significant change in body satisfaction (Wasilenko, Kulik, & Wanic, 2007). The results of these early experimental studies are important in that they identified a causal relationship such that when college women were exposed to thin, fit, and attractive peers whom they did not know in person or via photographic images, they reported higher levels of momentary body image concerns. However, these studies did not examine the impact of exposure to potentially idealized images of friends for which social media provides instant and abundant access.

Social Media, Body Image Concerns, and Eating Psychopathology

A growing body of research has focused on the relationship between social media use and body image concerns as well as eating psychopathology, with most focusing on Facebook use among girls and women (see review by Holland & Tiggemann, 2016, and discussion by Fardouly & Vartanian, 2016). The results of this research suggest that social media users differ from non-users with regard to body image concerns. Tiggemann and Slater (2013, 2014) found that Australian pre-adolescent and adolescent girls who were Facebook users scored higher on several indices of body image concerns compared to those who were not Facebook users. Others have found that American teenage girls who used Facebook reported higher levels of self-objectification and physical appearance comparison compared to non-users (Meier & Gray, 2014). Furthermore, researchers have consistently identified concurrent correlations between social media use and body image concerns in girls and young women, most focusing on amount of time spent on social media. Tiggemann and Slater (2014) found that total time spent using

MySpace and Facebook per day was associated with higher thin-ideal internalization, body surveillance, and dieting, and lower body esteem among Australian pre-adolescent girls. Similarly, Tiggemann and Miller (2010) found that total time spent on Myspace and total time spent on Facebook were significantly positively correlated with drive for thinness among a sample of Australian teenage girls; total time spent on Facebook per day was also associated with higher thin-ideal internalization and lower levels of weight satisfaction. Others have identified relationships between more frequent Facebook use and increased body image concerns among Australian college women (Cohen & Blaszczynski, 2015; Fardouly & Vartanian, 2015) and increased eating psychopathology among American college students (Mabe, Forney, & Keel, 2014; Sidani, Shensa, Hoffman, Hanmer, & Primack, 2016).

Facebook is a multidimensional social media platform in which users can engage in many different activities, some of which appear to be related to body image outcomes (e.g., viewing idealized images of same-sex friends) while others do not (e.g., viewing pages of non-appearance related businesses). Research suggests that viewing photos of friends is among the most frequent and popular Facebook activities reported by college students (Junco, 2012; Mabe et al., 2014). One study found that comparing photos to female friends more frequently on Facebook was related to higher levels of eating psychopathology among American college women (Mabe et al., 2014). Another found that engaging in Facebook photo-related activity specifically (i.e., viewing, posting, and commenting on photos) was positively associated with weight dissatisfaction, drive for thinness, thin-ideal internalization and self-objectification among American adolescent girls, while overall Facebook use was not significantly related to body image concerns (Meier & Gray, 2014). Others have found that online social grooming behaviors, which included viewing and commenting on peers' profiles, were positively associated with drive for thinness among

American college students, though overall time spent on social media was not significantly related to body image concerns (Kim & Chock, 2015). The results of these studies suggest that engaging in photo-related activities involving peers on social media, not social media use overall, may impact body image concerns and eating psychopathology among girls and young women.

Longitudinal studies have found that social media use predicts body image concerns and eating psychopathology over time. One study found that frequency of checking a social networking site comparable to Facebook (i.e., Hyves.nl) prospectively predicted desire to change one's appearance through cosmetic surgery approximately one year later among Dutch adolescents and that this temporal relationship was mediated by appearance investment (de Vries, Peter, Nikken, & de Graaf, 2014). De Vries and colleagues (2016) also found that frequency of checking this social networking site predicted an increase in body dissatisfaction at an 18-month follow-up among Dutch adolescents. Interestingly, the findings from both of these studies were not moderated by gender.

Others have examined the temporal relationship between specific uses of Facebook and body image concerns and eating psychopathology among college students. One study found that maladaptive Facebook use, which the authors defined as the tendency to seek out negative evaluations and engage in general social comparison, predicted bulimic symptoms at a four-week follow-up in a sample of American college women (Smith, Hames, & Joiner Jr., 2013); body dissatisfaction partially mediated this effect. Similarly, Hummel and Smith (2015) found that those who sought out and received negative feedback via Facebook reported higher levels of disordered eating concerns four weeks later among a sample of American college students. These

findings suggest that maladaptive Facebook use specifically predicts body dissatisfaction and eating disorder symptoms over time.

One study failed to find relationships between social media exposure to thin-ideal media and body dissatisfaction or eating disorder symptomology either concurrently or prospectively six months later among American adolescent girls (Ferguson, Munoz, Garza, & Galindo, 2014); however, it was found that social media use was prospectively predictive of peer competition, a construct which the authors defined by responses to such comparison-related questions as “I am anxious about my appearance as compared to other girls.” Peer competition, in turn, was both concurrently and prospectively predictive of body dissatisfaction and prospectively predictive of eating disorder symptoms. Thus, while a direct relationship between social media use and body dissatisfaction or eating disorder symptomology was not found, the results suggest possible indirect effects of social media use on negative body-related outcomes. Furthermore, this study appears to differ from the other longitudinal studies with regard to racial/ethnic composition and definition of social media use. While it included a sample of mostly Hispanic adolescent females, previous studies have included samples of primarily Caucasian/White girls and young women (de Vries et al., 2014, 2016; Hummel & Smith, 2015; Smith et al., 2013), and it is possible that racial and ethnic identity may differentially impact the relationship between social media use and risk for eating psychopathology. Further, this study defined social media use broadly to include such activities as use of social gaming websites and blogging. This may limit the generalizability of the results of this study as others have found that the use of different socially-oriented websites is differentially related to body image (Tiggemann & Miller, 2010).

Findings from recent experimental research examining the effects of social media on body image concerns are mixed. Two studies have examined the causal effects of viewing mock

Facebook profiles of peers who differed with regard to attractiveness and thinness on body image outcomes. One study found that viewing mock Facebook profile pictures of users of the participants' same-sex who had been rated as attractive led to higher body dissatisfaction compared to viewing pictures of users who were rated as unattractive among a community sample of young men and women in Germany (Haferkamp & Krämer, 2011). A cross-cultural study found that Korean college women exposed to a mock Facebook profile of a peer who appeared underweight and posted comments referencing desire to lose weight reported lower body satisfaction compared to those exposed to a peer who appeared overweight and endorsed a desire to lose weight (Lee, Taniguchi, Modica, & Park, 2013); however, peer's body size did not impact body satisfaction in American college women. The authors speculated that these differences may have been due to the fact that the woman in the profile pictures appeared to be Asian and, thus, may not have been a relevant target for social comparison for American women who did not identify as Asian. Another recent experimental study found that exposure to a series of pre-selected fitspiration images (i.e., images intended to inspire exercise and healthy eating, which included women who were in fitness clothing or exercising coupled with inspirational quotes) via Instagram negatively impacted state body image compared to viewing control images pertaining to travel among college women in Australia (Tiggemann & Zaccardo, 2015).

Others have examined the causal effects of brief, typical Facebook use on body image outcomes. Typical Facebook use refers to when participants were instructed to log in to their own accounts and use the website as they normally would. One study found that 20 minutes of typical Facebook use did not lead to higher post-exposure preoccupation with weight and shape or urge to exercise compared to an alternate Internet activity consisting of watching a video and reading information about a neutral topic (ocelot) among American college women (Mabe et al.,

2014). Both conditions experienced a decline in preoccupation with weight and shape and urge to exercise following Internet use; however, there was a group by time interaction such that the control condition experienced a larger decline in weight and shape preoccupation than the Facebook condition. Thus, the authors concluded that this finding indicates that Facebook use maintains momentary weight and shape concerns compared to Internet activity involving a neutral topic (Mabe et al., 2014). Another recent study found that 10 minutes of typical Facebook use did not result in higher body dissatisfaction or weight and shape discrepancy compared to an online fashion magazine website or an appearance-neutral control website among a sample of college women and female university staff in the United Kingdom (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015a). It is possible that these two studies failed to find a significant main effect of typical Facebook use on body image outcomes because it is not overall general Facebook use, but rather viewing potentially idealized images of friends specifically, that negatively impacts body image outcomes.

The influence of sociocultural processes. Sociocultural factors, including thin-ideal internalization and appearance-based social comparison, have long been thought to influence the relationships between mass media exposure, body dissatisfaction, and eating psychopathology among girls and young women. Thin-ideal internalization is defined as the tendency to accept as important and strive toward achieving sociocultural ideals of thinness and beauty (Suisman et al., 2012). In other words, thin-ideal internalization occurs when one believes that they must be ultra-thin and beautiful by societal standards in order to have success in life (Fitzsimmons-Craft, 2011). Social comparison theory (Festinger, 1954) suggests that we tend to compare ourselves to similar others and that comparing ourselves to those we perceive to be better off may result in negative psychological outcomes. Much research has focused on social comparison as an avenue

by which women gain information to evaluate their physical appearance and the detrimental consequences of such comparisons, including body dissatisfaction (Myers & Crowther, 2009) and eating psychopathology (Bailey & Ricciardelli, 2010). The Tripartite Influence Model (Keery, van den Berg, & Thompson, 2004; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; van den Berg, Thompson, Obremski-Brandon, & Coover, 2002) incorporates both of these sociocultural processes, asserting that sociocultural influences, including media and peers, impact body dissatisfaction and eating psychopathology among young women through their effects on thin-ideal internalization and appearance comparison. Some have suggested that such social psychological processes should also be applied in conceptualizing the effects of newer forms of social media on body image concerns among young women (Perloff, 2014a, 2014b). Indeed, it seems possible that women who endorse the thin ideal and who tend to compare themselves to idealized images of peers who they know on social media may experience heightened body image concerns and risk for eating psychopathology.

Recent studies have attempted to clarify if and how appearance comparison and thin-ideal internalization play a role in the effects of social media use on body image concerns. The results of cross-sectional research suggest that appearance comparison may mediate the relationship between social media use and body image concerns (Fardouly & Vartanian, 2015), including drive for thinness (Kim & Chock, 2015) and self-objectification (Fardouly et al., 2015b), among college students. A cross-sectional study indicated that the effects of Internet appearance exposure, including appearance exposure on social media, on drive for thinness and weight satisfaction were at least partially mediated by thin-ideal internalization and appearance comparison among Australian adolescent girls (Tiggemann & Miller, 2010). A recent experimental study found that state appearance-based comparison mediated the impact of

exposure to fitspiration images via Instagram on state body image (Tiggemann & Zaccardo, 2015). These findings are important in that they suggest that appearance comparison, and possibly thin-ideal internalization, may be the mechanisms by which social media use leads to heightened body image concerns; however, few studies have attempted to identify how these sociocultural processes may predispose individuals to experience an increase in body image concerns following social media use.

Thin-ideal internalization and social comparison occur both at the state level as well as the trait level, whereby individuals differ in the extent to which they tend to believe it is important to be very thin (Dittmar, Halliwell, & Stirling, 2009; Karazsia, van Dulmen, Wong, & Crowther, 2013) and the extent to which they compare their appearance to others (Tiggemann & Zaccardo, 2015). Previous research suggests that women who internalize the thin-ideal are more likely to experience negative body image-related outcomes following brief exposure to thin-idealized mass media images of models (Brown & Dittmar, 2005; Dittmar & Howard, 2004; Dittmar et al., 2009; Halliwell & Dittmar, 2004; Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005). However, the author is not aware of any studies that have examined the extent to which trait thin-ideal internalization moderates the relationship between social media use and risk for eating psychopathology. Further, while one study found that baseline social comparison moderated the impact of exposure to thin-idealized mass media and body-focused anxiety (Dittmar & Howard, 2004), relatively few have examined the extent to which trait appearance comparison moderates the impact of exposure to images via social media on state body image concerns. One recent experimental study failed to find a moderating effect of trait appearance comparison on the relationship between exposure to a series of pre-selected fitspiration images via Instagram and state body image (Tiggemann & Zaccardo, 2015). Another found that trait

appearance comparison tendency moderated the effects of brief, typical Facebook use, such that women high in trait appearance comparison tendency reported higher post-exposure face, skin, and hair discrepancies (Fardouly et al., 2015a). Although they failed to find that trait appearance comparison tendency moderated the effects of Facebook use on post-exposure body satisfaction or weight and shape discrepancy, the authors argued that this may have been due to the ubiquity of portrait photos on Facebook depicting friends' faces, which may have limited opportunities to engage in body weight and shape-related comparisons (Fardouly et al., 2015a). Considering the dearth of research in this area, studies are needed to investigate the influence of trait thin-ideal internalization and appearance comparison on the effects of exposure to potentially idealized images of one's actual friends via social media, given their relevance as a target for comparison.

The influence of trait body image (dis)satisfaction and eating psychopathology.

Research also suggests that trait body image dissatisfaction and baseline eating psychopathology may moderate the effects of media exposure on state body image concerns and momentary risk for eating psychopathology. Body image dissatisfaction is defined as one's subjective and affective experience of the negative evaluation of their body (Shroff, Calogero, & Thompson, 2009). Body image (dis)satisfaction exists at both the state level, fluctuating moment-to-moment as impacted by contextual factors, as well as at the enduring trait level (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002; Colautti et al., 2011; Thompson, 2004). Trait-level body dissatisfaction is relatively common, with prevalence rates ranging from 13.4%-31.8% among adult women living in the U.S. (Fallon, Harris, & Johnson, 2014). Research suggests that women with pre-existing appearance concerns, including body dissatisfaction, may be particularly susceptible to the effects of exposure to thin-ideal images depicted in the mass media (Ferguson, 2013; Groesz et al., 2002; Want, 2009). However, to date, the author is not aware of

any research that has examined the moderating effect of trait body image (dis)satisfaction on the relationship between social media use and state body image.

Eating psychopathology is characterized by both cognitive and behavioral eating disorder-related symptoms. Cognitively, the hallmark of eating psychopathology is over-evaluation of weight and shape and over-evaluation of one's ability to control their weight and shape (Fairburn, 2008). Eating psychopathology is further characterized by dietary restraint (i.e., the intention to restrict eating) and extreme behaviors to control one's body shape and weight, including restrictive eating, excessive exercise, and purging (i.e., self-induced vomiting, laxative, and diuretic misuse), which are often interrupted by binge-eating episodes (Fairburn, 2008). Eating disorder diagnoses meeting full-criteria per the *Diagnostic and Statistical Manual of Mental Disorders* are relatively uncommon amongst the general population (lifetime prevalence of 0.9% for anorexia nervosa and 1.5% for bulimia nervosa among women in the community; Hudson, Hiripi, Pope, & Kessler, 2007). However, research suggests that cognitive aspects of eating psychopathology, including dietary restraint, body dissatisfaction, and drive for thinness, are dimensional in that individuals vary along a continuum with higher levels indicating severe eating psychopathology (Holm-Denoma, Richey, & Joiner Jr., 2010). Results of research investigating the structure of behavioral aspects associated with eating psychopathology is not as clear (Wildes & Marcus, 2013). Few studies have examined the extent to which baseline eating psychopathology moderates the impact of exposure to thin-idealized media images on body image concerns (Myers & Crowther, 2009), and those that have tend to define eating psychopathology as a categorical construct. Some studies suggest that women with a history of eating psychopathology may be more susceptible to the negative effects of exposure to images of the thin-ideal conveyed in mass media (Groesz et al., 2002; Hamilton & Waller, 1993) with

regard to body image concerns and other momentary risk for eating psychopathology. One recent study found that media-induced stress associated with exposure to food, shape, or weight-related media broadly, which may have included images from social media, prospectively predicted eating disorder behaviors among women with anorexia nervosa in the moment as well as over the course of a day (White et al., 2016). However, the author is not aware of any studies that have examined the moderating effect of baseline eating psychopathology on the relationship between exposure to images of friends via social media and state body image satisfaction and momentary risk for eating psychopathology.

Limitations of Previous Research

In conclusion, correlational research has identified a positive, concurrent relationship between self-reported social media use and various measures of body image concerns (Cohen & Blaszczynski, 2015; Fardouly & Vartanian, 2015; Tiggemann & Miller, 2010; Tiggemann & Slater, 2014) and eating psychopathology (Mabe et al., 2014; Sidani et al., 2016) with most focusing specifically on Facebook use among girls and women. The results of some studies suggest that engaging in photo-related activity involving peers specifically, not social media use overall, is related to increases in body image concerns (Kim & Chock, 2015, Meier & Gray, 2014). Longitudinal studies have found that social media use predicts body image concerns (de Vries et al., 2014, 2016) and eating psychopathology (Hummel & Smith, 2015; Smith et al., 2013) over time. The findings of experimental research investigating the causal relationship between social media use and body image concerns are less clear. Some experimental studies have found that exposure to mock social media profiles with pre-selected photos of thin, attractive, and/or physically fit peers leads to higher state body dissatisfaction compared to profiles of peers who are not thin or attractive or control (travel) photos (Haferkamp & Krämer,

2011; Lee et al., 2013; Tiggemann & Zaccardo, 2015). Others have found that brief, typical Facebook use does not lead to a significant increase in body image concerns (Fardouly et al., 2015a) or urge to exercise (Mabe et al., 2014) compared to non-appearance Internet controls. However, it is possible that these studies failed to find a significant main effect of typical social media use because it is not social media use overall, but rather viewing potentially idealized images of friends specifically via social media that negatively impacts body image outcomes. Furthermore, research suggests that certain women may be predisposed to experiencing increases in body dissatisfaction and risk for eating psychopathology following exposure to idealized media images, including those with high levels of trait thin-ideal internalization, appearance comparison, body dissatisfaction, and eating psychopathology (Brown & Dittmar, 2005; Dittmar & Howard, 2004; Dittmar et al., 2009; Ferguson, 2013; Groesz et al., 2002; Halliwell & Dittmar, 2004; Hamilton & Waller, 1993; Want, 2009; White et al., 2016; Yamamiya et al., 2005).

Importantly, it is not yet known exactly whether and for whom exposure to potentially idealized images of friends, peers who users actually know, often encountered on social media websites impacts momentary risk for eating psychopathology. Lacking is a study that examines the causal relationship between exposure to images of friends via Facebook, the most popular social media website (Duggan & Smith, 2014), and momentary risk for eating psychopathology in college women, a group particularly at risk for body image concerns and eating psychopathology (Fitzsimmons-Craft, 2011). Further, lacking is a study examining the possible moderating influence of trait-level sociocultural processes, including thin-ideal internalization and appearance comparison, as well as pre-existing psychopathology, including lower trait body image satisfaction and higher baseline eating psychopathology, on this relationship. Such research will be important in aiding the prevention and treatment of eating psychopathology by

identifying whether viewing images of friends encountered on social media, an activity that has become increasingly common among college women, impacts momentary risk for eating psychopathology and who may be the most negatively impacted by such exposure.

Current Study Objectives, Aims, and Hypotheses

The current study sought to address the limitations of previous research by (1) examining the causal effects of exposure to images of friends via social media on state body image satisfaction and momentary desires to engage in weight-loss behaviors. Further, the current study sought to (2) identify for whom exposure to images of friends via social media impacts momentary risk for eating psychopathology.

Aim 1: To determine whether a causal relationship exists between exposure to images of friends via social media and momentary risk for eating psychopathology.

Hypothesis 1a: It was hypothesized that exposure to images of friends via Facebook would lead to lower state body image satisfaction compared to appearance-neutral images.

Hypothesis 1b: It was hypothesized that exposure to images of friends via Facebook would lead to higher momentary desires to engage in weight-loss behaviors compared to appearance-neutral images.

Aim 2: To identify the extent to which individual differences in trait-level sociocultural processes moderate the relationship between exposure to images of friends via social media and momentary risk for eating psychopathology.

Hypothesis 2a: It was hypothesized that, for women with high trait thin-ideal internalization, state body image satisfaction would be lower following exposure to images of friends via Facebook compared to appearance-neutral images.

Hypothesis 2b: It was hypothesized that, for women with high trait thin-ideal internalization, momentary desires to engage in weight-loss behaviors would be higher following exposure to images of friends via Facebook compared to appearance-neutral images.

Hypothesis 2c: It was hypothesized that, for women with high trait appearance comparison, state body image satisfaction would be lower following exposure to images of friends via Facebook compared to appearance-neutral images.

Hypothesis 2d: It was hypothesized that, for women with high trait appearance comparison, momentary desires to engage in weight-loss behaviors would be higher following exposure to images of friends via Facebook compared to appearance-neutral images.

Aim 3: To identify the extent to which individual differences in baseline eating disorder-related psychopathology moderate the relationship between exposure to images of friends via social media and momentary risk for eating psychopathology.

Hypothesis 3a: It was hypothesized that, for women with lower trait body image satisfaction, state body image satisfaction would be lower following exposure to images of friends via Facebook compared to appearance-neutral images.

Hypothesis 3b: It was hypothesized that, for women with lower trait body image satisfaction, momentary desires to engage in weight-loss behaviors would be higher following exposure to images of friends via Facebook compared to viewing appearance-neutral images.

Hypothesis 3c: It was hypothesized that, for women with higher baseline eating psychopathology, state body image satisfaction would be lower following exposure to images of friends via Facebook compared to viewing appearance-neutral images.

Hypothesis 3d: It was hypothesized that, for women with higher baseline eating psychopathology, momentary desires to engage in weight-loss behaviors would be higher following exposure to images of friends via Facebook compared to viewing appearance-neutral images.

CHAPTER II

METHODS

Participants

Participants included in this sample ($N=183$) were recruited from a research pool of undergraduate psychology students at the University of North Dakota campus via the SONA Research Participation System. Participants met the following criteria to participate: 1) female 2) 18 years or older and 3) had a Facebook account on which they had at least one friend who was female and in their age range. Participants received credit toward course requirements for participation in this study. Participants were an average (SD) of 19.52 (2.39) years in age. Participants had an average (SD) Body Mass Index (BMI) of 23.15 (3.76) kg/m^2 . The majority identified as White (92.9%). Few identified as American Indian/Alaska Native (2.2%), Asian (2.7%), or endorsed other racial identities (2.1%). The majority identified as non-Hispanic, Latino, or Spanish (96.2%) with few identifying as Hispanic, Latino, or Spanish (2.7%) or declining to provide their ethnicity (1.1%). Participants were primarily freshmen (43.2%) and sophomores (35.5%), with fewer juniors (13.1%) and seniors (8.2%). Nearly all participants reported that they were not married (99.5%). Approximately half of the sample reported that they were in a romantic relationship at the time they participated in the study (55.2%).

Design and Procedure

Participants were invited to complete a 2-phase study titled “Facebook & How You Feel About Yourself.” Participants first scheduled a laboratory appointment via the SONA Research

Participation System. Upon scheduling their lab appointment, participants were provided with a link directing them to complete a series of baseline measures online via Qualtrics (Phase 1) at least 4 hours prior to their lab appointment (Phase 2). This was done so participants' responses to measures during Phase 1 would not affect responses during Phase 2. Participants were also instructed to engage in a 4-hour Facebook fast prior to arriving to their lab appointment so as to increase the likelihood that they would engage in the Facebook-based experiment.

After arriving to the laboratory appointment and providing consent for Phase 2, participants were instructed to log in to their Facebook account and collaborate with a trained research assistant on a Facebook activity exercise using a desktop computer. The purpose of this exercise was to objectively identify the similar-aged, female Facebook friend with whom the participant engaged in the most photo-related activity recently (see Appendix A for the Facebook activity exercise protocol). Afterward, participants completed the pre-exposure Body Image State Scale (BISS), Weight-Loss Desires VAS Questionnaire (see detailed description in Phase 2 Measures), PANAS Negative Affect Scale, and Distractor Satisfaction VAS items regarding friendships, academics, romantic relationships, work, and hobbies to reduce demand characteristics, which is similar to methods used by Fardouly and colleagues (2015a). Pre-exposure measures were completed via Qualtrics using an iPad.

For the Facebook exposure, participants were randomly assigned to either the experimental or the control condition. The experimental condition viewed photos of the Facebook friend identified in the earlier Facebook activity exercise. The control condition viewed photos from a Facebook page containing physical appearance-neutral content (i.e., Pottery Barn), similar to methods used in previous research (e.g., Fardouly et al., 2015a; Mabe et al., 2014). The Pottery Barn Facebook page posts photos of home décor manufactured by the

home furnishing chain. Participants were either instructed to select their Facebook friend's profile page or the Pottery Barn Facebook page and then select "Photos." Participants were instructed to view photos in reverse chronological order at a rate of one photo per minute. Participants were instructed to view each photo carefully using the desktop computer and to complete a corresponding photo rating form via Qualtrics using an iPad. Photo rating forms were used to ensure participants engaged in the photo-viewing activity and included two items ("I like this photo;" "this photo is interesting") for which participants were asked to indicate the extent to which they agree with each statement using a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree." Photo rating forms were also used to serve as a manipulation check and included items that asked participants to select the primary focus of each photo (i.e., people, animal(s), landscape/nature, or non-living objects (e.g., home décor, furniture, food, vehicles)) and to indicate whether or not they could actually see their Facebook friend in the photo and whether this Facebook friend was the primary focus of the photo. A countdown timer was displayed at the top of each photo rating form indicating how long the participant had left to view the photo. Participants were instructed not to view the next photo before the one minute was up. Early in the process of data collection, participants ($n=5$) who deviated from these instructions were asked by the research assistant to start the Facebook exposure over, and data collected during this 2nd trial were used in analyses. Language was later adopted so that research assistants responded to participant deviation from protocol in a uniform manner. Specifically, research assistants timed the first minute of the Facebook exposure, and participants who deviated from protocol were provided with one prompt "*please don't use the next button*" and "*use the full minute to view each photo in the future*" without any further action taken by the research assistants. Research assistants were instructed to sit at a desk facing away from the

participant for the remainder of the Facebook exposure. Participants were instructed to log out of their Facebook account upon completing the Facebook exposure.

Following the Facebook exposure, participants completed the post-exposure BISS, Weight-Loss Desires VAS Questionnaire, Distractor Satisfaction VAS items, and questions regarding the physical attractiveness and thinness of their Facebook friend as well as the nature of their relationship. At the conclusion of their lab appointment, participants were debriefed and informed that the desktop computer Internet history would be cleared. Participation in the study took approximately one hour total including completion of baseline measures and a laboratory appointment. This study was approved by the University of North Dakota Institutional Review Board.

Measures

Phase 1 Baseline Measures

Sociocultural Attitudes Towards Appearance Questionnaire-4 Internalization: Thin/Low Body Fat Subscale. (SATAQ-4 Internalization: Thin/Low Body Fat subscale; Schaefer et al., 2015). The SATAQ-4 is a 22-item measure of sociocultural influences on appearance ideals. Items from this measure are used to generate subscales that assess thin-ideal internalization (Internalization: Thin/Low Body Fat), internalization of the muscular ideal (Internalization: Muscular/Athletic), and appearance-related pressure from different domains (Pressures: Peers, Pressures: Family, Pressures: Media). For this study, participants completed the five-item Internalization: Thin/Low Body Fat subscale (example: “I want my body to look very thin”). Participants were asked to indicate the extent to which they agree with each statement using a five-point Likert scale ranging from 1 (“Definitely Disagree”) to 5 (“Definitely Agree”). Subscale scores were determined by calculating the mean of the subscale items with

higher scores indicating higher levels of thin-ideal internalization. Internal consistency reliability for the current study was good (Cronbach's $\alpha = .81$). For this study, SATAQ-4 Internalization: Thin/Low Body Fat subscale scores were used to examine the extent to which baseline thin-ideal internalization moderates the effects of exposure to images of friends via Facebook.

Physical Appearance Comparison Scale-Revised. (PACS-R; Schaefer & Thompson, 2014). The PACS-R is an 11-item measure used to assess tendencies to engage in physical appearance comparison. Participants indicated how often they engage in comparisons to others across different contexts (e.g., “when I’m in public, I compare my physical appearance to the appearance of others”) using a five-point rating scale ranging from “Never” to “Always.” Scores were determined by calculating the mean of the scale items with higher scores indicating higher levels of physical appearance comparison tendency. Internal consistency reliability was excellent in the current study (Cronbach's $\alpha = .95$). For this study, PACS-R scores were used to examine the extent to which trait-level appearance comparison moderate the effects of exposure to images of friends via Facebook.

Additionally, participants completed five PACS-R (Schaefer & Thompson, 2014) items that were modified to assess trait-level appearance comparison while using Facebook specifically, as has been done previously by researchers in this area (Fardouly & Vartanian, 2015). Items were worded in the following way: “when I'm using Facebook, I compare my physical appearance to the appearance of others;” “when I'm using Facebook, I compare my body size to the body size of others;” “when I'm using Facebook, I compare my body shape to the body shape of others;” “when I'm using Facebook, I compare my body fat to the body fat of others;” “when I'm using Facebook, I compare my weight to the weight of others.” An average Facebook appearance comparison score was determined by calculating the mean of all five items

with higher scores indicating higher levels of physical appearance comparison tendency on Facebook. Internal consistency reliability was excellent in the current study (Cronbach's $\alpha=.95$). For this study, the Facebook appearance comparison score was used to assess the concurrent correlation between trait-level appearance comparison via Facebook and body image concerns and eating psychopathology to make comparisons with findings from previous research.

Multidimensional Body-Self Relations Questionnaire-Appearance Evaluation

Subscale. (MBSRQ-AE; Brown, Cash, & Mikulka, 1990). The seven-item MBSRQ-AE is a widely-used measure of trait body image satisfaction/dissatisfaction. It asks participants to rate items pertaining to the extent to which they like their physical appearance (e.g., "I like my looks just the way they are") on a five-point Likert scale ranging from "Definitely Disagree" to "Definitely Agree." Following reverse scoring for items 6 and 7, responses to scale items are averaged with higher scores indicating greater body image satisfaction and lower scores indicating body image dissatisfaction. Internal consistency reliability for this study was good (Cronbach's $\alpha= .88$). For the current study, MBSRQ-AE scores were used to examine the extent to which trait body image satisfaction moderates the effects of exposure to images of friends via Facebook.

Eating Disorder Examination Questionnaire 6.0. (EDE-Q 6.0; Fairburn & Beglin, 1994, 2008). The EDE-Q 6.0 is a self-report instrument used to assess the frequency with which participants have experienced cognitive and behavioral symptoms of eating disorders during the last 28 days using a seven-point rating scale ranging from "No days" to "Every day." It consists of four subscales: Dietary Restraint, Eating Concern, Weight Concern, and Shape Concern. The EDE-Q global score is generated by averaging the four subscale scores, with higher scores indicating higher levels of eating psychopathology. Due to technical error, responses for EDE-Q

items 22 through 28, which are included when generating the Weight and Shape Concern subscales, were not collected from participants; however, an EDE-Q global score was generated using the remaining items and found to be highly internally consistent (Cronbach's $\alpha = .91$). This EDE-Q global score was used in the current study to examine the extent to which baseline eating psychopathology moderates the effects of exposure to images of friends via Facebook.

Social Media Use Survey. Participants were given a survey created by previous researchers in this area (Mabe et al., 2014) to assess the motivations for and frequency of social media use behaviors (i.e., posting and viewing photos, updating statuses and profile, commenting on photos and statuses of others, etc.). Some questions were omitted (i.e., #'s 5 & 8) and others were added to assess the frequency of use of other social media websites. Responses to this survey were used to provide descriptive information for the current sample as well as to examine between-group differences in baseline self-reported social media use and to assess relationships between self-reported social media use, body image concerns, and eating psychopathology.

In an attempt to replicate findings from previous research (Mabe et al., 2014), a Facebook score was generated by averaging responses from eight items assessing frequency and importance of engaging in Facebook activities, particularly photo-related activities, thought to be related to body image concerns (e.g., how often do you compare your photos to photos of your female friends; how important is it to you to have more comments on your photos than your female friends?). Internal consistency for this score was acceptable (Cronbach's $\alpha = .78$).

Demographic Questionnaire. Participants were given a brief survey created by the author to collect demographic information including age, ethnicity, race, year in school, marital status, relationship status, height, and body weight. Information collected from the questionnaires was used to provide descriptive information for the current sample as well as to

assess between-group differences on these demographic variables. Information from this questionnaire was used to calculate BMI (weight (lb) / [height (in)]² x 703).¹

Phase 2 In-Laboratory Measures

Body Image State Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). The BISS is a six-item measure of state body image. Participants were asked to indicate how they feel “right now, at this moment” with regard to satisfaction/dissatisfaction with aspects of their physical appearance. Following reverse scoring for certain items, responses were averaged with higher scores indicating higher state body image satisfaction and lower scores indicating state body image dissatisfaction. Inspection of the version used in the current study revealed that the presentation of responses for items #2 and #6 was not positive-to-negative as it had been in the original article presenting this measure (Cash et al., 2002) and that typographical errors were present in two of the choices for item #4, which may have impacted participants’ responses to this item. Because internal consistency reliability was improved when item #4 was not included (BISS Pre-Test and Post-Test Cronbach’s $\alpha=.87$) compared to the six-item version (BISS Pre-Test Cronbach’s $\alpha=.84$; BISS Post-Test Cronbach’s $\alpha=.82$), this item was removed from the measure. For the current study, BISS scores were used to examine the effect of exposure to images of friends via Facebook on state body image satisfaction. The BISS was also completed prior to Facebook exposure to statistically control for within-group error variance explained by pre-exposure state body image satisfaction.

Weight-Loss Desires VAS Questionnaire. In the absence of an existing measure, the author generated items for a questionnaire to assess momentary desires to engage in weight-loss

¹ Other measures administered during Phase 1 but not included in analyses discussed in this manuscript include the Appearance Schemas Inventory-Revised (Cash, Melnyk, & Hrabosky, 2004), Multidimensional Body-Self Relations Questionnaire-Body Area Satisfaction Subscale (BASS; Brown et al., 1990), and the Figure Rating Scale (FRS; Stunkard, Sørensen, & Schulsinger, 1983).

behaviors drawing from methods used in previous research (Leahey & Crowther, 2008; Mabe et al., 2014). Specifically, participants completed a visual analogue scale (VAS) questionnaire, which included the following items: “how much do you want to diet to lose weight;” “how much do you want to exercise to lose weight;” “how much do you want to vomit to lose weight;” “how much do you want to use laxatives to lose weight;” and “how much do you want to use diuretics to lose weight?” Participants were instructed to indicate the levels of thoughts related to engaging in these weight-loss behaviors occurring “RIGHT NOW” by selecting a point on a computerized horizontal line, anchored from “None at all” (0) to “Extremely” (100). VAS ratings have been used increasingly in body image research to assess changes in state body image variables following brief exposure to media (Thompson, 2004), including Facebook (e.g., Mabe et al., 2014).

Preliminary data analyses were conducted to examine the factor structure and psychometric properties of the Weight-Loss Desires VAS Questionnaire. Results of analyses run on both pre- and post-exposure questionnaires were similar; thus, only the results of the post-exposure questionnaire are discussed below. Most items comprising the questionnaire were found to be non-normally distributed during data screening. Specifically, visual inspection of histograms as well as evaluation of the Fischer’s skewness coefficients indicated that the exercise item ($z=-2.13$) was somewhat negatively skewed and the vomiting ($z=27.38$), laxative ($z=48.14$), and diuretic use ($z=22.76$) items were severely, positively skewed with a large, discrete mass at zero. Skewness has been shown to decrease the magnitude of Pearson’s product-moment correlations (Dunlap, Burke, & Greer, 1995), which can negatively impact estimates of internal consistency reliability using Cronbach’s alpha and degrade the results of factor analysis; however, some have suggested that transforming substantially skewed continuous variables to

ranks may improve estimates of reliability (Greer, Dunlap, Hunter, & Berman, 2006). Initial attempts at other types of data transformations (e.g., logarithm, etc.) were not successful in producing normal or near-normal distribution in all of the variables. Thus, the raw scores were converted to ranks, and factor analyses and evaluation of internal consistency reliability (discussed below) were performed on the ranked data.

Factor analysis was conducted to determine what underlying structures exist for the five items included in the Weight-Loss Desires VAS Questionnaire. Principal component analysis was conducted utilizing varimax rotation. The analysis produced a two-component solution, which was evaluated with the following criteria: eigenvalue, variance, scree plot, and residuals. These criteria indicated that a two-component solution was appropriate. After rotation, the first component accounted for 52.52% while the second component accounted for 33.41% of the total variance in the original variables. Component 1 consisted of 3 of the 5 items: wanting to (1) vomit, (2) use laxatives, and (3) use diuretics to lose weight. All items loaded positively. Component 1 was named Extreme Weight-Loss Behavior Desire. Component 2 consisted of the remaining 2 items: wanting to (1) diet and (2) exercise. Both items loaded positively. Component 2 was named Exercise & Diet Desire (See Table 1).

Internal consistency reliability was excellent for Extreme Weight-Loss Behavior Desire (Cronbach's α using ranked data=.95) and good for Exercise & Diet Desire (Cronbach's α =.83). Furthermore, Extreme Weight-Loss Behavior Desire Scores were significantly positively correlated with items conceptually related to this construct, including EDE-Q items assessing self-induced vomiting ($r_s(181)$ =.39, p <.001) and laxative use ($r_s(180)$ =.41, p <.001) frequency in the past 28 days. Exercise & Diet Desire Scores were significantly positively correlated with the

Table 1. Component Loadings for Weight-Loss Desires VAS Questionnaire.

	Loadings
Component 1: Extreme Weight-Loss Desire	
Laxatives	.96
Vomiting	.95
Diuretics	.88
Component 2: Exercise & Diet Desire	
Exercise	.91
Dieting	.89

Note. Pearson product-moment correlations were performed on raw scores converted to ranks.

EDE-Q Dietary Restraint ($r_s(181)=.62, p<.001$) and Eating Concerns subscales ($r_s(178)=.57, p<.001$) as well as the EDE-Q item assessing frequency of compulsive exercise ($r_s(181)=.36, p<.001$) during the past 28 days. Thus, responses for the vomiting, laxative, and diuretic use items were averaged to generate the Extreme Weight-Loss Behavior Desire Score while responses for diet and exercise items were averaged to generate the Exercise & Diet Desire Score. For the current study, Extreme Weight-Loss Behavior Desire Scores were used to examine the effect of exposure to images of friends via Facebook on momentary desire to engage in extreme weight-loss behaviors. Exercise & Diet Desire Scores were used to examine the effect of exposure to images on friends via Facebook on momentary desire to diet and exercise. Pre-exposure Extreme Weight-Loss Behavior Desire Scores and Exercise & Diet Desire Scores were generated and used to statistically control for within-group error variance explained by pre-exposure desire to engage in these different categories of weight-loss behaviors.

The Positive and Negative Affect Schedule-Negative Affect Scale (PANAS; Watson & Clark, 1994). The PANAS is a widely-used measure of affect. Respondents were asked to rate

affect-laden words on a five-point rating scale ranging from “Very slightly or not at all” to “Extremely” to indicate the extent to which they had felt a particular way during the specified time frame. Short-term time instructions were given for this study in which participants were asked to indicate how they feel “right now (that is, at this present moment).” Participants were asked to complete only the 10-items from the negative affect scale. A total score was generated for this scale with higher scores indicating higher levels of state negative affect. Internal consistency reliability was good for the present study (Cronbach’s $\alpha = .87$). PANAS Negative Affect Scale scores were used to assess equivalency between conditions on momentary negative affect prior to Facebook exposure as such differences could potentially confound the results of the study.

Measure of Facebook Friends’ Physical Attractiveness and Thinness: The results of previous research suggest that physical attractiveness and thinness of peers may moderate the impact of exposure of images of peers on negative body-related outcomes (Cash et al., 1983, Haferkamp & Krämer, 2011; Lin & Kulik, 2002). In the absence of an existing measure, participants completed a series of questions regarding their Facebook friend’s physical attractiveness and thinness created by the author for the current study. Using a five-point Likert-type scale, participants rated the extent to which they agree or disagree that the Facebook friend they identified in the Facebook activity exercise is thin and physically attractive as well as the extent to which she exhibits other distractor “traits” (e.g., “she is outgoing;” “she is smart;” “we are close friends”). The primary purpose of this measure was to obtain a subjective appraisal of Facebook friend’s physical attractiveness and thinness and assess the utility of including these variables as covariates. Facebook friend’s physical attractiveness (experimental condition: $M=4.25$, $SD=.70$) and Facebook friend’s thinness (experimental condition: $M=3.64$, $SD=1.10$)

rating items were only moderately related ($r(98)=.48, p<.001$) in the experimental condition; thus, the decision was made to analyze them separately. However, because neither Facebook friend's physical attractiveness nor Facebook friend's thinness items were significantly correlated with post-exposure state body image satisfaction (attractiveness: $r(100)=-.02, p=.811$; thinness: $r(98)=.10, p=.317$), diet and exercise desire (attractiveness: $r(100)=-.09, p=.351$; thinness: $r(98)=.07, p=.445$), or extreme weight-loss behavior desire (attractiveness: $r_s(99)=.06, p=.523$; thinness: $r_s(97)=.03, p=.767$) in the experimental condition, these two items were not used in any further analyses. ²

Preliminary Data Analyses and Screening

Missing Data & Participant Exclusion

A total of 373 individuals initially consented to participate in Phase 1, Phase 2, or both phases of this study. There were 185 individuals with large amounts of missing data due to the following reasons: failure to complete (i.e., >80% missing data) Phase 1 and failure to attend Phase 2 lab appointment (11 participants), completion of Phase 1 but failure to attend Phase 2 lab appointment (167 participants), and failure to complete Phase 1 prior to completing Phase 2 lab appointment (7 participants). These study non-completers (185 participants) were not significantly different from study completers (188 participants) with regard to age [$t(356)=.45, p=.66$], BMI [$t(350)=-.87, p=.39$], Facebook score [$t(346)=-1.40, p=.162$], or EDE-Q Global Score [$t(343)=-1.86; p=.06$]. Thus, the decision was made to exclude them from analyses as doing so would not appear to impact the generalizability of study results. One participant

² Other measures administered during Phase 2 but not included in analyses discussed in this manuscript include VAS ratings assessing momentary desire to change non-weight related aspects of appearance as well as more specific body areas, which were included in an attempt to replicate previous research that has found that Facebook impacts non-weight and shape related aspects of appearance for certain women (Fardouly et al., 2015a). In particular, items were adapted from the BASS (Brown et al., 1990) and included momentary desire to change one's face (facial features, complexion), hair (color, thickness, texture), lower torso (buttocks, hips, thighs, legs), upper torso (chest or breasts, shoulders, arms), and muscle tone.

completed the study on two separate occasions; thus, this participant's second attempt was excluded from the following analyses. A minority of participants completed Phase 1 online questionnaires on multiple occasions prior to their Phase 2 lab appointment. If complete, only the first set of completed questionnaires was included in analyses ($n=7$); if incomplete, only the second set of questionnaires was included in analyses ($n=1$).

Manipulation Check

To test if the manipulation produced the anticipated effects, independent samples t-tests were conducted comparing the two conditions with regard to the total number of times participants selected "people" as the primary focus of the photo and total number of times participants endorsed seeing their Facebook friend during the Facebook exposure. As expected, the conditions differed such that the experimental condition selected "people" as the primary focus [$t(125.89)=53.77, p<.001$] and reported seeing their Facebook friend significantly more often [$t(184.17)=35.59, p<.001$]³ during the Facebook exposure than the control condition (See Table 2). Follow-up visual inspection of histograms and box-plots indicated that five participants provided markedly different responses compared to others in their respective condition. Specifically, three participants from the control condition endorsed seeing their Facebook friend in more than three photos and two from the experimental condition endorsed seeing their friend in fewer than three of the photos. Thus, these five participants were excluded from analyses.

³ Statistics reported are corrected for inequality of variances.

Table 2. Manipulation Check Scores by Condition.

Condition	<i>n</i>	Total Times Selected “People” as Focus of Photo		Total Times Saw Facebook Friend in Photo	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Control	84	.50	.72	.54	2.13
Experimental	104	13.67	2.37	13.67	2.92

For the remaining sample ($N=183$), missing data were minimal (<5%) for the variables to be included in the primary statistical analyses with the exception of pre-exposure Exercise & Diet Desire Scores (9.3%). Little’s MCAR test indicated that the data were missing completely at random ($\chi^2(125)=129.19, p=.38$). Missing values were replaced using the expectation-maximization (EM) method of imputation. Negative values generated for the EDE-Q Global Score, pre-exposure Exercise & Diet Scores, and pre- and post-exposure Extreme Weight-Loss Behavior Desire Scores were manually replaced with the nearest possible scale value (i.e., 0). Means generated including the imputed values were compared to those generated from complete cases only and judged to be similar. Primary statistical analyses were run using the complete data set.

Independent samples t-tests and chi-square analyses indicated that there were no significant differences between conditions with regard to age [$t(181)=-.87, p=.386$], BMI [$t(168.31)=1.89, p=.060$], ethnicity [$\chi(1)=.52, p=.471$], or race [$\chi(4)=1.50, p=.827$]. There were no significant differences between conditions with regard to self-reported Facebook use, including total number of Facebook friends [$t(173)=-.58, p=.565$], days per week using Facebook [$t(180)=-.86, p=.392$], total time (in minutes) spent on Facebook per day [$t(181)=.28, p=.783$],

and average Facebook session (in minutes) [$t(180)=-1.27, p=.208$]. There were also no significant differences between conditions with regard to any of the proposed moderators, including trait thin-ideal internalization [$t(181)=-.54, p=.590$], appearance comparison [$t(155.33)=1.01, p=.312$], body image satisfaction [$t(157.20)=-.86, p=.391$], or eating psychopathology [$t(181)=.38, p=.702$]. Furthermore, there were no significant differences between conditions on pre-exposure measures of state body image satisfaction [$t(181)=-.34, p=.732$], exercise and diet desire [$t(181)=.30, p=.762$], extreme weight-loss behavior desire [$t(181)=.15, p=.876$], or momentary negative affect [$t(181)=.36, p=.718$]. Thus, it appears that randomization of conditions was successful.

Statistical Analyses

Primary Analyses

A one-way analysis of covariance (ANCOVA) was conducted to test the hypothesis that exposure to images of friends via Facebook (between-subjects independent variable) would decrease state body image satisfaction (dependent variable) while controlling for within-group variability in pre-exposure state body image satisfaction (covariate). An ANCOVA was conducted to test the hypothesis that exposure to images of friends via Facebook (between-subjects independent variable) would increase momentary desire to exercise and diet (dependent variable) while controlling for pre-exposure desire to exercise and diet (covariate). Multiple regression analyses were conducted to test the hypotheses that trait thin-ideal internalization, appearance comparison, body image satisfaction, and eating psychopathology would moderate the effects of condition on momentary changes in state body image satisfaction and exercise and diet desire. Condition was dummy-coded (experimental=1; control=0), and continuous predictors were mean-centered before adding them to the models.

Initial data screening indicated that post-exposure Extreme Weight-Loss Behavior Desire Scores were markedly, positively skewed with both a large, discrete mass at zero and continuous positive values. Attempts at transforming the data were not successful in producing a normal or near-normal distribution. Thus, a generalized linear model was fit to the data using a Tweedie (1984) distribution with a log link function in order to test the hypotheses that exposure to images of friends via Facebook (between-subjects independent variable) would increase momentary desire to engage in extreme weight-loss behaviors (dependent variable) and that trait thin-ideal internalization, appearance comparison, body image satisfaction, and eating psychopathology would moderate these effects while controlling for pre-exposure desire to engage in extreme weight-loss behaviors (covariate). Condition was dummy-coded (experimental=1; control=0), and continuous predictors were mean-centered before adding them to the models using the Enter method. Statistical significance was set at $p < .05$.

Ancillary Analyses

In an effort to interpret findings from the current study in light of previous research, bivariate correlations were also conducted to examine the associations of different indices of Facebook use, including Facebook scores (as examined by Mabe et al., 2014), Facebook appearance comparison scores (as examined by Fardouly & Vartanian, 2015), and total time spent on Facebook each day, with trait thin-ideal internalization, appearance comparison, body image satisfaction, and eating psychopathology.

CHAPTER III

RESULTS

The current sample endorsed using Facebook nearly every day of the week ($M=6.14$, $SD=1.43$ days), for an average of 43.21 ($SD=32.87$) minutes per day, with a typical session lasting an average of 14.96 ($SD=19.56$) minutes. Average total number of Facebook friends was 690.11 ($SD=362.41$). Nearly all participants reported using Facebook regularly (92.3%) and that they use the Facebook application on their smartphone (95.6%). Many participants also reported using other social media websites regularly, including Instagram (89.6%), Twitter (61.7%), and Pinterest (57.9%), with less reporting regular use of Tumblr (10.4%) and none endorsing regular use of MySpace. Participants reported that they use Instagram the most among the social media websites (53.6%), followed by Facebook (29.0%), Twitter (13.1%), Pinterest (10.4%), and Tumblr (2.7%), with no participants reporting using MySpace the most.

In the current sample, looking at photos was the activity that the majority of participants ranked as being the top function for which they use Facebook (39.3%) compared to other Facebook activities (See Table 3). Similarly, participants selected looking at photos as the most interesting activity on Facebook (75.4%) compared to other Facebook activities, including commenting on or “liking” status updates (6.0%), posting one’s own photos (4.9%), viewing or posting in groups (3.3%), looking at business/company pages (2.7%), commenting on or “liking” friend’s photos (2.2%), using chat or sending messages (2.2%), finding friends (1.6%), using events (0.5%), and using applications and games (0.5%).

Table 3. Percentage of Sample Ranking Activities as Top Function for Using Facebook.

Facebook Activity	Percentage of Sample
Looking at photos	39.3
Use notes	8.7
Use check-ins	8.7
Use applications and games	8.2
View or post in groups	7.7
Comment on or "like" status updates	6.6
Use events	3.8
Post your own photos	3.8
Find friends	3.3
Use chat or send messages	2.7
Look at business/company pages	2.7
Post your own status updates	2.2
Comment on or "like" friend's photos	1.6

Note. Table generated using questions from social media use survey created by Mabe et al. (2014).

Facebook scores were significantly, positively related to trait thin-ideal internalization [$r(179) = .32, p < .001$], appearance comparison [$r(179) = .45, p < .001$], and eating psychopathology [$r(179) = .41, p < .001$], and significantly, negatively related to trait body image satisfaction [$r(179) = -.25, p < .001$]. Similarly, Facebook appearance comparison scores were significantly, positively correlated with trait thin-ideal internalization [$r(181) = .49, p < .001$], appearance comparison [$r(181) = .80, p < .001$], and eating psychopathology [$r(181) = .55, p < .001$], and significantly, negatively related to trait body image satisfaction [$r(181) = -.45, p < .001$]. However, total time spent on Facebook per day was not significantly related to trait thin-ideal internalization [$r(181) = -.03, p = .677$], appearance comparison [$r(181) = -.05, p = .524$], eating psychopathology [$r(181) = -.03, p = .687$], or body image satisfaction [$r(181) = .00, p = .983$].

(See Table 4). Thus, frequency and importance of engaging in Facebook activities, particularly photo-related activity, and tendency to compare one's physical appearance to others while using Facebook were significantly, concurrently associated with higher baseline body image concerns and eating psychopathology. Total time using Facebook per day was not significantly, concurrently related to baseline body image concerns or eating psychopathology.

Table 4. Correlations Between Facebook Use and Measures of Trait Thin-Ideal Internalization, Appearance Comparison, Body Image Satisfaction, and Eating Psychopathology.

Measure	1	2	3	4	5	6	7
1. Facebook Score	--	.50**	.17*	.32**	.45**	-.25**	.41**
2. FB ^a Appearance Comparison		--	-.05	.49**	.80**	-.45**	.55**
3. Time on Facebook Per Day ^b			--	-.03	-.05	-.00	-.03
4. SATAQ-4 ^c				--	.54**	-.33**	.59**
5. PACS-R ^d					--	.51**	.62**
6. MBSRQ-AE ^e						--	-.58**
7. EDE-Q Global Score ^f							--

Note. * $p < .05$. ** $p < .001$.

^a Facebook

^b In minutes

^c Sociocultural Attitudes Towards Appearance Questionnaire-4 Internalization: Thin/Low Body Fat Subscale.

^d Physical Appearance Comparison Scale-Revised

^e Multidimensional Body-Self Relations Questionnaire- Appearance Evaluation Subscale

^f Eating Disorder Examination Questionnaire

Participants completed the Facebook exposure in 13.00 ($SD=3.78$) minutes on average. There were no significant between group differences in total exposure time as indicated by the Mann Whitney U Test ($p = .116$), which was chosen due to skewness of the data, and total exposure time was not significantly related to post exposure state body image satisfaction ($r(181) = -.125, p = .093$), exercise and diet desire ($r(179) = .01, p = .852$), or extreme weight-loss

behavior desire ($r(179)=-.12, p=.108$). Participants in the experimental condition indicated that the Facebook friend they identified during the Facebook activity exercise was the primary focus in 36.67% of the photos they viewed during the Facebook exposure ($M=5.5, SD=3.99$). The nature of the relationship with the Facebook friend was also assessed in the experimental condition using descriptions outlined by previous researchers in this area (Fardouly et al., 2015b; Fardouly & Vartanian, 2015); most participants (76.5%) reported that their Facebook friend was an actual close friend (i.e., a female friend on Facebook and someone they regularly hang out with), much less (17.6%) reported that their Facebook “friend” was just a friend on Facebook (i.e., females they are friends with on Facebook but do not regularly hang out with), and few (5.9%) reported that they were family members (i.e., sisters or cousins of similar age).

Main Effects of Condition

State Body Image Satisfaction

Data were first examined to determine whether ANCOVA test assumptions were met. Visual inspection of histograms, boxplots, and normal Q-Q plots as well as Fischer’s skewness and kurtosis coefficients ($z<\pm 1.96$) indicated that scores on this variable were approximately normally distributed for both groups. Visual inspection of bivariate scatterplots suggested that pre-exposure state body image satisfaction was approximately linearly related to post-exposure state body image satisfaction. There was not a significant interaction between condition and pre-exposure state body image satisfaction [$F(1,179)=3.75, p=.055$], indicating that the homogeneity of regression slopes assumption was met. Levene’s Test indicated that variances were unequal across conditions, $F(1,181)=5.28, p=.023$; however, the ratio comparing the largest to smallest variance (1.12) does not appear to be large enough to invalidate the results of the analysis of covariance (Howell, 2009).

Contrary to hypotheses, there was no significant main effect of condition on post-exposure state body image satisfaction after controlling for within-group variability in pre-exposure state body image satisfaction, $F(1,180)=.75, p=.387$ (See Tables 5 and 6). In other words, post-exposure state body image satisfaction was not significantly different for participants who viewed photos of friends via Facebook compared those who viewed appearance-neutral photos from the Pottery Barn Facebook page.

Table 5. Analysis of Covariance for State Body Image Satisfaction by Facebook Condition.

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>partial</i> η^2
Condition	.32	1	.32	.75	.387	.004
Pre-Exposure BISS Scores	245.10	1	245.10	571.62	<.001*	.761
Error	77.18	180	.43			
Total	5735.36	183				

Note. * $p < .001$.

Table 6. Adjusted and Unadjusted Group Means for Post-Exposure Body Image State Scale Scores.

	Adjusted <i>M</i>	Unadjusted <i>M</i>
Experimental Condition	5.40	5.37
Control Condition	5.48	5.52

Note. Covariates appearing in the model are evaluated at the following values: Pre-Exposure Body Image State Scale Mean= 5.50.

Momentary Exercise & Diet Desire

Data were examined to determine whether ANCOVA test assumptions were met. Visual inspection of histograms, boxplots, and normal Q-Q plots as well as Fischer's skewness coefficients ($z < \pm 1.96$) indicated that scores on this variable were not markedly skewed. Kurtosis coefficients indicated that the variable was somewhat platykurtic for both groups ($z < -1.96$); however, given the small degree to which the variable appeared to deviate from normality, data transformation were not applied to this variable. There was not a significant interaction between condition and pre-exposure exercise and diet desire [$F(1,179)=2.65, p=.105$], indicating that the homogeneity of regression slopes assumption was met. Further, Levene's Test indicated that variances were equal across conditions, $F(1,181)=.94, p=.335$.

Contrary to hypotheses, there was no significant main effect of condition on momentary desire to exercise and diet after controlling for within-group variability in pre-exposure desire to exercise and diet, $F(1,180)=2.99, p=.086$ (See Tables 7 and 8). Thus, post-exposure momentary desire to engage in exercise and dieting was not significantly different for participants who viewed photos of friends via Facebook compared those who viewed appearance-neutral photos from the Pottery Barn Facebook page.

Momentary Extreme Weight-Loss Behaviors Desire

Initial evaluation of model goodness of fit was performed. The scaled Pearson χ^2 value divided by degrees of freedom was close to 1 ($143.04/180=0.79$), which indicated that the specified model fit the data.

Tweedie regression revealed that there was a significant main effect of condition on momentary extreme weight-loss behavior desire after controlling for within-group variability in pre-exposure extreme weight-loss behaviors desire, such that momentary extreme weight-loss

Table 7. Analysis of Covariance for Momentary Exercise & Diet Desire by Facebook Condition.

Source	SS	df	MS	F	p	partial η^2
Condition	237.93	1	237.93	2.99	.086	.016
Pre-Exposure Exercise & Diet Desire Scores	161083.80	1	161083.80	2023.40	<.001*	.918
Error	14329.88	180	79.61			
Total	183					

Note. * p<.001.

Table 8. Adjusted and Unadjusted Group Means for Momentary Exercise & Diet Desire Scores.

	Adjusted <i>M</i>	Unadjusted <i>M</i>
Experimental Condition	50.17	50.77
Control Condition	47.88	47.12

Note. Covariates appearing in the model are evaluated at the following values: Pre-Exposure Exercise & Diet Desire Scores Mean= 48.43.

behaviors desire was higher for the experimental condition compared to the control condition ($\beta = 1.23$, $Exp(\beta)=3.43$, $Wald X^2(1) = 7.92$, $p = .005$) (See Tables 9 & 10). Specifically, the incidence rate for extreme-weight loss behaviors desire was 243% higher for participants who viewed photos of friends via Facebook compared to that of participants who viewed appearance-neutral photos from the Pottery Barn Facebook page.

Table 9. Tweedie Regression Coefficients Predicting Momentary Extreme Weight-Loss Behaviors Desire.

	<i>B</i>	<i>Exp(β)</i>	<i>Wald χ²</i>	<i>df</i>	<i>p</i>
Experimental Condition	1.23	3.43	7.92	1	.005*
Control Condition	0 ^a	1	.	.	.
Pre-Exposure Extreme Weight-Loss Behaviors Desire Scores	.16	1.17	78.06	1	<.001*

Notes. * $p < .05$.

^a Set to zero because this parameter is redundant.

Table 10. Adjusted and Unadjusted Group Means for Momentary Extreme Weight-Loss Behaviors Desire Scores.

	Adjusted <i>M</i>	Unadjusted <i>M</i>
Experimental Condition	2.29 ^a	2.23
Control Condition	1.27 ^a	0.72

Notes. Covariates appearing in the model are evaluated for the following values: Pre-Exposure Extreme Weight-Loss Behaviors Desire Scores = 1.82.

^aThe adjusted post-exposure Extreme Weight-Loss Behaviors Desire Scores are presented in original scale form by applying an exponential function with a base of *e* to the natural logarithm values used in the Tweedie regression.

Moderation Effects

State Body Image Satisfaction

Visual inspection of the standardized predicted values (ZPRED) plotted against the standardized residuals (ZRESID) indicated that the assumption of homoscedasticity was met.

Evaluation of tolerance (>.1) and variance inflation factor (<10) statistics indicated the absence of multicollinearity issues.

Standard multiple regression analyses were run to examine the significance of interaction terms for each of the proposed moderators. Results of the regression analyses indicated that the interaction term between condition and trait thin-ideal internalization was significant in predicting post-exposure state body image satisfaction [$\beta=-.11$, $t(182)=-2.00$, $p=.046$] when controlling for the main effects of condition, trait thin-ideal internalization, and pre-exposure state body image satisfaction. Thus, consistent with hypotheses, thin-ideal internalization moderated the impact of condition on state body image satisfaction. Simple slopes for the relationship between condition on state body image satisfaction were evaluated for both low thin-ideal internalization (1SD below mean) and high thin-ideal internalization (1 SD above the mean) to facilitate interpretation of this interaction. While the simple slope was significantly different from zero for high thin-ideal internalization ($t(178)=-2.57$, $p=.005$), the simple slope was not significantly different from zero for low thin-ideal internalization ($t(178)= 1.10$, $p=.136$). Thus, for participants with higher levels of thin-ideal internalization, exposure to photos of friends via Facebook resulted in lower state body image satisfaction compared to exposure to appearance-neutral photos via the Pottery Barn Facebook page (See Figure 1).

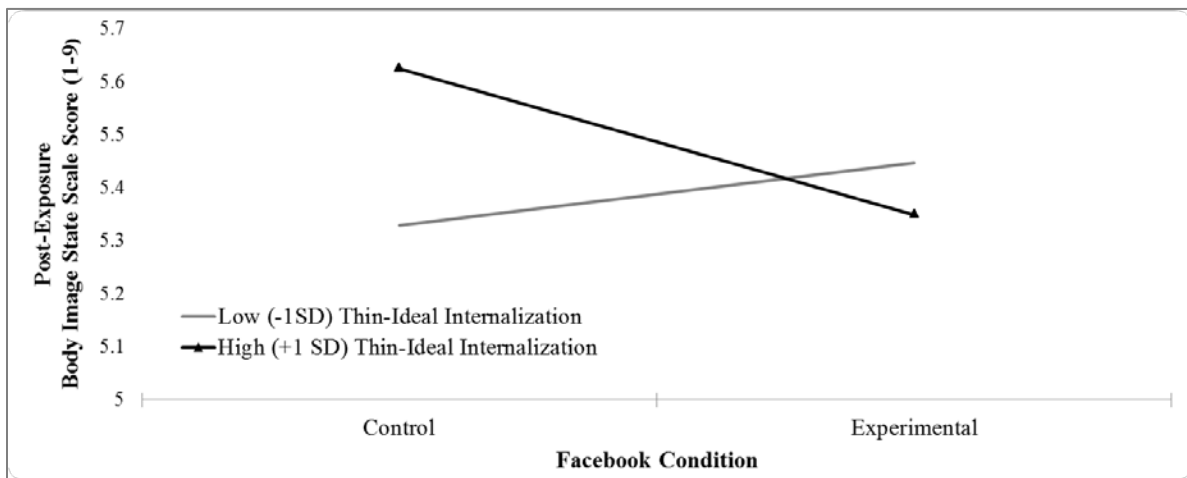


Figure 1. Interaction of condition and thin-ideal internalization predicting state body image satisfaction.

Interaction terms between condition and trait appearance comparison [$\beta=-.05$, $t(182)=-1.03$, $p=.306$], body image satisfaction [$\beta=-.11$, $t(182)=-1.03$, $p=.306$], and eating psychopathology [$\beta=-.09$, $t(182)=-1.63$, $p=.104$] were not significant in predicting post-exposure state body image satisfaction after controlling for main effects of condition as well as the main effects of the moderator and pre-exposure state body image satisfaction.

Momentary Exercise & Diet Desire

Visual inspection of the standardized predicted values (ZPRED) plotted against the standardized residuals (ZRESID) indicated that the assumption of homoscedasticity was met. Evaluation of tolerance ($>.1$) and variance inflation factor (<10) statistics indicated the absence of multicollinearity issues.

Interaction terms between condition and trait thin-ideal internalization [$\beta=.05$, $t(182)=1.38$, $p=.169$], appearance comparison [$\beta=-.01$, $t(182)=.17$, $p=.866$], body image satisfaction [$\beta=-.01$, $t(182)=-.32$, $p=.749$], and eating psychopathology [$\beta=-.003$, $t(182)=-.08$, $p=.934$] were not significant in predicting post-exposure momentary desire to exercise and diet after controlling for main effects of condition as well as the main effects of the moderator and pre-exposure momentary desire to exercise and diet.

Momentary Extreme Weight-Loss Behaviors Desire

Results of the Tweedie regression analyses indicated that the interaction term between condition and trait thin-ideal internalization was significant in predicting post-exposure extreme weight-loss behaviors desire ($\beta = 1.28$, $Exp(\beta)=3.60$, $Wald X^2(1) = 4.78$, $p = .029$) when controlling for the main effects of condition, trait thin-ideal internalization, and pre-exposure extreme weight-loss behavior desire. Thus, consistent with hypotheses, trait thin-ideal internalization moderated the impact of condition on momentary extreme weight-loss behaviors

desire. Simple slopes for the relationship between condition and extreme weight-loss behaviors desire were evaluated for both low thin-ideal internalization (1SD below mean) and high thin-ideal internalization (1 SD above the mean) to facilitate interpretation of this interaction. While the simple slope was significantly different from zero for high thin-ideal internalization ($t(178)=3.48, p<.001$), the simple slope was not significantly different from zero for low thin-ideal internalization ($t(178)= -.57, p=.285$). Thus, for participants with higher levels of thin-ideal internalization, exposure to photos of friends via Facebook resulted in higher momentary desire to engage in extreme-weight loss behaviors compared to exposure to appearance-neutral photos on the Pottery Barn Facebook page (See Figure 2). It is important to note that the main effect of condition on post-exposure extreme weight-loss behaviors desire was no longer significant ($\beta = .55, Exp(\beta)=1.74, Wald X^2(1) = 1.13, p = .287$) when trait thin-ideal internalization and its interaction with condition were added as predictors to the model.

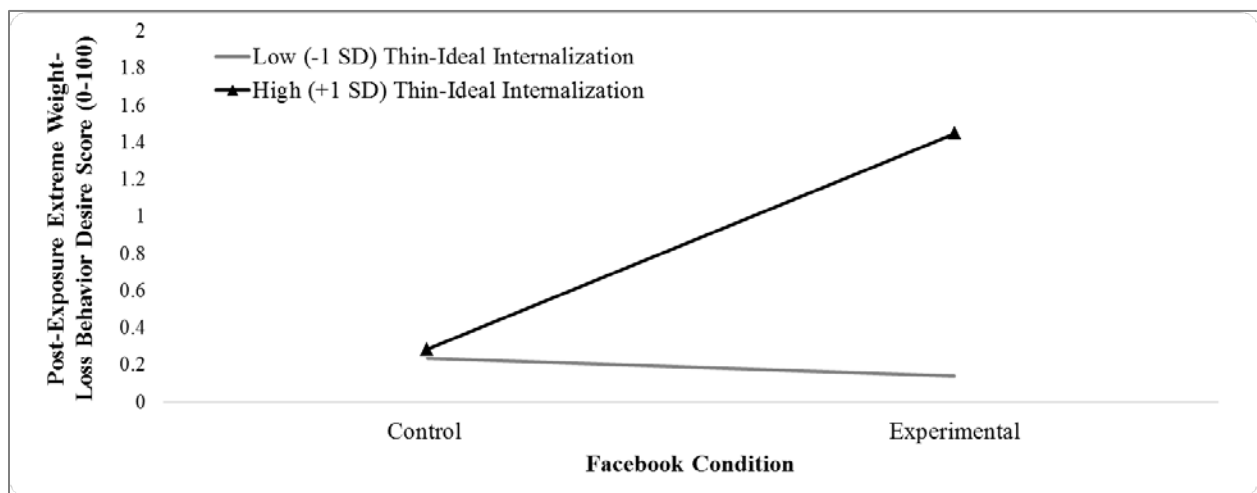


Figure 2. Interaction of condition and thin-ideal internalization predicting momentary extreme weight-loss behaviors desire.

Interaction terms between condition and trait appearance comparison ($\beta = .13, Exp(\beta)=1.14, Wald X^2(1) = 0.06, p = .810$), body image satisfaction ($\beta = -.27, Exp(\beta)=.77, Wald$

$X^2(1) = .19, p = .665$), and eating psychopathology ($\beta = .512, \text{Exp}(\beta) = 1.67, \text{Wald } X^2(1) = 2.30, p = .129$) were not significant in predicting post-exposure extreme weight-loss behaviors desire after controlling for the main effects of condition as well as the main effects of the moderator and pre-exposure extreme weight-loss behaviors desire.

CHAPTER IV

DISCUSSION

The purpose of this study was to (1) examine the causal effects of exposure to images of friends via social media on state body image satisfaction and desire to engage in weight-loss behaviors and (2) identify for whom exposure to images of friends via social media may impact momentary risk for eating psychopathology. Consistent with hypotheses, exposure to images of friends led to higher desire to engage in extreme weight-loss behaviors (i.e., self-induced vomiting, laxative and diuretic use) compared to viewing appearance-neutral photos via Facebook, an effect that was moderated by trait thin-ideal internalization. Specifically, for women high in thin-ideal internalization, viewing images of friends led to higher momentary desire to engage in extreme weight-loss behaviors compared to viewing appearance-neutral photos on Facebook. Similarly, exposure to images of friends led to lower state body image satisfaction compared to viewing appearance-neutral photos on Facebook for women high in thin-ideal internalization. This is consistent with previous research that has found that exposure to idealized images of models and celebrities depicted in the mass media negatively impacts state body image for women who endorse the thin ideal (Brown & Dittmar, 2005; Dittmar & Howard, 2004; Dittmar et al., 2009; Halliwell & Dittmar, 2004; Yamamiya et al., 2005). The findings of the current study extend those of previous mass media research by suggesting that women who internalize the thin ideal experience negative body image-related outcomes as a result of viewing potentially idealized images of their similar-aged, female friends, peers who they know, which

are abundant and easily accessible via social media. Additionally, the findings of the current study extend those of previous mass media research in that they suggest that, not only do women who internalize the thin ideal experience lower body image satisfaction, they also experience a higher desire to engage in extreme and potentially dangerous weight-loss behaviors after viewing idealized images of their friends via social media for only a brief amount of time. Perhaps this is because women who endorsed the thin ideal compared their appearance with the physical appearance of their female friends as depicted in images on social media (Tiggemann & Zaccardo, 2015) or perhaps exposure to such images led to activation of self-discrepancies pertaining to weight and body size (Dittmar et al., 2009), leading them to momentarily feel bad about their bodies and want to use extreme measures to lose weight. These findings are particularly concerning because such purging behaviors, particularly self-induced vomiting, have been associated with dental, esophageal, gastrointestinal, kidney, cardiovascular, musculoskeletal, and skin complications (Forney et al., 2016). Although it is unclear to what extent one's momentary desire to engage in these extreme weight-loss behaviors would predict actual behaviors in the future, it is important to note post-exposure momentary desire to engage in extreme weight-loss behaviors was significantly related to self-induced vomiting and laxative use frequency in the 28 days prior to completion of Phase 1 measures. Findings of the current study highlight the need for future research to investigate the impact of exposure to potentially idealized images of friends via social media on risk for eating psychopathology, particularly among young women who believe it is important and strive to be ultra-thin.

The hypotheses that exposure to images of friends via Facebook would lead to lower state body image satisfaction and higher momentary desire to exercise and diet (i.e., main effects) were not supported. Further, although there was a significant main effect of condition on

momentary desire to engage in extreme weight-loss behaviors as hypothesized, this main effect was no longer significant after accounting for the interaction between condition and trait thin-ideal internalization. In other words, these findings indicate that viewing photos of friends via social media leads to higher momentary desire to engage in extreme weight-loss behaviors but only for women with high thin-ideal internalization. While some experimental studies have found that viewing mock social media-based profiles with images of thin, attractive, and physically-fit same-sex peers led to higher body dissatisfaction (Haferkamp & Krämer, 2011; Lee et al., 2013; Tiggemann & Zaccardo, 2015), other studies failed to find a significant main effect of brief, typical Facebook use on state body image concerns or urge to exercise (Fardouly et al., 2015a; Mabe et al., 2014). It seemed possible that these studies failed to find a significant main effect of typical Facebook use because participants were instructed to use Facebook as they typically would, whereas correlational research suggests that engaging in photo-related activity involving peers on social media, not typical or overall use of social media, negatively impacts body image outcomes (Kim & Chock, 2015; Meier & Gray, 2014). Indeed, findings from this correlational research were replicated in the current study such that frequency and importance of engaging in Facebook activities, particularly those involving photos, and tendency to compare one's physical appearance to others while using Facebook, but not overall time spent on Facebook per day, were significantly, concurrently associated with higher baseline body image concerns and eating psychopathology. The findings from the current study suggest that brief exposure to images of similar-aged, female friends via social media does not negatively impact state body image and momentary desire to engage in weight-loss behaviors among all college women; rather, certain women appear to be susceptible to these negative effects. However, it is possible that differences in the experimental manipulation led to a failure to find significant main

effects as expected in the current study. Previous research suggests that physical attractiveness and thinness of peers may moderate the impact of exposure of images of peers on negative body-related outcomes (Cash et al., 1983, Haferkamp & Krämer, 2011; Lin & Kulik, 2002, Tiggemann & Zaccardo, 2015). In the current study, participants in the experimental condition viewed real photos that had been posted by their actual similar-aged, female Facebook friends, who may have differed substantially with regard to thinness and attractiveness. It appears possible that studies using mock social media profiles and images of unfamiliar peers that had been pre-selected for thinness, attractiveness, and portrayal of physical fitness, may have provided a stronger, more controlled manipulation, which may account for the differences in findings compared to the current study. It is surprising then that participants' subjective ratings of their Facebook friend's thinness and attractiveness were not significantly related to post-exposure state body image satisfaction or momentary desire to engage in weight-loss behaviors among the experimental condition in the current study. However, it is possible that these ratings were artificially inflated possibly due to desirability effects, and perhaps this led to non-significant relationships between subjective ratings of Facebook friend's physical attractiveness and thinness and post-exposure state body image satisfaction and momentary desire to engage in weight-loss behaviors among women who viewed images of their friend via Facebook.

Contrary to hypotheses, trait thin-ideal internalization did not moderate the effects of condition on momentary exercise and diet desire. It was expected that desire to exercise and diet would be higher following exposure to images of friends via Facebook for women with high thin-ideal internalization compared to viewing appearance-neutral photos, though this prediction was not supported. This is surprising given the finding that trait thin-ideal internalization moderated the impact of Facebook exposure on state body image satisfaction and momentary

desire to engage in extreme weight-loss behaviors. Perhaps exposure to images of friends via Facebook did not lead to higher exercise and diet desire compared to a non-appearance control because wanting to exercise and diet to lose weight is common among college women (Wharton, Adams, & Hampl, 2008) and not necessarily an indication of eating psychopathology; self-induce vomiting, diuretic, and laxative misuse, on the other hand, are relatively uncommon, inappropriate weight-loss methods indicative of eating psychopathology. Perhaps significant effects of Facebook exposure on exercise and diet desire were not found because this variable had less of a potential to be impacted by exposure to images of friends via Facebook. It is important to note that extreme dietary restraint and compulsive exercising are common in individuals with eating disorders (Fairburn, 2008); however, it is possible that the wording of items included in the current study was not specific enough (e.g., how much do you want to diet to lose weight; how much do you want to exercise to lose weight?) to fully capture the cognitive and behavioral aspects of these indicators of eating psychopathology, pointing to a methodological flaw in the study.

Contrary to hypotheses, trait appearance comparison did not moderate the impact of exposure to images of friends via Facebook on state body image satisfaction, exercise and diet desire, or extreme weight-loss behaviors desire. This is surprising given the finding that trait thin-ideal internalization moderated the relationship between condition and state body image satisfaction and momentary desire to engage in extreme weight-loss behaviors. This prediction was based in part on sociocultural theory, which suggests that thin-ideal internalization and appearance-focused social comparison play a role in the relationship between media and peer influences and risk for eating psychopathology (Keery et al., 2004; Thompson et al., 1999; van den Berg et al., 2002). Further, a recent experimental study found that trait appearance

comparison tendency moderated the effects of brief, typical Facebook use, such that women high in trait appearance comparison reported higher post-exposure face, skin, and hair discrepancies (Fardouly et al., 2015a); however, this study and another (Tiggemann & Ziccardo, 2015) failed to find a moderating effect of baseline appearance comparison on state body image and weight and shape discrepancies following exposure to social media. Perhaps trait appearance comparison did not moderate the impact of condition on state body image and desire to engage in weight-loss behaviors because participants were viewing primarily portrait pictures of their friends' faces versus full-body photos and, therefore, did not have adequate opportunity to compare themselves to their friends' bodies or apparent weight, as has been suggested by Fardouly and colleagues (2015a). Also, it is possible that trait appearance comparison did not moderate the effect of condition because the measure used (i.e., PACS-R) assessed frequency, not the general direction of physical appearance comparisons (i.e., upward versus downward) or the motivation to engage in them (i.e., self-evaluation versus self-improvement), which research suggests may differentially influence the impact of exposure to thin-idealized mass media images. In particular, research suggests that upward social comparisons lead to more negative body image-related outcomes compared to downward comparisons (Engeln-Maddox, 2005; Myers, Ridolfi, Crowther, & Ciesla, 2012; O'brien et al., 2009) and that those motivated by self-evaluation lead to more negative body image-related outcomes compared to those motivated by self-improvement (Halliwell & Dittmar, 2005). Furthermore, it is possible that trait appearance comparison interacts with other variables, including thin-ideal internalization, rather than acting alone to moderate the impact of exposure to images of thin-idealized mass media images (Dittmar & Howard, 2004), and perhaps this is why trait appearance comparison did not moderate the impact of condition on state body image and desire to lose weight in the current

study. Future research may benefit from exploring these distinctions in appearance-focused social comparison and how they may differentially influence the impact of exposure to images of friends via social media.

Neither trait body image satisfaction nor baseline eating psychopathology moderated the impact of exposure to images of friends via Facebook on state body image satisfaction, exercise and diet desire, or extreme weight-loss behaviors desire, contrary to hypotheses. It was expected that exposure to images of friends on Facebook would lead to lower state body image satisfaction and higher desires to engage in weight-loss behaviors for women who already had low body image satisfaction and who had higher baseline eating psychopathology, though these predictions were not supported. This is surprising given the finding that trait thin-ideal internalization moderated the relationship between condition and state body image satisfaction and momentary desire to engage in extreme weight-loss behaviors, and the author is unsure what to make of this. The predictions were based on previous research which suggests that women with pre-existing appearance concerns, including body dissatisfaction (Ferguson, 2013; Groesz et al., 2002; Want, 2009), and pre-existing eating psychopathology (Groesz et al., 2002; Hamilton & Waller, 1993) may be particularly susceptible to the negative effects of exposure to thin-idealized mass media images; however, this is the first study that the author is aware of that has examined the moderating effect of trait body image satisfaction and eating psychopathology on the relationship between social media use specifically and state body image satisfaction and momentary weight-loss desires. Perhaps there was not a moderating effect of trait-level body satisfaction or eating psychopathology on condition because the manipulation of the independent variable was not strong enough in this study to detect the extent to which these variables interact with condition to affect state body image satisfaction and weight-loss desires.

Clinical Implications

The results of this study have important clinical implications. Specifically, the findings suggest that college women who endorse the thin ideal may be particularly susceptible to experiencing momentary risk for eating psychopathology following exposure to potentially idealized images of friends via social media. This highlights the need for efforts aimed at mitigating the impact of exposure to these images for women at risk. One way to address these concerns would be to develop programs targeting the thin ideal and media literacy as they apply to social media content specifically for women who are at risk. Some research suggests that media literacy intervention programs may decrease body image concerns (for review, see McLean, Paxton, & Wertheim, 2016). For instance, Yamamiya and colleagues (2005) found that providing women with media-literacy information before exposing them to images of thin and attractive fashion models lessened the detrimental impact on body image among women high in thin-ideal internalization. Furthermore, there is a body of research supporting the efficacy and effectiveness of dissonance-based group prevention programs in reducing thin-ideal internalization as well as symptoms of bulimia and other risk factors for eating psychopathology among young women (Stice, Butryn, Rohde, Shaw, & Marti, 2013; Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Mazotti, Weibel, & Agras, 2000; Stice, Shaw, Burton, & Wade, 2006), including when such interventions are delivered by peers (Stice, Rohde, Durant, Shaw, & Wade, 2013) and via the Internet (Stice, Rohde, Durant, & Shaw, 2012). Through these dissonance-based prevention programs, young women learn to identify the thin ideal and are encouraged to publicly criticize it (Stice et al., 2000). Perhaps programs that incorporate elements of media literacy as well as techniques to identify and challenge the thin ideal may help at-risk women critically analyze potentially idealized images of friends they encounter on social media and

reduce risk for eating psychopathology. Future research could benefit from exploring the efficacy of such efforts.

Limitations and Future Directions

The limitations of this study are important to note. While this experimental study was designed to maximize external validity, it is possible that the manipulation of the independent variable was not strong enough to produce some of the expected effects. Participants in the experimental condition were instructed to view photos of the one similar-aged, female Facebook friend of theirs with whom they engaged in the most photo-related activity recently. The vast majority of participants in the experimental condition reported that they viewed photos from the Facebook page of an actual close friend of theirs. However, while the manipulation check revealed that participants in the experimental group selected “people” as the primary focus and endorsed actually seeing their Facebook friend in most of the photos they viewed, they indicated that their Facebook friend was the primary focus in only a little over one-third of these photos. Perhaps, while their friend was “tagged” and visible in the images they were viewing much of the time, other individuals were present and the primary focus of many of the photos. This may have weakened the potency of the manipulation and introduced error, which may have reduced the ability to detect expected effects on state body image satisfaction and momentary weight-loss desire. Further, although participants were instructed to view 15 photos at a rate of one photo per minute, several deviated from protocol and did not take the entire 15 minutes to complete the Facebook exposure activity. It is possible that this, too, may have introduced error and weakened the manipulation, potentially threatening the internal validity of the study. Previous research suggests that photos that are posted via social media are often carefully selected and altered so as to portray one’s ideal self (Mehdizadeh, 2010); however, the extent to which images viewed in

the experimental condition were in fact idealized was not assessed, which is another limitation of this study. Also, participants' completion of Phase 1 baseline measures, which they were instructed to complete at least four hours prior to their in-laboratory exposure, may have actually sensitized them to the effects of the experimental manipulation and potentially threatened the internal validity of the current study.

At the same time, the results of this study may be limited in the extent to which they generalize to social media use in a natural setting. Participants in the current study were instructed to view photos of one of their own Facebook friends for 15 minutes while answering a pre-determined set of questions. Previous research indicates that viewing photos of friends on Facebook is popular among college women (Junco, 2012; Mabe et al., 2014). Indeed, the majority of the current sample selected looking at photos as the most interesting and most frequently used activity for which they use Facebook compared to other Facebook activities. However, it is possible that the Facebook photo-viewing activity used in the current study may not have represented the range of photo-related activity that college women typically engage in when using social media. Facebook allows users to view images as well as post their own images and engage in reciprocal "dialogue" (i.e., commenting on, "liking," and reacting to images) with other users in response to images on the social media website. Some have suggested that such interactive functions of social media distinguish it from traditional forms of media (Perloff, 2014a). Lee et al. (2013) found that Korean college women exposed to a mock Facebook profile of a peer who was underweight and posted comments indicating a desire to lose weight reported lower body satisfaction than participants exposed to a peer who was overweight and referenced a desire to lose weight. Research also suggests that dialogue which otherwise disparages one's own or others' bodies in a way that endorses the thin ideal (i.e., "fat talk") impacts the effects of

exposure to thin-ideal images. For example, one recent experimental study found that young women who were exposed to their friend expressing fat talk pertaining to images of thin and attractive female celebrities via instant messenger scored higher on correlates of disordered eating, effects that were mediated by the expression of fat talk by participants themselves (Cruwys, Leverington, & Sheldon, 2016). It is possible that exposure to images of friends via social media may be particularly detrimental when combined with “fat talk” exchanges among friends (e.g., I look so gross in this pic. I need to lose weight! You should come to Hot Yoga with me next week. It helped me shrink my belly bulge!). Future research should seek to better understand the impact of exposure to images of friends via social media when combined with such body-disparaging dialogue.

Furthermore, the current study examined the effects of one brief exposure to images of friends via Facebook. While the duration of the experimental manipulation was similar to a typical Facebook session for the current study sample, participants reported that they use Facebook more frequently overall during the day and that they use Facebook nearly every day of the week. This is in line with research that has found that 70% of Facebook users log in to the site daily and 45% of users log in multiple times every day (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). Additionally, nearly all of the participants in the current study reported that they use the Facebook application on their smartphone, potentially increasing access to the website. Further, while nearly all participants reported using Facebook regularly, many reported using other social media websites regularly as well, including Instagram, Twitter, and Pinterest, which is consistent with previous research that has found that approximately half of online adults use multiple social media websites (Duggan et al., 2015). Interestingly, participants in the current study reported that they use Instagram the most among the social media websites, even more

frequently than Facebook. To date, longitudinal studies have found that social media use predicts body image concerns and eating psychopathology over time. However, many of the previous studies have examined the use of specific social media sites (e.g., de Vries et al., 2014, 2016), most often Facebook, or the specific uses of certain social media sites (e.g., Hummel & Smith, 2015; Smith et al., 2013). As social media use becomes more and more integrated into the everyday lives of young women, it is important that future longitudinal research examines the cumulative effects of exposure to potentially idealized images of friends via multiple social media websites over time. Further, as has been suggested by other researchers (Holland & Tiggemann, 2016), future research may benefit from further investigating the impacts of more imagery-focused social media platforms, including Instagram, for which one recent study found that young women who were briefly exposed to pre-selected fitspiration images experienced higher body dissatisfaction and lower appearance self-esteem (Tiggemann & Zaccardo, 2015).

Another potential limitation of this study was that it did not assess the mechanism by which exposure to images of friends via social media impacts state body image satisfaction and momentary desires to lose weight. In other words, the findings of the current study suggest that women who endorse the thin ideal experience higher momentary risk for eating psychopathology after viewing photos of friends via Facebook, though it is unclear why they experienced these negative outcomes. Findings from previous research suggest that state appearance comparison may mediate the relationship between exposure to images of peers via social media and negative body-related outcomes (Fardouly et al., 2015b, Fardouly & Vartanian, 2015, Kim & Chock, 2015, Tiggemann & Miller, 2010, Tiggemann & Zaccardo, 2015), though it is possible that other mechanisms, such as activation of self-discrepancies related to weight and body size (Dittmar et

al., 2009), may be responsible for the effects that were found among women with high thin-ideal internalization.

Finally, it is unclear the extent to which the findings from this study would generalize to other groups of social media users. The current study included primarily young, unmarried Caucasian women attending a Midwestern university. However, research suggests that social media use is related to body image concerns among pre-adolescent and adolescent girls (Tiggemann & Slater, 2013, 2014), young women with other racial and cultural identities (Lee et al., 2013), and boys and young men (de Vries et al., 2014, 2016; Haferkamp & Krämer, 2011). Further, as has been suggested by others (Holland & Tiggemann, 2016), research is needed to investigate the body image-related outcomes resulting from social media for middle-aged and older adults, who represent a growing group of social media users (Madden, 2010). Future research may benefit from investigating the impact of exposure to social media-based images of friends on risk for eating psychopathology among these groups.

Conclusions

The findings from this study are important in that they suggest that brief exposure to images of friends via Facebook may be detrimental for a subset of college women who want to be very thin, though it may not negatively impact body image satisfaction and desire to engage in extreme weight-loss behaviors for all women. Future research should examine the potential efficacy of media literacy and thin-ideal dissonance-based programs in mitigating the negative impact of exposure to potentially idealized images of friends via social media for women who are most at risk. Further, future research is needed to better understand the impact of exposure to images of friends via social media when combined with “fat talk” and other body-disparaging

dialogue as well as the cumulative effects of exposure to images of friends via multiple social media platforms over time.

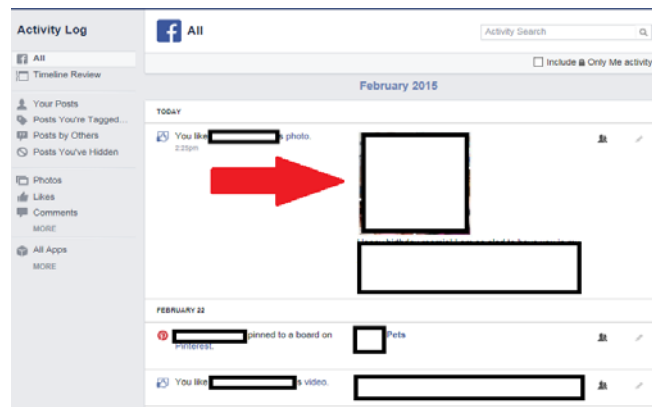
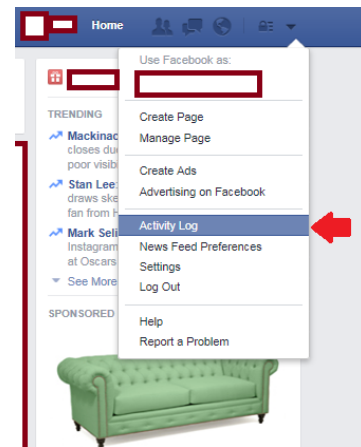
APPENDIX

Appendix A Facebook Activity Exercise

We are interested in your recent activity involving photos of Facebook “friends” who are (1) female and (2) in your age range. For the purposes of this study, Facebook “friend” means **any** individual with whom you are linked as a “friend” on Facebook. Later, we’ll ask you to do an activity and/or answer questions about the “friend” with whom you engage in the most photo-related Facebook Activity. We will be asking you to write down the initials of friends in this activity to cue your memory for these later tasks.

Instructions for Participants:

- 1.) Log in to your Facebook account with your username and password.
- 2.) Click on the downward-facing arrow icon that is located on the right corner of the dark blue bar at the top of your screen. Then, select “Activity Log.” See screenshot to the right→
- 3.) Use your “Activity Log” to identify the most recent time you engaged in **ANY activity that involved photos** where you can actually see a Facebook “friend” in the photo who is *female and in your age range*. Such activities include liking, commenting on, or posting a photo and updating a cover photo or profile picture. See screenshot below.



- 4.) Using the chart below, record the first and last initials of the Facebook “friend” you can see in the photo in the left column under “Name” and a tally mark in the right column under “Photo Activity”.

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