

# Unique associations of social media use and online appearance preoccupation with depression, anxiety, and appearance rejection sensitivity



Tanya Hawes\*, Melanie J. Zimmer-Gembeck, Shawna M. Campbell

Griffith University, School of Applied Psychology, Gold Coast, Australia

## ARTICLE INFO

### Article history:

Received 3 August 2019

Received in revised form 15 February 2020

Accepted 19 February 2020

### Keywords:

Rejection sensitivity

Body image

Social media

Depression

Anxiety

## ABSTRACT

Social media (SM) can create a climate of social comparison and preoccupation with appearance, which can pose risks for emotional problems, such as depression and social anxiety. In this study, 763 adolescents and young adults reported time spent and intensity of social media use and preoccupation with both general and appearance-related (AR) social media activities and content. Associations were investigated with markers of depression and social anxiety symptoms and appearance sensitivities – appearance anxiety and appearance rejection sensitivity (appearance-RS). Social media use was positively associated with symptoms of depression, social anxiety, appearance anxiety, and appearance-RS. General and AR preoccupation had unique and positive associations with depression and social anxiety symptoms and with appearance sensitivities. AR preoccupation was also found to strengthen the relationship between time spent on social media and appearance-RS. Although there were gender differences on all measures, with young women scoring higher on all measures, there was no evidence that gender moderated the effects of AR social media preoccupation. Findings support emerging evidence that social media engagement and behavior, particularly activities involving appearance comparisons and judgements, may be more of a risk to depression and social anxiety symptoms and appearance sensitivities than simply the frequency of social media use.

© 2020 Elsevier Ltd. All rights reserved.

## 1. Introduction

Social media has become a universal platform for social interaction for adolescents and young adults (usually defined as age 10–25 years). Young social media users often post photos and videos to promote their lived experiences, but also to draw attention to their appearance, exposing them to feedback from others (Manago, Graham, Greenfield, & Salimkhan, 2008). The interactive nature of social media enables users to publicly comment on each other's appearance as well as their own appearance, creating a complex system of body image and appearance socialisation. Many studies have discovered that these online interactions may contribute to unrealistic appearance goals and negative self-evaluations, which may trigger sensitive feelings, lower mood and become a source of stress (see Holland & Tiggemann, 2016; Fardouly & Vartanian, 2015; Mills, Musto, Williams, & Tiggemann, 2018; Nesi & Prinstein,

2015). Given this photo- and video-based social interaction, social media use is likely to involve judgement and social comparison processes (Manago et al., 2008; Tiggemann & McGill, 2004). In particular, general social media use has been found to be important to consider as a risk factor for general emotional maladjustment, such as depression and social anxiety symptoms (Richards, Caldwell, & Go, 2015; Shensa, Sidani, Dew, Escobar-Viera, & Primack, 2018). In contrast, it may be appearance-based social media experiences that are more strongly associated with heightened symptoms of maladjustment related to appearance (Lonergan et al., 2019; Mills et al., 2018) such as appearance anxiety or sensitivity to rejection based on appearance (Appearance-RS; Webb et al., 2017).

### 1.1. Social media use and social comparison

A large proportion of youth are regular consumers of social media, with 67 % percent of 12–13-year-olds, 85 % of 14–15-year-olds, and 92 % of 16–17-year-olds in Australia reporting use (Australian Media Communication Authority, 2013). Usage has been found to increase steadily over the teenage years, where almost all (99 %) of 18–25-year-olds report being social media

\* Corresponding author at: School of Applied Psychology, Griffith University, Parklands Dr, G40.7.86, Southport, QLD 4222, Australia.

E-mail address: [t.hawes@griffith.edu.au](mailto:t.hawes@griffith.edu.au) (T. Hawes).

consumers (Sensis, 2017). Similar trends exist in the United States (Pew Research Center, 2016). Unlike traditional mediums like television and magazines, social media platforms such as Facebook, YouTube, Instagram, Twitter, and Snapchat enable users to be both information sources and receivers, making them active participants within interactive formats (Miller, 2011; Perloff, 2014). In addition to interacting with family and friends, keeping up with entertainment, news and current affairs and watching videos, increasingly, social media is used for sharing photos and videos (Haferkamp, Eimler, Papadakis, & Kruck, 2012; Sensis, 2017). This highly intimate feature exposes young people to visual representations of celebrities, friends, peers, and even strangers that are cultivated by social and cultural appearance stereotypes and provides increased opportunities to evaluate themselves against these representations of others (Saunders & Eaton, 2018). Such sharing implies that social comparison will occur. Thus, social comparison theory (Festinger, 1954; Suls & Wheeler, 2000) can be helpful for understanding why social media use may impact emotional adjustment.

In social comparison theory, the assertion is made that individuals have the drive and tendency to evaluate their own social and personal worth based on how they compare themselves to others on dimensions such as financial and career success, intelligence, physical appearance, and eating habits and particularly in comparison to their peers (Wheeler & Miyake, 1992). Social media provides a highly visual, readily-available platform in which this type of social comparison can occur (Manago et al., 2008; Tiggemann & McGill, 2004). Further, online images and posts are often enhanced and altered to reflect an idealized body image (Harrison & Hefner, 2014; Manago et al., 2008). Consequently, comparisons to others on social media often take place in the absence of tangible and authentic criteria for judgment, and individuals may have biased perceptions of themselves and others (Fardouly, Pinkus, & Vartanian, 2017; Kim & Chock, 2015; Manago et al., 2008). Hence, young people may compare themselves to images that are curated and idealistic, which may prompt unrealistic expectations of themselves and in turn produce stress, appearance dissatisfaction, sensitivity to appearance feedback and judgements, negative self-esteem and low mood when these expectations are unable to be met (Anixiadis, Wertheim, Rodgers, & Caruana, 2019; Fardouly & Rapee, 2019; Saunders & Eaton, 2018; Tiggemann & Zinoviev, 2019). All of these repeated interactions and triggered beliefs and concerns could elevate the risk of general mental health problems, such as depression or social anxiety, or appearance-related problems, such as appearance anxiety or appearance-RS.

### 1.2. Appearance anxiety and appearance-RS: links with social media use

Researchers have described positive associations between appearance-based experiences with social media and body image or weight concerns, as well as eating problems (e.g., Doğan & Çolak, 2016; Lonergan et al., 2019; Mills et al., 2018; Tiggemann & Miller, 2010; Tiggemann & Slater, 2013). Unexpectedly, however, we could locate no research that specifically focused on the influence of social media use and consumption practices on appearance anxiety and appearance-RS. Such research is needed, given that appearance anxiety and appearance-RS are two important aspects of appearance-related socioemotional maladjustment that are known to cause significant interpersonal and psychological distress (Lavell, Zimmer-Gembeck, Farrell, & Webb, 2014; Mastro, Zimmer-Gembeck, Webb, Farrell, & Waters, 2015). More specifically, appearance anxiety and appearance-RS are of interest given that research indicates that they increase during adolescence, they affect social functioning, and they are associated with more symptoms of depression and social anxiety (Webb & Zimmer-Gembeck, 2016; Zimmer-Gembeck, Webb, Farrell, & Waters, 2018).

Appearance anxiety includes thoughts (e.g., excessive worrying) and behaviours (e.g., appearance checking and camouflaging) in relation to appearance that can interfere with daily life (Zimmer-Gembeck et al., 2018). Appearance anxiety can be a subclinical indicator of Body Dysphoric Disorder (BDD: Veale, Kinderman, Riley, & Lambrou, 2003), an intrusive psychological condition characterised by the preoccupation with an actual defect or perceived flaw in appearance and where recurring behaviours such as checking, grooming and comparisons to others are performed in response to these concerns (American Psychiatric Association, 2013). The prevalence of BDD is known to be between 1.7 % and 2.3 % in adolescents (Mayville, Katz, Gipson, & Cabral, 1999; Rief, Buhlmann, Wilhelm, Borkenhagen, & Brahler, 2006; Schneider, Mond, Turner, & Hudson, 2017) with an average age of onset at 16 years-of age (Bjornsson, Didie, & Phillips, 2010; Schneider et al., 2017).

Appearance-RS is the tendency to overestimate the possibility of, anxiously expect, readily perceive, and overreact to interpersonal rejection making the attribution that rejection is due to aspects of one's physical appearance (Park, 2007; Park & Pinkus, 2009). Adolescents and young adults are likely to be more sensitive to acceptance and rejection, spend more time thinking about their peer status and how others perceive them, and are often acutely aware of evaluation by others (Sebastian, Burnett, & Blakemore, 2008), making them emotionally and psychologically vulnerable to real and ambiguous appearance feedback on social media. Park, DiRaddo, and Calogero (2009) reported that conditional acceptance about appearance from peers predicted appearance-RS in women, while internalised media ideals predicted appearance-RS for both women and men ( $M_{age} = 19.30$ ). Similarly, Webb et al. (2017) identified that adolescents of both genders who reported more acceptance of media appearance ideals and pressure from peers to be attractive reported more appearance-RS.

Previous research has found that social media use is associated with body dissatisfaction and body image concerns in young people (see Melioli, Rodgers, Rodrigues, & Chabrol, 2015). For example, adolescents, especially girls, who more frequently use social media have reported more dissatisfaction with their bodies (Fardouly & Vartanian, 2015; Tiggemann & Miller, 2010; Tiggemann & Slater, 2013); a pattern that was also represented in a meta-analysis by Holland and Tiggemann (2016). Facebook users, in particular, have reported more body image concerns than non-users, and more time spent on Facebook has been associated with greater body image concerns (Fardouly & Vartanian, 2015; Meier & Gray, 2014; Tiggemann & Slater, 2013, 2014). In addition, and consistent with social comparison theory, in an experimental study, young adults reported a more negative body image of themselves after looking at social media profile pictures of 'attractive' users when compared to participants who were shown less attractive profile pictures (Haferkamp & Krämer, 2011). Yet, despite such findings pointing to the importance of social media for body dissatisfaction, no previous study can be located that has tested associations of social media use, either general use or appearance-related use, with appearance anxiety and appearance-RS. Such a study is needed because appearance anxiety and appearance-RS place the focus on more than just how social media impacts on personal views of the body by more directly assessing behaviors associated with appearance-concerns that can restrict daily life and interfere with positive interactions with others.

### 1.3. Multiple measures of social media use: unique effects and interactions

Notably, social media use has not consistently been associated with adolescent or young adult emotional maladjustment. Social media use has been found to be a risk, but also a benefit, for emotional health (e.g., Lampe, Ellison, & Steinfield, 2006; Lin et al.,

2016; Malinen, 2015; Vannucci, Flannery, & Ohannessian, 2016). In a systematic review (Seabrook, Kern, & Rickard, 2016), 8 of 30 included studies found direct positive associations between frequency and time spent on social media and depression, and 3 of 30 studies found direct positive associations between frequency and time spent on social media and anxiety, including social anxiety. When mediators of these relationships were considered, the frequency of social comparison emerged as a significant risk factor for depression and anxiety (see Feinstein et al., 2013; Lup, Trub, & Rosenthal, 2015; Steers, Wickham, & Acitelli, 2014). Moreover, other factors were identified that mediate or moderate the association of social media use with emotional maladjustment, including poorer friendship quality (Selfhout, Branje, Delsing, ter Bogt, & Meeus, 2009), rumination (Feinstein et al., 2013); low self-esteem (Bosacki, Dane, Marini, & YLC-CURA, 2007), self-regulation and social media use expectations (Wegmann, Stodt, & Brand, 2015). In studies that have found protective benefits of social media use for emotional adjustment, it seems that benefits were linked to perceived increased access to expanded social resources and networks (Donath & Boyd, 2004; Ellison, Steinfield, & Lampe, 2007), access to social support (Ibarra-Rovillard & Kuiper, 2011; Lee, Noh, & Koo, 2013), or enhanced companionship and decreased loneliness (Bargh & McKenna, 2004; Ferguson, Winegard, & Winegard, 2011).

Drawing this research together, the findings suggest that a measure of frequency of social media use may not be precise enough to identify when media use is a risk for emotional maladjustment. As such, it is becoming more recognized that there is a need to study more than just frequency of social media use, such as the emotional connectedness youth feel towards using social media and more specific details on social media engagement habits that may be maladaptive (e.g., Shensa et al., 2018). Of relevance in the current study, exposure to a peer culture that more frequently presents idealized images online may prompt social media activities such as preoccupation with viewing, judging, and comparing appearance (Appel, Crusius, & Gerlach, 2015; Modica, 2019; Tandoc, Ferrucci, & Duffy, 2015). Such behavior on social media may be more directly relevant to depression and social anxiety symptoms and appearance sensitivity than general social media use or even general preoccupation with social media. However, no previous research has examined whether appearance-related (AR) social media preoccupation has a unique role in predicting appearance concerns, specifically appearance anxiety and appearance-RS, even after considering amount of use and general maladaptive use of social media. We expected that AR social media preoccupation would exacerbate the negative effect of the time spent on social media, for appearance-RS and appearance anxiety. Therefore, in the present study we tested the unique associations of AR social media preoccupation with depression, social anxiety, appearance-RS and appearance anxiety, but also extended this to consider interactions between AR social media preoccupation and frequency/intensity of social media use in the models of appearance-RS and appearance anxiety.

#### 1.4. Gender moderation

There are many differences between young women and men in appearance-related concerns. In particular, adolescent girls, relative to boys, report more appearance anxiety symptoms and increase in anxiety over the teenage years more so than boys (Rief et al., 2006; Zimmer-Gembeck et al., 2018). Girls, relative to boys, also report more appearance-RS (Bowker, Thomas, Spencer, & Park, 2013), and more body dissatisfaction (Thompson & Loughheed, 2012; Vincent & McCabe, 2000). Further, there are also parallel differences in emotional maladjustment with adolescent girls and young women reporting more social anxiety symptoms (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Rose & Rudolph, 2006)

and depressive symptoms (Dyer & Wade, 2012) than their male peers.

Beyond the above gender differences, some models of appearance concerns, which identify the significant role of the media, tend to focus primarily on girls and women (e.g., Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Tiggemann & Miller, 2010). This focus is likely motivated by the fact that images of thin, fit, and beautiful women are so prominent in all media (Holland & Tiggemann, 2016). Additionally, and despite some findings that photo-based social media use is related to body dissatisfaction in both men and women (see Lonergan et al., 2019), many studies have shown that women's appearance-related concerns and dissatisfaction may be most influenced by media use, when considered relative to other potential environmental influences (see Holland & Tiggemann, 2016 for a review). Although previous studies have examined gender as a moderator of the impact of media use on depression and social anxiety symptoms and appearance sensitivities, such focus on girls and women suggests that gender moderation deserves additional attention, despite the evidence from a few past studies that have shown mixed evidence with most pointing to a lack of gender moderation (Holland & Tiggemann, 2016).

#### 1.5. The current study

The current study was designed to extend on previous findings about associations between social media use and emotional maladjustment, with a special focus on associations between appearance-related social media use and symptoms of appearance anxiety and appearance-RS – connections that are warranted by an emphasis on appearance activity on social media. This is important considering the personal and interpersonal distress associated with symptoms of appearance-RS and appearance anxiety.

The current study had three aims, and two hypotheses. The first aim was to test the notion that AR social media preoccupation would be uniquely associated with more elevated symptoms of depression and social anxiety (Hypothesis 1a) and greater appearance-related sensitivity measured by appearance anxiety and appearance-RS (Hypothesis 1b), even after considering frequency and intensity of social media use and general maladaptive social media use. The second aim was to test the hypotheses that AR social media preoccupation use moderates and intensifies the positive associations of frequency and intensity of social media use with appearance anxiety and appearance-RS (Hypothesis 2). Previous body image research has not revealed consistent differences by gender (see Holland & Tiggemann, 2016), however, young women have reported more appearance anxiety, appearance-RS, social anxiety and depression than young men. Therefore, the third study aim was to explore whether associations of AR social media preoccupation with depression and social anxiety symptoms and appearance sensitivities are stronger in young women or in young men.

## 2. Method

### 2.1. Participants

Participants were 763 adolescents and young adults ( $M = 17.7$  years,  $SD = 1.8$  years; 41 % male) drawn from three high schools ( $n = 279$ ) and one large urban university ( $n = 484$ ). High school participants were in Grades 9–11 in an urban area of Australia. High school participants ranged from 12 to 17 years ( $M = 15.8$ ,  $SD = 1.0$ , 48 % male). University student participants ranged from 16 to 25 years ( $M = 18.9$ ,  $SD = 0.9$ , 36 % male, with 2 participants just under age 16). High school students reported their sociocultural background,

with 80 % Caucasian/White Australians, and others identifying as Asian Australian (15 %), Australian first peoples / Torres Strait Islander/Pacific Islander (<1%), or a mix of other backgrounds (5%). To capture information from university students, participants were allowed to endorse as many options as applied, with most (84 %) of the participants endorsing white Australian, 12 % instead or in addition endorsing Asian, 3% endorsing Australian first peoples / Torres Strait Islander/Pacific Islander, and 9% describing a diverse range of other backgrounds. The total number of high school and university students who attempted the survey was 790; however, 4 were missing gender and were excluded and the other 23 surveys were incomplete (missing > 40 % of items and demographic information) and therefore were excluded from the current study.

## 2.2. Procedure

Approval for this study was obtained from the Griffith University Human Research Ethics Committee. In an earlier study (not focused on social media), students in Grades 5–10 were recruited from three Australian schools. The students in this previous study represented 42 % of the students from the three schools. In this study, parents had provided consent for recontact regarding participation in future research. We recontacted the parents and students to invite them to participate in the present study, and 279 parents (79 %) consented to their children's participation and the children also agreed. Students who returned parent consent forms (either agreeing or declining participation) were included in a draw to win five \$100 gift vouchers to a store of their choice. Students from two schools completed the 45-minute survey either by mail or online. One school opted to have surveys completed during school time under research assistant supervision. Each participant also received a \$20 gift card.

The other 484 participants were recruited on a university campus during orientation week and the first week of classes and completed a paper survey under the supervision of a research assistant. Participants were also recruited through the first-year psychology research participation program and supplied with a link to complete the survey online. Participants who completed the paper-and-pencil survey on campus received a chocolate bar or muffin, whereas those recruited through the research participation program received course credit (0.5 % course credit).

Given that participants were drawn from both high school and university settings, groups were compared on all measures (see Table 1). University students were higher on all study variables compared to high school students ( $t$ s ranged from 2.14 to 2.84,  $p$ s ranged from .032 to .000), with the exception of depressive symptoms. Age also differed between groups,  $t(1,761) = 4.46$ ,  $p < .01$ , given that in-person participants were more likely university students. Similarly, age was positively associated with all measures, with the exception of depressive symptoms (see Table 1). Responses from individuals who participated online were compared to those who

participated via telephone or in the classroom. Individuals who completed online surveys were significantly higher in AR social media preoccupation,  $t(1,761) = -2.19$ ,  $p < .01$ , maladaptive social media use,  $t(1,761) = -2.17$ ,  $p < .01$ , appearance anxiety,  $t(1,761) = -2.00$ ,  $p < .05$ , and Appearance-RS,  $t(1,761) = -2.10$ ,  $p < .05$ . No other significant group differences were found. To address the differences found, age and survey format (0 = online, 1 = paper) were included as covariates in all multivariate analyses.

## 2.3. Measures

### 2.3.1. Appearance-related (AR) social media preoccupation

Five items were used to measure AR social media preoccupation (see Appendix). Items were based on reviewing literature on social media measures and drawn as much as possible from existing measures related to social comparison and body image. Items were designed to measure the degree that participants' endorsed negative preoccupation with appearance and comparison on social media. Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Items formed a 1-factor solution (eigenvalue = 3.86, variance 77.2 %) and factor loadings (using principal axis factoring) ranged from .83 to .87 (see Appendix for the items and factor loadings). A total score was calculated by averaging the items, Cronbach's  $\alpha = .93$ .

### 2.3.2. Time spent on social media

Two items asked participants how much time they spent on social media per weekend day and per weekday and response options ranged from 1 (*less than 30 min*) to 5 (*more than 3 h*). Prior to completing items about social media use, participants read the following: "Social media includes all the websites and applications that you use to create and share content with others or to participate in social networking such as Facebook, Instagram, Snapchat, Twitter, Tumblr or Periscope." Given that reported weekday and weekend use were highly correlated ( $r = .78$ ,  $p < .001$ ), an average score was created and used in all analyses (Table 2).

### 2.3.3. Intensity of social media use

In addition to measuring the frequency of social media use, a scale to measure the emotional connectedness towards social media use was also deemed appropriate. There is some question about the accuracy of self-reported and retrospective estimates of frequency of use (Sigerson & Cheng, 2018) and studies are increasingly showing individual differences in attitudes towards social media use. Thus, three items from the Facebook Intensity Scale (FBI; Ellison et al., 2007) were modified slightly to measure emotional connectedness and the integration of social media use (rather than only Facebook) in daily life (e.g., "Using social media is part of my everyday activity"). Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*) and items were averaged to form an intensity score, Cronbach's  $\alpha = .86$ .

**Table 1**

Means, Standard Deviations, and Results of  $t$ -tests Comparing High School Students ( $n = 279$ ) to University Students ( $n = 484$ ) and Associations with Age ( $n = 763$ ).

Variable	All Participants $M$ ( $SD$ )	High School $M$ ( $SD$ )	University $M$ ( $SD$ )	$t$ (1, 761)	$p$	Cohen's $d$	Age ( $r$ )
Depression	1.99 (0.96)	1.97 (1.01)	1.99 (0.93)	0.30	.762	0.02	.05
Social Anxiety	2.60 (0.93)	2.47 (0.90)	2.68 (0.95)	2.95	.004	0.23	.10**
Appearance Anxiety	25.07 (8.07)	23.64 (7.79)	25.90 (8.16)	3.81	< .001	0.28	.13**
Appearance RS	11.43 (7.94)	10.52 (7.44)	11.96 (8.21)	2.48	.013	0.18	.09**
AR Preoccupation	3.08 (1.75)	2.82 (1.64)	3.23 (1.80)	3.11	.002	0.24	.11**
SM time spent	3.30 (1.26)	3.02(1.22)	3.47 (1.26)	4.84	< .001	0.36	.14**
SM intensity	3.53 (1.10)	3.41 (1.13)	3.59 (1.07)	2.14	.032	0.16	.10**
Gen Preoccupation	2.60 (1.13)	2.40 (1.06)	2.71 (1.16)	3.75	< .001	0.28	.14**

\* $p < .05$ , \*\* $p < .01$ .

Note. RS = rejection sensitivity. AR preoccupation = appearance related social media preoccupation. SM = social media. Gen Preoccupation = general social media preoccupation.



**Table 2**  
Means, Standard Deviations, and Results of *t*-tests Comparing Young Men (*n* = 311) to Young Women (*n* = 452).

Variable	Male <i>M</i> ( <i>SD</i> )	Female <i>M</i> ( <i>SD</i> )	<i>t</i> (1, 761)	<i>p</i>	Cohen's <i>d</i>
Depression	1.88 (0.91)	2.06 (0.98)	−2.55	.009	0.19
Social Anxiety	2.39 (0.85)	2.75 (0.96)	−5.45	< .001	0.40
Appearance Anxiety	22.63 (7.23)	26.76 (8.13)	−7.30	< .001	0.54
Appearance RS	9.02 (6.71)	13.09 (8.30)	−7.46	< .001	0.54
AR Preoccupation	2.37 (1.47)	3.57 (1.43)	−10.23	< .001	0.83
SM time spent	2.97 (1.08)	3.54 (1.18)	−6.07	< .001	0.50
SM intensity	3.17 (1.10)	3.77 (1.00)	−7.62	< .001	0.57
Gen Preoccupation	2.32 (1.10)	2.80 (1.11)	−5.89	< .001	0.43

Note. RS = rejection sensitivity. AR preoccupation = appearance related social media preoccupation. SM = social media. Gen Preoccupation = general social media preoccupation.

### 2.3.4. Maladaptive social media use

Seven items, from the Maladaptive Facebook Scale (MFS; Smith, Hames, & Joiner, 2013), were used to measure maladaptive social media use (e.g., “When I update my social media status, I expect others to comment on it”). Participants rated the items from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were averaged so that a higher score indicated more maladaptive use of social media, Cronbach's  $\alpha = .83$ .

### 2.3.5. Social anxiety symptoms

Social anxiety symptoms were assessed using the Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998). Eighteen descriptive items (e.g., “I worry about doing something new in front of others”) were rated on a 5-point scale from 1 (*not true*) to 5 (*very true*). Items were averaged so that higher scores indicated an endorsement of more social anxiety symptoms, Cronbach's  $\alpha = .95$ .

### 2.3.6. Depression symptoms

Depression symptoms were assessed using the Mood and Feelings Questionnaire – Short Version (MFQ; Angold & Costello, 1987). Participants responded to a series of 13 descriptive phrases about emotional states and behaviours in the previous 2-week period (e.g., “I felt miserable or unhappy”; “I cried a lot”). Responses options ranged from 1 (*not true*) to 5 (*very true*). Items were averaged, with higher scores indicating more depressive symptoms, Cronbach's  $\alpha = .94$ .

### 2.3.7. Appearance anxiety symptoms

The Appearance Anxiety Inventory (AAI; Veale et al., 2014) was used to measure symptoms of appearance anxiety. The AAI is a 10-item scale (e.g., “I try to camouflage or alter aspects of my appearance”). Participants indicated on a 5-point scale the frequency with which they experienced symptoms 0 (*Never*) to 4 (*Always or almost always*). The total score was formed by averaging the items, Cronbach's  $\alpha = .89$ .

### 2.3.8. Appearance rejection sensitivity (*appearance-RS*)

Participants were presented with 10 hypothetical scenarios in which they might anxiously expect to be rejected based on appearance from an appearance-RS scale modified for use with children and adolescents (Webb & Zimmer-Gembeck, 2015; Webb et al., 2017) (e.g., “You are leaving your house to go to school/university when you notice a big pimple on your face” was changed from “You are leaving your house to go on a first date when you notice a blemish on your face”). Participants indicated their concern/anxiety about being rejected based on appearance (e.g., “How concerned or anxious would you feel that others would think you were less attractive because of the way you look?”) on a scale from 1 (*not concerned or anxious*) to 6 (*very concerned*). Their expectation of appearance-based rejection was also measured (e.g., “Do you think that other people would find you unattractive?”) on a scale from 1 (*No*) to 6 (*Yes*). Appearance-RS was calculated by multiplying the

degree of anxious concern with the degree of rejection expectation in each scenario before computing an average of the items. Items were averaged, so that a higher appearance-RS score indicated greater sensitivity to perceive rejection due to appearance concerns, Cronbach's  $\alpha = .92$ .

## 2.4. Overview of the statistical analysis

Data were examined for outliers and the distributions of variables were investigated. There were no significant outliers. The measures of social anxiety and depressive symptoms were positively skewed and, in an attempt to normalize these distributions, square root and  $\text{Log}_{10}$  transformations were applied. Transforming made little difference to the distributions and correlations with other variables; thus, the untransformed variables were used in the analyses. Missing values were investigated. There were no variables with 5% or more missing values, however, Little's MCAR statistic was significant ( $p < .001$ ) and consequently Multiple Imputation was used to impute missing data. Pooled results are reported.

After examining descriptive statistics, independent sample *t*-tests were used to investigate differences between young men and women. Pearson correlations and regression analyses were used to test all hypotheses with hierarchical moderation analyses employed to test Hypotheses 2a and explore other moderation effects. Moderation was conducted the SPSS macro, PROCESS (Hayes, 2013). For these analyses age, survey format (online or paper), time spent on social media, intensity of social media use and general social media use were covariates.

## 3. Results

### 3.1. Descriptive statistics and differences by participant gender

Means and standard deviations of all measures for all participants and results of *t*-tests comparing young men and women on all measures are reported in Table 1. There were gender differences in AR social media preoccupation and maladaptive social media use, with girls reporting more preoccupation and maladaptive use than young men. In addition, young men and women differed on all other measures. Young women, relative to men, reported more social media use and intensity of use, more symptoms of depression and social anxiety, and more appearance anxiety and appearance-RS.

### 3.2. Correlations between all measures by participant gender

As shown in Table 3, correlations between all measures were calculated by analyzing data for young men and women separately. Time spent on social media, intensity of social media use, maladaptive social media use, and AR social media preoccupation were significantly associated with more depression symptoms in both genders. Measures of social media use were also associated with social anxiety symptoms, but in young women only. Associations

**Table 3**  
Bivariate Correlations for Young Men (n = 311) and Young Women (n = 452).

Variable	1	2	3	4	5	6	7	8
1 Depression	–	.53**	.53**	.52**	.47**	.16**	.16**	.36**
2 Social Anxiety	.62**	–	.66**	.67**	.56**	.18**	.20**	.47**
3 Appearance Anxiety	.57**	.52**	–	.75**	.67**	.23**	.30**	.51**
4 Appearance RS	.55**	.60**	.63**	–	.70**	.26**	.29**	.52**
5 AR Preoccupation	.55**	.49**	.63**	.66**	–	.21**	.32**	.64**
6 SM time spent	.16**	.03	.29**	.20**	.25**	–	.61**	.21**
7 SM intensity	.11*	.06	.27**	.18**	.26**	.68**	–	.35**
8 Gen Preoccupation	.41**	.38**	.43**	.43**	.58**	.39**	.43**	–

\*p < .05, \*\*p < .01. Note. RS = rejection sensitivity. AR preoccupation = appearance related social media preoccupation. SM = social media. Gen Preoccupation = general social media preoccupation. Correlations for young women appear above the diagonal. Correlations for young men appear below the diagonal.

of maladaptive social media use and AR social media preoccupation with depression and social anxiety symptoms, and with appearance sensitivities were significant for both young men and women.

To identify significant differences in the correlations for men and for women, we used the Fisher *r*-to-*z* transformation (e.g., see <http://vassarstats.net/rdiff.html>). Three correlations differed. The first two differences were for the association between time spent on social media and social anxiety and the association between social anxiety and appearance anxiety; both were stronger among young women than young men ( $z = -2.07, p = .04$  and  $z = -3.03, p = .003$ , respectively). The third difference was the correlation between time spent on social media and maladaptive social media use, which was stronger among young men than women ( $z = -2.63, p = .001$ ).

**3.3. Associations of social media use with emotional maladjustment**

When age, gender, and survey format were controlled, 16 % of the variance in depression symptoms and 22 % of the variance in social anxiety symptoms was accounted for by the combination of time spent on social media, intensity of social media use, and maladaptive social media use. Time spent on social media was significantly associated with depression symptoms ( $\beta = .09, p < .05$ ), as was maladaptive social media use ( $\beta = .39, p < .01$ ) however, intensity of social media use was not. Maladaptive social media use was significantly associated with social anxiety symptoms ( $\beta = .44, p < .01$ ); however, time spent on social media and intensity of social

media use were not. When AR social media preoccupation was added to the models, they accounted for an additional 11 % of variance in depression symptoms and additional 11 % of variance in social anxiety symptoms. In support of Hypothesis 1a, AR social media appearance preoccupation was uniquely and significantly associated with depression symptoms ( $\beta = .45, p < .01$ ) and social anxiety symptoms ( $\beta = .45, p < .01$ ), as shown in Table 4.

**3.4. Associations of social media use with appearance sensitivities**

When age, gender, and survey format were controlled, 30 % of the variance in appearance anxiety and 29 % of the variance in appearance-RS were accounted for by the combination of time spent on social media, intensity of social media use, and maladaptive social media use. Maladaptive social media use was significantly associated with appearance anxiety ( $\beta = .42, p < .01$ ); however, time spent on social media and intensity of social media use were not. Time spent on social media ( $\beta = .09, p < .05$ ) and maladaptive social media use ( $\beta = .45, p < .01$ ) were significantly associated with appearance-RS; however, intensity of social media use was not. When AR social media preoccupation was added to the models, they accounted for an additional 19 % of variance in appearance anxiety and additional 23 % of variance in appearance-RS. In support of Hypothesis 1b, AR social media preoccupation was uniquely and significantly associated with appearance anxiety ( $\beta = .58, p < .01$ ) and appearance-RS ( $\beta = .64, p < .01$ ), as shown in Table 4.

**Table 4**  
Results of Regressing Depression Symptoms, Social Anxiety Symptoms, Appearance Anxiety and Appearance-RS on measures of General and Appearance-related Social Media use (N = 763).

Measure	Depression Symptoms		Social Anxiety Symptoms		Appearance Anxiety		Appearance-RS	
	B (SE B)	β	B (SE B)	β	B (SE B)	β	B (SE B)	β
<b>Step 1</b>								
Age	–0.01 (0.02)	–.02	0.02 (0.02)	.03	0.13 (0.18)	.03	0.02 (0.17)	.01
Gender	0.02 (0.07)	.01	0.20 (0.06)	.11**	2.04 (0.52)	.12**	2.18 (0.52)	.14**
Survey format	0.02 (0.10)	.01	0.20 (0.10)	.01	0.61 (0.80)	.03	0.14 (0.79)	.01
SM time spent	0.07 (0.03)	.09*	0.01 (0.03)	.01	0.47 (0.27)	.07	0.60 (0.26)	.09*
SM Intensity	–0.06 (0.04)	–.06	–0.03 (0.04)	.04	0.52 (0.32)	.07	0.06 (0.31)	.01
Gen Preoccupation	0.33 (0.03)	.39**	0.37 (0.03)	.44**	3.02 (0.24)	.42**	3.14 (0.24)	.45**
<b>Step 2</b>								
Age	–0.01 (0.02)	–.02	0.01 (0.02)	.03	0.14 (0.15)	.03	0.03 (0.14)	.01
Gender	–0.16 (0.06)	–.08*	0.03 (0.06)	.01	0.11 (0.47)	.01	0.08 (0.44)	.01
Survey format	0.01 (0.10)	.00	–0.01 (0.09)	–.01	0.35 (0.68)	.02	–0.13 (0.65)	–.01
SM time spent	0.06 (0.03)	.08*	0.00 (0.03)	.00	0.42 (0.23)	.07	0.54 (0.22)	.09*
SM intensity	–0.08 (0.04)	–.09*	–0.05 (0.04)	–.06	0.28 (0.27)	.04	–0.21 (0.26)	–.03
Gen Preoccupation	0.11 (0.04)	.14**	0.15 (0.03)	.19**	0.65 (0.25)	.09**	0.57 (0.24)	.08*
AR Preoccupation	0.25 (0.02)	.45**	0.24 (0.02)	.45**	2.70 (0.16)	.58**	2.93 (0.16)	.64**

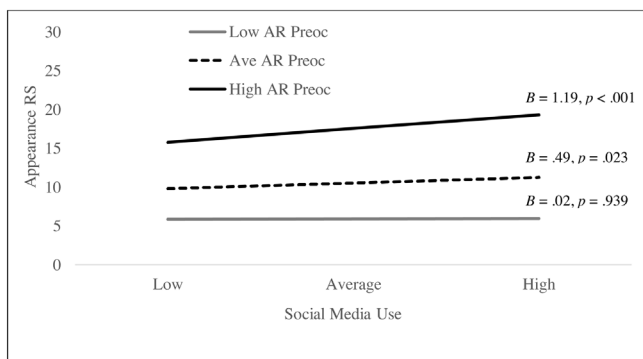
\*p < .05, \*\*p < .01. Note. SM = social media; Gen Preoccupation = general social media preoccupation; AR preoccupation = appearance related social media preoccupation; RS = rejection sensitivity.

Depressive symptoms: Step 1  $R^2 = .16, F(5, 757) = 23.60$ , Step 2  $\Delta R^2 = .11, \Delta F(1, 756) = 113.01$ .

Social anxiety symptoms: Step 1  $R^2 = .22, F(5, 757) = 35.50$ , Step 2  $\Delta R^2 = .11, \Delta F(1, 756) = 125.44$ .

Appearance anxiety: Step 1  $R^2 = .30, F(5, 757) = 53.21$ , Step 2  $\Delta R^2 = .19, \Delta F(1, 756) = 271.80$ .

Appearance-RS: Step 1  $R^2 = .29, F(5, 757) = 51.36$ , Step 2  $\Delta R^2 = .23, \Delta F(1, 756) = 352.31$ .



**Fig. 1.** Simple slopes of time spent on social media predicting appearance-RS at high (+1SD), average, and low (-1SD) levels of appearance-related social media preoccupation.

Note. AR Preoc = appearance-related social media preoccupation; RS = rejection sensitivity.

### 3.5. AR social media preoccupation as a moderator

To test Hypothesis 2, that AR social media preoccupation would moderate the relationship of social media use (i.e., time and intensity) with appearance anxiety and appearance-RS, two hierarchical multiple regression analyses were estimated to test the AR social media preoccupation  $\times$  social media use interaction and two were estimated to test the AR social media preoccupation  $\times$  social media intensity interaction. In these models, age, gender, survey format, and other social media measures were included as covariates. One interaction was significant; in the model of appearance-RS there was a significant interaction of time spent on social media  $\times$  AR social media preoccupation,  $\Delta R^2 = .01$ ,  $F(1, 755) = 9.58$ ,  $p < .01$ ,  $B = .29$ . Simple slopes indicated an enhancement effect, such that the association of time spent on social media with appearance-RS was stronger when preoccupation was high relative to average or low (see Fig. 1). Moreover, the association between social media use and appearance-RS was only significant when AR preoccupation was average or high.

### 3.6. Gender as a moderator

We found no gender differences in the associations of AR social media preoccupation and each of depression, social anxiety, appearance anxiety, and appearance-RS in the estimated correlations (see Table 3). However, to consider this further, we also created an interaction term of AR social media preoccupation (centred)  $\times$  gender (coded 0 = male, 1 = female) and entered this into regression models with depression, social anxiety, appearance-RS or appearance anxiety as the dependent variables. Age, survey format, and all other social media measures were included as covariates. No interaction effects of AR preoccupation  $\times$  gender were significant.

## 4. Discussion

Social media use has been associated with both better and worse emotional adjustment among adolescents and young adults (e.g., Lampe et al., 2006; Lin et al., 2016; Malinen, 2015; Vannucci et al., 2016). This evidence has led social media research to converge on the view that understanding the impact of social media use on emotional adjustment depends on understanding its multiple social complexities and individual engagement and interactional styles (e.g., Seabrook et al., 2016; Shensa et al., 2018). Given (1) the predominant focus on appearance among adolescents and young adults and the high level of concern about appearance that is found

in these age groups (Voelker, Reel, & Greenleaf, 2015; Webb et al., 2017) and (2) past research suggesting that the way adolescents integrate themselves with social media may have a more salient effect on maladjustment than merely the frequency of use and time spent on social media (Fardouly & Vartanian, 2015; Modica, 2019; Shensa et al., 2018), we hypothesized that preoccupation with social media use that involves appearance judgments and comparisons, as well as general preoccupation with social media, would be uniquely related to poorer emotional adjustment (i.e., more depressive and social anxiety symptoms) and would have stronger associations than would measures of social media use. We also extended this focus to include two measures of appearance sensitivities (i.e., concerns), namely appearance anxiety and appearance-RS, both of which had not been examined as correlates of social media use in past research.

Overall, the main study hypotheses (Hypothesis 1a and 1b) regarding associations of various measures of social media use with adjustment were supported. Firstly, social media use had small and positive associations with symptoms of depression and social anxiety. Also, our novel focus on two other aspects of adjustment, namely appearance anxiety and appearance-RS, showed that social media use also covaries with more reported appearance-related sensitivities. Secondly, when preoccupation with social media measures were examined, both general and appearance-related social media preoccupation were found to have unique positive associations with depression, social anxiety, appearance anxiety, and appearance-RS. Thus, our major findings suggest that frequency and intensity of social media use may have very small risks for emotional maladjustment, but that social media preoccupation in general and related to appearance are stronger correlates of depression and social anxiety, with appearance preoccupation an especially potent risk factor for elevated appearance anxiety and appearance-RS.

We also anticipated that appearance-related preoccupation with social media would interact with use to better predict appearance anxiety and appearance-RS (Hypothesis 2). Appearance-related social media preoccupation was found to moderate the strength of the relationship between time spent on social media and appearance-RS, while the same effect was not present for the intensity of social media use or symptoms of appearance anxiety. Hence, Hypothesis 2 was only partially supported. Overall, and consistent with other recent studies (see Bell, Cassarly, & Dunbar, 2018; Lonergan et al., 2019; Mills et al., 2018; Tiggemann, Hayden, Brown, & Veldhuis, 2018) these results reiterate that it is preoccupation with appearance related social media posts, photos based activities (e.g., selfies), feedback, (e.g., “likes”) and comments on social media that may be most important to identifying adolescents and young adults who will report more elevated symptom severity for appearance-related stress and psychopathology. In addition, more social media use combined with preoccupation might be particularly problematic for adolescents and young adults for some appearance related outcomes, such as appearance-RS and appearance anxiety, as we have discovered with this current study.

Our results correspond with other research (e.g., Andreassen & Pallesen, 2014; Bodroža & Jovanović, 2016; Shensa et al., 2018) showing that adolescents' and young adults' cognitive styles and behaviors have stronger adverse associations with mental health outcomes than the frequency and quantity of social media use. Mediators and moderators of the relationship between frequency of social media use and well-being outcomes have been identified as significant risk factors; these have included social comparison, friendship quality, rumination, self-esteem, motivation, self-regulation, and expectations (Bosacki et al., 2007; Feinstein et al., 2013; Rae & Lonborg, 2015; Selfhout et al., 2009; Wegmann et al., 2015). We posit that exposure to a peer culture of appearance comparisons on social media, as measured by

our AR social media preoccupation scale, coupled with a society that values presentation of idealized body images online, leads to feelings of body dissatisfaction, envy, self-inferiority, lowered self-esteem and lowered life satisfaction, which all have known associations with depression and social anxiety, appearance anxiety, and appearance-RS (Appel et al., 2015; Tandoc et al., 2015; Tiggemann & Miller, 2010; Tiggemann & Slater, 2013).

For this study, preoccupation was conceptualized in terms of both general preoccupation with social media and items that put a lens on a more specific preoccupation with appearance comparison and judgment on social media. Social media appearance-related preoccupation was very relevant to the symptoms and appearance concerns studied here. In particular, AR social media preoccupation accounted for more unique variance in depression and social anxiety, and especially appearance anxiety and appearance-RS, when compared to the variance accounted for by general social media preoccupation. Preoccupation with appearance involves processes of social comparison where individuals evaluate their own worth in comparison to their peers and body image norms. The visual and curatorial nature of social media means young people are likely to compare themselves to images that are unrealistic, thereby prompting unrealistic expectations of themselves. In turn, this can produce distress, appearance dissatisfaction, sensitivity to appearance feedback and judgments and negative self-esteem when these expectations are unable to be met (Nesi & Prinstein, 2015; Saunders & Eaton, 2018). In addition, it may be that absence of face-to-face-social cues promotes the ambiguous nature of appearance feedback and perceptions online, therefore producing anxious expectations in vulnerable users.

Our findings did not support our hypothesis that AR social media preoccupation would moderate the relationship of social media use with appearance anxiety, but it did moderate the association of social media use with appearance-RS. It may be that the focus on social comparison with others in many of the AR social media preoccupation items resulted in a stronger association of social media use with appearance-RS only, because of the common feature of social concern. In particular, AR social media preoccupation includes multiple items that focus on social comparison and appearance-RS is a bias in social information processing. In comparison, symptoms of appearance anxiety include perceiving appearance flaws, being preoccupied with flaws, and day-to-day behaviors that are reactions to beliefs about flaws. In addition, another possibility is that the absence of face-to-face-social cues on social media promotes the ambiguous nature of appearance feedback online, therefore producing a greater number of anxious expectations of rejection by others when social media use is high.

Young men and women differed on all measures. Specifically, young women reported significantly more social media use, and general and appearance-related social media preoccupation compared with young men. Young women also reported more depressive symptoms, social anxiety, appearance anxiety, and appearance-RS. However, no evidence was found for gender moderation involving AR social media preoccupation. These results are consistent with previous findings of little support for gender moderation in accounting for body image concerns prompted by social media use (Holland & Tiggemann, 2016). Nevertheless, previous research has found that females tend to involve themselves with an appearance culture concerning diet and thinness (Vincent & McCabe, 2000), whereas males concentrate on muscle-building (McCabe & Ricciardelli, 2003). Therefore, more gender appropriate preoccupation indicators may be warranted in future research to help understand gender differences with regards to appearance based social media activities and their associations with well-being.

#### 4.1. Limitations and recommendations

This current study identified how appearance related social media preoccupation was associated with both general and appearance-specific symptoms and concerns. This was novel, but the study did have limitations. The first limitation to mention is that the measure of AR social media preoccupation was developed for this study. The measure did appear to be psychometrically sound, and its associations with other social media measures and the outcomes measured here provides evidence of its validity. However, the items focused on appearance comparisons, so expansion of the scale to include other online cognitions and behaviors (passive and active), as well as alignment with other socio-cultural theories such as impression management and objectification, is necessary in future research.

A second study limitation to mention comes from the cross-sectional study design. The relationships between appearance preoccupation on social media, emotional maladjustment, and appearance sensitivities reported here could be bidirectional. For example, social media preoccupation could lead to increasing symptoms, but it may also be that individuals with symptoms may be engaging in online social behaviours in more maladaptive ways over time. Such possibilities could be tested in future longitudinal research.

Third, because young adults are the heaviest users of social media, our results are based on a convenience sample of school and university students (< 25 years). This sample may restrict the generalizability of the findings. Lastly, while we asked participants to report on the amount of time spent and the intensity of their social media use and measured their general and appearance preoccupation when using social media, we did not measure other technology use (e.g., gaming), which could also be a source of appearance-related messages and portray body image ideals. Future research should consider other visual online and technology-based media as correlates of general mental health or appearance-related distress.

#### 4.2. Conclusion

Overall, we found that frequency and intensity of social media use in adolescents and young adults may pose a small risk for symptoms of depression, social anxiety, appearance anxiety and appearance-RS, but it is especially preoccupation with appearance-based activities on social media that may have a much greater negative impact. Moreover, although young women report more social media preoccupation, as well as more depression, social anxiety and appearance concerns, than young men, the negative impact of appearance-based activities on social media does not appear to differ between young women and men. Taken together, these findings suggest that more research is needed to understand the complex system of appearance related motivations, biases and expectations involved when individuals engage with social media, particularly given that visual interactions and appearance-based comparisons between young people are likely to increase as new applications and platforms are released into the market.

There are also practical implications that follow from the knowledge that appearance comparisons and appearance preoccupation online and in social media may be more of a risk to appearance-related maladjustment than frequency of social media use. Clinicians working with young people presenting with body dissatisfaction, disordered eating, and other body image concerns, including appearance anxiety and appearance-RS, can use this information to educate clients about how maladaptive social media use in relation to appearance can be contributing to their stress and aggravating their symptoms in order to help them engage



with social media in more adaptive ways. While this research highlights some of the adverse effects of social media use on emotional health and appearance concerns, social media also offer opportunities to promote equally constructive body image messages to young users. There will be an ongoing need for not only individual and school-based interventions, but also for wider reaching public health campaigns, even on social media platforms themselves, to support young people as they navigate these social spaces.

### Declaration of Competing Interest

None.

### Acknowledgements

This research was funded by an Australian Research Council Discovery Grants (DP170102547). We thank Haley Webb, Drew Nesdale, Geraldine Downey, Allison Waters, Lara Farrell and Wyn-dol Furman for advice during the early stages of the larger project on appearance-based rejection sensitivity, from which these data were drawn. We also thank the students and the schools for their continued involvement, and acknowledge the important contributions from research assistants who were critical to the collection of data.

### Appendix A

#### Items used to Measure Social Media Appearance-related Preoccupation and Factor Analysis Loadings

Item	Loading
I feel like I want to change my diet after viewing other people's pictures online	.87
I am often dissatisfied with my weight or looks in my social media	.85
I feel like I want to change my exercise routine after viewing other people's pictures online	.84
I feel inadequate in appearance compared to my friends on social media	.83
How I feel about my body and appearance is influenced by other people's social media pictures	.83

### Appendix B. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.bodyim.2020.02.010>.

### References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5<sup>th</sup> ed.). Washington, DC: American Psychiatric Association.
- Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction – An overview. *Current Pharmaceutical Design*, 20, 4053–4061. <http://dx.doi.org/10.2174/13816128113199990616>
- Angold, A., & Costello, E. J. (1987). *Mood and Feelings Questionnaire (MFQ)*. Durham: Developmental Epidemiology Program, Duke University.
- Anixiadis, F., Wertheim, E. H., Rodgers, R., & Caruana, B. (2019). Effects of thin-ideal Instagram images: The roles of appearance comparisons, internalization of the thin ideal and critical media processing. *Body Image*, 31, 181–190. <http://dx.doi.org/10.1016/j.bodyim.2019.10.005>
- Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology*, 34, 277–289. <http://dx.doi.org/10.1521/jsocp.2015.34.4.277>
- Australian Media Communication Authority. (2013). *Like, post, share: Young Australians' experience of social media* Belconnen, ACT, Australia. Retrieved from [www.acma.gov.au/~media/mediacomms/Report/pdf/Like%20post%20share%20Young%20Australians%20experience%20of%20social%20media%20Quantitative%20research%20report.pdf](http://www.acma.gov.au/~media/mediacomms/Report/pdf/Like%20post%20share%20Young%20Australians%20experience%20of%20social%20media%20Quantitative%20research%20report.pdf).
- Bargh, J. A., & McKenna, K. Y. A. (2004). The Internet and social life. *Annual Review of Psychology*, 55, 573–590. <http://dx.doi.org/10.1146/annurev.psych.55.090902.141922>
- Bell, B. T., Cassarly, J. A., & Dunbar, L. (2018). Selfie-objectification: Self-objectification and positive feedback (“likes”) are associated with frequency of posting sexually objectifying self-images on social media. *Body Image*, 26, 83–89. <http://dx.doi.org/10.1016/j.bodyim.2018.06.005>
- Bjornsson, A. S., Didie, E. R., & Phillips, K. A. (2010). Body dysmorphic disorder. *Dialogues in Clinical Neuroscience*, 12, 221–232.
- Bodroža, B., & Jovanović, T. (2016). Validation of the new scale for measuring behaviors of Facebook users: Psycho-Social Aspects of Facebook Use (PSAFU). *Computers in Human Behavior*, 54, 425–435. <http://dx.doi.org/10.1016/j.chb.2015.07.032>
- Bosacki, S., Dane, A., Marini, Z., & YLC-CURA. (2007). Peer relationships and internalizing problems in adolescents: Mediating role of self-esteem. *Emotional and Behavioural Difficulties*, 12, 261–282. <http://dx.doi.org/10.1080/13632750701664293>
- Bowker, J. C., Thomas, K. K., Spencer, S. V., & Park, L. E. (2013). Examining appearance-based rejection sensitivity during early adolescence. *Journal of Research on Adolescence*, 23, 375–388. <http://dx.doi.org/10.1111/jora.12003>
- Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, 60, 837–844. <http://dx.doi.org/10.1001/archpsyc.60.8.837>
- Doğan, U., & Çolak, T. S. (2016). Self-concealment, social network sites usage, social appearance anxiety, loneliness of high school students: A model testing. *Journal of Education and Training Studies*, 4, 176. <http://dx.doi.org/10.11114/jets.v4i6.1420>
- Donath, J., & Boyd, D. (2004). Public displays of connection. *BT Technology Journal*, 22, 71–82. <http://dx.doi.org/10.1023/B:BTJ.0000047585.06264.c>
- Dyer, J. G., & Wade, E. H. (2012). Gender differences in adolescent depression. *Journal of Psychosocial Nursing and Mental Health Services*, 50, 17–20. <http://dx.doi.org/10.3928/02793695-20121107-04>
- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook friends: Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication*, 12, 1143–1168. <http://dx.doi.org/10.1111/j.1083-6101.2007.00367.x>
- Fardouly, J., & Rapee, R. M. (2019). The impact of no-makeup selfies on young women's body image. *Body Image*, 28, 128–134. <http://dx.doi.org/10.1016/j.bodyim.2019.01.006>
- Fardouly, J., & Vartanian, L. R. (2015). Negative comparisons about one's appearance mediate the relationship between Facebook usage and body image concerns. *Body Image*, 12, 82–88. <http://dx.doi.org/10.1016/j.bodyim.2014.10.004>
- Fardouly, J., Pinkus, R. T., & Vartanian, L. R. (2017). The impact of appearance comparisons made through social media, traditional media, and in person in women's everyday lives. *Body Image*, 20, 31–39. <http://dx.doi.org/10.1016/j.bodyim.2016.11.002>
- Feinstein, B. A., Hershenberg, R., Bhatia, V., Latack, J. A., Meuwly, N., & Davila, J. (2013). Negative social comparison on Facebook and depressive symptoms: Rumination as a mechanism. *Psychology of Popular Media Culture*, 2, 161–170. <http://dx.doi.org/10.1037/a0033111>
- Ferguson, C. J., Winegard, B., & Winegard, B. M. (2011). Who is the fairest one of all? How evolution guides peer and media influences on female body dissatisfaction. *Review of General Psychology*, 15, 11–28. <http://dx.doi.org/10.1037/a0022607>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140. <http://dx.doi.org/10.1177/001872675400700202>
- Haferkamp, N., & Krämer, N. C. (2011). Social comparison 2.0: Examining the effects of online profiles on social-networking sites. *Cyberpsychology, Behavior and Social Networking*, 14, 39–314. <http://dx.doi.org/10.1089/cyber.2010.0120>
- Haferkamp, N., Eimler, S. C., Papadakis, A., & Kruck, J. V. (2012). Men are from Mars, women are from Venus? Examining gender differences in self-presentation on social networking sites. *Cyberpsychology, Behavior and Social Networking*, 15, 91–98. <http://dx.doi.org/10.1089/cyber.2011.0151>
- Harrison, K., & Hefner, V. (2014). Virtually perfect: Image retouching and adolescent body image. *Media Psychology*, 17, 134–153. <http://dx.doi.org/10.1080/15213269.2013.770354>
- Hayes, A. F., & ProQuest. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Holland, G., & Tiggemann, M. (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image*, 17, 100–110. <http://dx.doi.org/10.1016/j.bodyim.2016.02.008>
- Ibarra-Rovillard, M. S., & Kuiper, N. A. (2011). Social support and social negativity findings in depression: Perceived responsiveness to basic psychological needs. *Clinical Psychology Review*, 31, 342–352. <http://dx.doi.org/10.1016/j.cpr.2011.01.005>
- Kim, J. W., & Chock, T. M. (2015). Body image 2.0: Associations between social grooming on Facebook and body image concerns. *Computers in Human Behavior*, 48, 331–339. <http://dx.doi.org/10.1016/j.chb.2015.01.009>
- La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology*, 26, 83–94. <http://dx.doi.org/10.1023/A:1022684520514>
- Lampe, C., Ellison, N., & Steinfield, C. (2006). A face(book) in the crowd: Social searching vs. social browsing [Conference Session]. In *Proceedings of the 2006*

- 20th Anniversary Conference on Computer Supported Cooperative Work <http://dx.doi.org/10.1145/1180875.1180901>
- Lavell, C. H., Zimmer-Gembeck, M. J., Farrell, L. J., & Webb, H. (2014). Victimization, social anxiety, and body dysmorphic concerns: Appearance-based rejection sensitivity as a mediator. *Body Image, 11*, 391–395. <http://dx.doi.org/10.1016/j.bodyim.2014.06.008>
- Lee, K., Noh, M., & Koo, D. (2013). Lonely people are no longer lonely on social networking sites: The mediating role of self-disclosure and social support. *Cyberpsychology, Behavior and Social Networking, 16*, 413–418. <http://dx.doi.org/10.1089/cyber.2012.0553>
- Lin, L. y., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., . . . & Primack, B. A. (2016). Association between social media use and depression among U.S. young adults. *Depression and Anxiety, 33*, 323–331. <http://dx.doi.org/10.1002/da.22466>
- Lonergan, A. R., Bussey, K., Mond, J., Brown, O., Griffiths, S., Murray, S. B., . . . & Mitchison, D. (2019). Me, my selfie, and I: The relationship between editing and posting selfies and body dissatisfaction in men and women. *Body Image, 28*, 39–43. <http://dx.doi.org/10.1016/j.bodyim.2018.12.001>
- Lup, K., Trub, L., & Rosenthal, L. (2015). Instagram #Instasad?: Exploring associations among Instagram use, depressive symptoms, negative social comparison, and strangers followed. *Cyberpsychology, Behavior and Social Networking, 18*, 247–252. <http://dx.doi.org/10.1089/cyber.2014.0560>
- Malinen, S. (2015). Understanding user participation in online communities: A systematic literature review of empirical studies. *Computers in Human Behavior, 46*, 228–238. <http://dx.doi.org/10.1016/j.chb.2015.01.004>
- Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology, 29*, 446–458. <http://dx.doi.org/10.1016/j.appdev.2008.07.001>
- Mastro, S., Zimmer-Gembeck, M. J., Webb, H. J., Farrell, L., & Waters, A. (2015). Young adolescents' appearance anxiety and body dysmorphic symptoms: Social problems, self-perceptions and comorbidities. *Journal of Obsessive-Compulsive and Related Disorders, 8*, 50–55. <http://dx.doi.org/10.1016/j.jocrd.2015.12.001>
- Mayville, S., Katz, R. C., Gipson, M. T., & Cabral, K. (1999). Assessing the prevalence of body dysmorphic disorder in an ethnically diverse group of adolescents. *Journal of Child and Family Studies, 8*, 357–362. <http://dx.doi.org/10.1023/A:1022023514730>
- McCabe, M. P., & Ricciardelli, L. A. (2003). Sociocultural influences on body image and body changes among adolescent boys and girls. *The Journal of Social Psychology, 143*, 5–26. <http://dx.doi.org/10.1080/0022454030959842>
- Meier, E. P., & Gray, J. (2014). Facebook photo activity associated with body image disturbance in adolescent girls. *Cyberpsychology, Behavior and Social Networking, 17*, 199–206. <http://dx.doi.org/10.1089/cyber.2013.0305>
- Melioli, T., Rodgers, R. F., Rodrigues, M., & Chabrol, H. (2015). The role of body image in the relationship between internet use and bulimic symptoms: Three theoretical frameworks. *Cyberpsychology, Behavior and Social Networking, 18*, 682–686. <http://dx.doi.org/10.1089/cyber.2015.0154>
- Miller, V. (2011). *Understanding digital culture*. London: Sage.
- Mills, J. S., Musto, S., Williams, L., & Tiggemann, M. (2018). "Selfie" harm: Effects on mood and body image in young women. *Body Image, 27*, 86–92. <http://dx.doi.org/10.1016/j.bodyim.2018.08.007>
- Modica, C. (2019). Facebook, body esteem, and body surveillance in adult women: The moderating role of self-compassion and appearance-contingent self-worth. *Body Image, 29*, 17–30. <http://dx.doi.org/10.1016/j.bodyim.2019.02.002>
- Nesi, J., & Prinstein, M. J. (2015). Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms. *Journal of Abnormal Child Psychology, 43*, 1427–1438. <http://dx.doi.org/10.1007/s10802-015-0020-0>
- Park, L. E. (2007). Appearance-based rejection sensitivity: Implications for mental and physical health, affect, and motivation. *Personality and Social Psychology Bulletin, 33*, 490–504. <http://dx.doi.org/10.1177/0146167206296301>
- Park, L. E., & Pinkus, R. T. (2009). Interpersonal effects of appearance-based rejection sensitivity. *Journal of Research in Personality, 43*, 602–612. <http://dx.doi.org/10.1016/j.jrp.2009.02.003>
- Park, L. E., DiRaddo, A. M., & Calogero, R. M. (2009). Sociocultural influence and appearance-based rejection sensitivity among college students. *Psychology of Women Quarterly, 33*, 108–119. <http://dx.doi.org/10.1111/j.1471-6402.2008.01478.x>
- Perloff, R. (2014). Social media effects on young women's body image concerns: Theoretical perspectives and an agenda for research. *Sex Roles, 71*, 363–377. <http://dx.doi.org/10.1007/s11199-014-0384-6>
- Pew Research Center. (2016). *Social Media Update 2016* Washington, D.C. (2016). Retrieved from <https://www.pewinternet.org/2016/11/11/social-media-update-2016/>
- Rae, J. R., & Lonborg, S. D. (2015). Do motivations for using Facebook moderate the association between Facebook use and psychological well-being? *Frontiers in Psychology, 6*, 771. <http://dx.doi.org/10.3389/fpsyg.2015.00771>
- Richards, D., Caldwell, P. H., & Go, H. (2015). Impact of social media on the health of children and young people. *Journal of Paediatrics and Child Health, 51*, 1152–1157. <http://dx.doi.org/10.1111/jpc.13023>
- Rief, W., Buhlmann, U., Wilhelm, S., Borkenhagen, A., & Brahler, E. (2006). The prevalence of body dysmorphic disorder: A population-based survey. *Psychological Medicine, 36*, 877–885. <http://dx.doi.org/10.1017/S0033291706007264>
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin, 132*, 98–131. <http://dx.doi.org/10.1037/0033-2909.132.1.98>
- Saunders, J. F., & Eaton, A. A. (2018). Snaps, selfies, and shares: How three popular social media platforms contribute to the sociocultural model of disordered eating among young women. *Cyberpsychology, Behavior and Social Networking, 21*, 343–354. <http://dx.doi.org/10.1089/cyber.2017.0713>
- Schneider, S. C., Mond, J., Turner, C. M., & Hudson, J. L. (2017). Sex differences in the presentation of body dysmorphic disorder in a community sample of adolescents. *Journal of Clinical Child and Adolescent Psychology, 53*, 1–13. <http://dx.doi.org/10.1080/15374416.2017.1321001>
- Seabrook, E. M., Kern, M. L., & Rickard, N. S. (2016). Social networking sites, depression, and anxiety: A systematic review. *JMIR Mental Health, 3*, e50. <http://dx.doi.org/10.2196/mental.5842>
- Sebastian, C., Burnett, S., & Blakemore, S. (2008). Development of the self-concept during adolescence. *Trends in Cognitive Sciences, 12*, 441–446. <http://dx.doi.org/10.1016/j.tics.2008.07.008>
- Selfhout, M. H. W., Branje, S. J. T., Delsing, M., ter Bogt, T. F. M., & Meeus, W. H. J. (2009). Different types of internet use, depression, and social anxiety: The role of perceived friendship quality. *Journal of Adolescence, 32*, 819–833. <http://dx.doi.org/10.1016/j.jadolescence.2008.10.011>
- Sensis. (2017). *Sensis Social Media Report* Retrieved from <https://www.sensis.com.au/socialmediareport>
- Shensa, A., Sidani, J., Dew, M., Escobar-Viera, C., & Primack, B. (2018). Social media use and depression and anxiety symptoms: A cluster analysis. *American Journal of Health Behavior, 42*, 116–128. <http://dx.doi.org/10.5993/AJHB.42.2.11>
- Sigerson, L., & Cheng, C. (2018). Scales for measuring user engagement with social network sites: A systematic review of psychometric properties. *Computers in Human Behavior, 83*, 87–105. <http://dx.doi.org/10.1016/j.chb.2018.01.023>
- Smith, A. R., Hames, J. L., & Joiner, T. E. (2013). Status update: Maladaptive Facebook usage predicts increases in body dissatisfaction and bulimic symptoms. *Journal of Affective Disorders, 149*, 235–240. <http://dx.doi.org/10.1016/j.jad.2013.01.032>
- Steers, M. N., Wickham, R. E., & Acitelli, L. K. (2014). Seeing everyone else's highlight reels: How Facebook usage is linked to depressive symptoms. *Journal of Social and Clinical Psychology, 33*, 701–731. <http://dx.doi.org/10.1521/jscp.2014.33.8.701>
- Suls, J., & Wheeler, L. (2000). *Handbook of social comparison; theory and research*. Portland: Ringold Inc.
- Tandoc, E. C., Ferrucci, P., & Duffy, M. (2015). Facebook use, envy, and depression among college students: Is Facebooking depressing? *Computers in Human Behavior, 43*, 139–146. <http://dx.doi.org/10.1016/j.chb.2014.10.053>
- Thompson, S. H., & Lougheed, E. (2012). *Frazzled by Facebook? An exploratory study of gender differences in social network communication among undergraduate men and women*. *College Student Journal, 46*, 88–98.
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington, DC, US: American Psychological Association. <http://dx.doi.org/10.1037/10312-000>
- Tiggemann, M., & McGill, B. (2004). The role of social comparison in the effect of magazine advertisements on women's mood and body dissatisfaction. *Journal of Social and Clinical Psychology, 23*, 23–44. <http://dx.doi.org/10.1521/jscp.23.1.23.26991>
- Tiggemann, M., & Miller, J. (2010). The Internet and adolescent girls' weight satisfaction and drive for thinness. *Sex Roles, 63*, 79–90. <http://dx.doi.org/10.1007/s11199-010-9789-z>
- Tiggemann, M., & Slater, A. (2013). NetGirls: The Internet, Facebook, and body image concern in adolescent girls. *International Journal of Eating Disorders, 46*, 630–633. <http://dx.doi.org/10.1002/eat.22141>
- Tiggemann, M., & Slater, A. (2014). NetTweens: The Internet and body image concerns in preteenage girls. *The Journal of Early Adolescence, 34*, 606–620. <http://dx.doi.org/10.1177/0272431613501083>
- Tiggemann, M., Hayden, S., Brown, Z., & Veldhuis, J. (2018). The effect of Instagram "likes" on women's social comparison and body dissatisfaction. *Body Image, 26*, 90–97. <http://dx.doi.org/10.1016/j.bodyim.2018.07.002>
- Tiggemann, M., & Zinoviev, K. (2019). The effect of #enhancement-free instagram images and hashtags on women's body image. *Body Image, 31*, 131–138. <http://dx.doi.org/10.1016/j.bodyim.2019.09.004>
- Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2016). Social media use and anxiety in emerging adults. *Journal of Affective Disorders, 207*, 163–166. <http://dx.doi.org/10.1016/j.jad.2016.08.040>
- Veale, D., Eshkevaria, E., Kanakama, N., Ellison, N., Costa, A., & Werner, T. (2014). The Appearance Anxiety Inventory: Validation of a process measure in the treatment of body dysmorphic disorder. *Behavioural and Cognitive Psychotherapy, 42*, 605–616. <http://dx.doi.org/10.1017/S1352465813000556>
- Veale, D., Kinderman, P., Riley, S., & Lambrou, C. (2003). Self-discrepancy in body dysmorphic disorder. *British Journal of Clinical Psychology, 42*, 157–169. <http://dx.doi.org/10.1348/014466503321903571>
- Vincent, M. A., & McCabe, M. P. (2000). Gender differences among adolescents in family, and peer influences on body dissatisfaction, weight loss, and binge eating behaviors. *Journal of Youth and Adolescence, 29*, 205–221. <http://dx.doi.org/10.1023/A:1005156616173>

- Voelker, D. K., Reel, J. J., & Greenleaf, C. (2015). Weight status and body image perceptions in adolescents: Current perspectives. *Adolescent Health, Medicine and Therapeutics*, 6, 149–158. <http://dx.doi.org/10.2147/AHMT.S68344>
- Webb, H., Zimmer-Gembeck, M., Waters, A., Farrell, L., Nesdale, D., & Downey, G. (2017). Pretty pressure from peers, parents, and the media: A longitudinal study of appearance-based rejection sensitivity. *Journal of Research on Adolescence*, 27, 718–735. <http://dx.doi.org/10.1111/jora.12310>
- Webb, H. J., & Zimmer-Gembeck, M. J. (2015). Body image and body change strategies within friendship dyads and groups: Implications for adolescent Appearance-based rejection sensitivity. *Social Development*, 24, 1–19. <http://dx.doi.org/10.1111/sode.12081>
- Webb, H. J., & Zimmer-Gembeck, M. J. (2016). A longitudinal study of appearance-based rejection sensitivity and the peer appearance culture. *Journal of Applied Developmental Psychology*, 43, 91–100. <http://dx.doi.org/10.1016/j.appdev.2016.01.004>
- Wegmann, E., Stodt, B., & Brand, M. (2015). Addictive use of social networking sites can be explained by the interaction of internet use expectancies, Internet literacy, and psychopathological symptoms. *Journal of Behavioral Addictions*, 4, 155–162. <http://dx.doi.org/10.1556/2006.4.2015.021>
- Wheeler, L., & Miyake, K. (1992). Social comparison in everyday life. *Journal of Personality and Social Psychology*, 62, 760–773. <http://dx.doi.org/10.1037/0022-3514.62.5.760>
- Zimmer-Gembeck, M., Webb, H., Farrell, L., & Waters, A. (2018). Girls' and boys' trajectories of appearance anxiety from age 10 to 15 years are associated with earlier maturation and appearance-related teasing. *Development and Psychopathology*, 30, 337–350. <http://dx.doi.org/10.1017/S0954579417000657>