Psychology of Popular Media

A Closer Look at Appearance and Social Media: Measuring Activity, Self-Presentation, and Social Comparison and Their Associations With Emotional Adjustment

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Social media use links with 2 major concerns of adolescents, namely, appearance and comparing favorably with others. Founded on theory, our purpose was to develop a reliable and valid measure of appearance preoccupation online, the Social Media Appearance Preoccupation Scale (SMAPS). In Study 1 ($N = 283$ Grade 9–12 students), Australian adolescents completed surveys containing 21 SMAPS items. After psychometric analyses, 18 retained items loaded highly on factors tapping (a) online self-presentation, (b) appearance-related activity online, or (c) appearance comparison. The items loading on each factor had high interitem correlations, and girls had higher SMAPS scores than boys. In Study 2 ($N = 327$ Australian university students <26 years), the SMAPS was confirmed and validated with a range of measures of social media use, emotional adjustment, appearance concerns, and social behaviors. Factor loadings were invariant by gender, SMAPS subscale scores had very small correlations with age, and incremental validity was tested and supported. Additionally, SMAPS subscale scores interacted with general social media use, adding to the explanation of appearance anxiety. The SMAPS will be a useful resource for the study of appearance-related social media use and interactions with friends and others online.

Public Policy Relevance Statement
One risk of social media is the development of a compulsive preoccupation with physical appearance. Researchers need tools to better assess this online behavior alongside other ways of using social media. In this study, a useful tool for assessing this behavior was developed, the Social Media Appearance Preoccupation Scale.

Keywords: body image, social media, depression, body dysmorphic symptoms, social comparison

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Using "social media" is a part of daily life for most adolescents and young adults (Pew Research Center, 2016). Social media, defined as websites and applications that allow for creating, posting, viewing, and interacting with original content (Choukas-Bradley, Nesi, Widman, & Higgins, 2019; Moreno, Kota, Schoohs, & Whitehill, 2013), provide a continuous source of communication with others, image sharing, information and ideas, and so much more. Such an integrated resource for daily living, which has become so diverse and individualized, probably is both a risk and a benefit for development across many levels of human functioning, and this has been supported in research (for a review, see Seabrook, Kern, & Rickard, 2016).

One very popular aspect of social media is the use of visual interactive tools to share and modify pictures or videos of lived experiences (Haferkamp, Eimler, Papadakis, & Kruck, 2012; Sensis, 2017). Sharing of visual images is very popular and engaging, and social media apps are increasingly capitalizing on this to build newer and better ways of capturing and streaming online material from all users. These platforms also then serve as a place to display and directly compare social circumstances, status, and physical appearance, resulting in frequent comparison processes and direct feedback from others about appearance, interests, and behavior for many youth (Saunders & Eaton, 2018; Talbot, Gavin, van Steen, & Morey, 2017; Uhlmann, Donovan, Zimmer-Gembeck, Bell, & Ramme, 2018). Thus, social media use directly links with two major concerns of many adolescents and young adults, namely, appearance and fitting in or comparing favorably with peers (Fardouly & Vartanian, 2015, 2016; Holland & Tiggemann, 2016;

Webb & Zimmer-Gembeck, 2014; Webb, Zimmer-Gembeck, & Mastro, 2016; Zimmer-Gembeck & Webb, 2017).

To study the ways that these concerns are managed online, researchers are struggling to keep up with the measures and resources needed to tap specific use patterns, with the aim of producing reliable and valid studies of how social media use may be related to positive development or the development of problems, such as depression, social anxiety, bullying and aggressive behavior, and eating disorders. For example, despite the very visual ways of interacting on social media, there are few comprehensive measures based on theory that have become standard in the assessment of online behaviors related to social comparisons and appearance-related interactions. Instead, just as in other areas of social media research, some of the most recent research relies on one or a few items developed for a particular study to assess quantitative or qualitative social media use patterns. What is also emerging from this literature, however, is the need to focus more precisely on how social media is used, with the aim of identifying specific online behaviors or experiences that might be relevant for specific social or emotional problems (Feinstein et al., 2013; Holland & Tiggemann, 2016; Lup, Trub, & Rosenthal, 2015; Steers, Wickham, & Acitelli, 2014).

When the aim has been to study social media use and its relationship to body image concerns and disordered eating, much of the research initially focused on quantity of use as a correlate of poorer body image or more symptoms of eating disorders (see Holland & Tiggemann, 2016, for a review; Melioli, Rodgers, Rodrigues, & Chabrol, 2015; Rodgers & Melioli, 2016). For example, in a study of university women, Facebook use was associated with more body image concerns (Fardouly & Vartanian, 2015), and, in a second study, after coding websites according to their level of appearance-related content, more frequent use of these sites was associated with greater internalization of the thin ideal, appearance comparison, weight dissatisfaction, and drive for thinness (Tiggemann & Miller, 2010).

Research has increasingly turned to focusing on more specific patterns or types of use (i.e., the quality of use) or mediators that might explain associations of social media use with body, appearance or eating beliefs, and behaviors. Such research very often addresses photo-based social media use or social comparison to others viewed online (Hogue & Mills, 2019; Holland & Tiggemann, 2017; Kleemans, Daalmans, Carbaat, & Anschütz, 2018; Lonergan et al., 2019). Overall, there has been an acknowledgment that there is a need to focus on online behaviors related to social comparison, judgment about appearance and viewing manipulated and idealized images as potentially most important for identifying when social media use may have a detrimental effect on body image or disordered eating (Choukas-Bradley et al., 2019; Holland & Tiggemann, 2017). However, to date, many of these studies create their own measures or rely on a range of short measures, some with reliability that is lower than desirable. Thus, there is a need for a more comprehensive measure of appearance-related social media use, with scores that are both reliable and valid. Our aim in the two studies presented here was to develop such a measure. To do so, we first reviewed recent research literature on social media and body image and eating disorders to identify core themes (and related theories). Five themes emerged, including (a) image sharing activity, (b) investment and self-presentation, (c)

social comparison, (d) active versus passive social media use, and (e) negative responses to social media.

Regarding the first theme of activity related to imaging sharing, research has focused on posting "selfies," or use of image intensive applications, but this area also tends to capture the second theme of investment and preoccupation, given that the measures used in this research can also involve concern with self-presentation via enhancing photos (Brown & Tiggemann, 2016; Cohen, Newton-John, & Slater, 2017, 2018; Holland & Tiggemann, 2017; Joiner, Brosnan, Duffield, Gavin, & Maras, 2007; Kim & Chock, 2015; Kim & Park, 2016; McLean, Paxton, Wertheim, & Masters, 2015; Rajan, 2018; Rutledge, Gillmor, & Gillen, 2013). For example, in one study of 339 university women with a mean age 18, the focus was on *appearance-related social media consciousness* (Choukas-Bradley et al., 2019). This measure, developed for use in this previous study, contained four items that asked women to report the frequency of their thoughts and behaviors about social media photo sharing ("When I am at an event in which people are taking photos of me [for example, a party or other social event], I feel distracted by thoughts about how the photos will look on social media," p. 475). Scores for appearance-related social media consciousness were correlated with time spent on social media ($r = .20$), body comparison ($r = .55$), body surveillance ($r = .56$), and depressive symptoms ($r = .25$). In a study of 103 middle and high school aged females, each adolescent was assigned an appearance exposure score, which was calculated based on use of Facebook's photo applications relative to total Facebook use (Meier & Gray, 2014). Greater exposure (rather than total Facebook use) was significantly correlated with internalization of the thin ideal ($r = .36$), weight satisfaction ($r = -.23$), self-objectification ($r = .29$), and drive for thinness ($r = .27$), but not with appearance comparison ($r = .17$). In a study of use of highly visible social media (Instagram and Snapchat) with 598 adolescents (average age of 15 years), those who reported frequent use (>2 h/day) reported significantly higher body image concerns and internalizing symptoms than peers reporting no use (Marengo, Longobardi, Fabris, & Settanni, 2018).

To date, although important to assess, it appears that photo sharing may not be as relevant to understanding deleterious outcomes of social media use as is overinvestment or preoccupation with photos and self-presentation online, which was the second theme found in this literature. For example, in a study of 259 women age 18 to 29 years, three items (drawn from McLean et al., 2015) were used to assess taking and sharing selfies (Cohen et al., 2018). In addition, measures of investment in photos (eight items) and manipulation of photos (two items; drawn from McLean et al., 2015) were also used. Posting selfies was associated with *better* body satisfaction, but investment in photos was associated with *worse* body satisfaction and more bulimic symptoms. In a similar study of 184 university students (both women and men) that also measured photo investment (eight items) and manipulation (10 items) using the same measures, these measures were correlated with body dissatisfaction with $r = .30$ and $r = .27$, respectively (Lonergan et al., 2019).

A third theme that seems to capture a particularly problematic aspects of social media is engaging in appearance comparisons when viewing images online. For example, in a study of 284 10- to 12-year-olds who used social media, time spent on social media (two items) and appearance comparison (one item; "how often

they compared their appearance on social media") were examined as correlates of emotional and well-being outcomes (Fardouly, Magson, Johnco, Oar, & Rapee, 2018). Social media use was not significantly correlated with depression, but it was associated with lower appearance satisfaction ($r = -.21$) and life satisfaction ($r = -.15$), whereas appearance comparison was much more correlated with all three measures (depression $r = .32$, appearance satisfaction $r = -.61$, and life satisfaction $r = -.50$).

A fourth theme was the need to consider active separate from passive social media use, given that these two ways of using social media can have opposing effects on well-being (Burke, Marlow, & Lento, 2010). For example, one study undertook to develop a measure of active versus passive use of Facebook finding three factors of active social, active nonsocial (posting things, tagging things only), and passive online behavior (Gerson, Plagnol, & Corr, 2017). However, the passive subscale had a low α in two studies (.70 or less). Nevertheless, this suggests that any development of a new measure should consider both active and passive use of social media.

Finally, a fifth theme was the need to be aware of items on measures that incorporate content that directly suggests negative emotional reactions to social media use. For example, in one study, a seven-item Maladaptive Facebook Usage Scale was created, with items that tapped negative reactions to social media activity and comparisons, such as "I tend to read the status updates of others to see if they are feeling the way I am, Reading the status updates of others tends to make me feel down on myself" (Smith, Hames, & Joiner, 2013, p. 236). In their sample of 232 female university students, maladaptive use was correlated with scores on the Eating Disorders Inventory (Garner, 2004) and the Eating Disorder Examination (Fairburn, Cooper, & O'Connor, 2008) subscales with r ranging from .18 to .30.

Taken together, these themes are quite consistent with some of the most relevant theories for understanding why social media use should be salient when studying body image disorders. These theories include social comparison theory (Festinger, 1954; Wheeler & Miyake, 1992), the tripartite sociocultural theory of body image and eating concerns (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), social learning theory (Bandura, 1962; Rodgers, Faure, & Chabrol, 2009), and social identity and related theories of group dynamics (Dijkstra, Cillessen, & Borch, 2013; Tajfel, 1982). Social comparison theory addresses how humans are highly motivated to evaluate their own social and personal worth based on how they compare themselves to others on dimensions such as intelligence, physical appearance and eating habits, and life success—particularly in comparison with their peers. The tripartite sociocultural theory brings together the importance of media and interpersonal interactions (e.g., with peers or family) for providing messages about adhering to societal standards of beauty, shaping what and how we make comparisons and judge self-worth. The social learning theory points to the modeling that can occur via the media and interpersonal interactions, so that direct experience is not needed to impact on beliefs and other outcomes. The social identity theory highlights the importance of belonging to a group and acceptance by others, which can involve conforming to group members' preferences and ideals. This can be a powerful socializer of behavior to conform to others' attitudes and preferences. Finally, often applied when focusing on girls or women, a final theory of self-objectification highlights how being viewed by

others can result in body surveillance and a focus on self-presentation to others (Frederickson & Roberts, 1997).

The Current Studies

Drawing on five identified themes and related theories applied to understanding the development of appearance-related concerns, body dissatisfaction and disordered eating, our aim in the two studies reported here was to develop a new measure of social media appearance preoccupation that would produce reliable and valid scores, which we refer to as the Social Media Appearance Preoccupation Scale (SMAPS). The psychometric properties of the items developed for the SMAPS were first examined by exploring the factor structure and the interitem correlations of items loadings on each factor in a sample of Australian adolescent students attending Grades 9 to 12 (Study 1). We next confirmed the subscale structure and validating scores derived from the SMAPS in Study 2 in a sample of young adults attending a large urban university in Australia. We focus here on adolescents and young adults, given their very high rates of social media use (Australian Media Communication Authority, 2013; Pew Research Center, 2016; Sensis, 2017) and their average to high level of concern with appearance and social belonging (Fardouly & Vartanian, 2015).

Study 1

Building on the five themes and associated theories, the aim of Study 1 was to develop a set of items to assess appearance-related online activity (Theme 1), self-presentation (Theme 2), and social comparison (Theme 3). In developing these items, attention was given to including items to tap active rather than passive social media use (Theme 4) and to include items that in content related to negative versus neutral responses to social media (Theme 5). Once the items were developed, our second study aim was to explore the factor structure of the set of items designed for the SMAPS.

Method

Participants and procedure. The participants were 283 high school students ages 13 to 18 years ($M = 16.62$, $SD = .95$; 47% male and 53% female) drawn from three schools in an urban area of Australia. The schools were moderate in size and contained Grades 7 to 12. The schools reported that their students were generally from low-middle to high-middle socioeconomic backgrounds. To measure sociocultural background, participants were asked to endorse as many options as applied, with most (84%) of the participants endorsing white Australian, 18% instead or in addition endorsing Asian, two endorsing Australian first peoples/Torres Strait Islander/Pacific Islander, and 11 also describing a diverse range of other backgrounds. Two participants did not respond to any of the social media items and were removed from the dataset, leaving a final sample size of 281.

Approval for this study was obtained from the Griffith University Human Research Ethics Committee. Attempts were made to recontact 335 students from three schools that had participated in an earlier study (not focused on social media use) to obtain consent from parents and adolescents to participate in this study. In the initial consent process, students who returned parent and personal consent forms (regardless of participation) were included in a draw

to win 5 $100 gift vouchers to a store of their choice. Overall, 309 families were able to be contacted and 26 parents or students declined to participate, resulting in a 92% response rate. Students from two schools completed the 45-min survey either by mail or online. One school opted to have surveys completed during school time under research assistant supervision. Each participant in this study received a $20 gift card when the survey was returned.

Measures. To investigate appearance-related preoccupation in adolescents' use of social media, participants responded to 21 items that were developed to tap into the five aforementioned themes identified in the literature including image activities (e.g., "I prefer to upload photos of myself to social media where I look fit and healthy"), investment and self-presentation (e.g., "When I upload photos of myself I usually use filters or alter/change them to make myself look better"), social comparison (e.g., "I feel like I want to change my diet after viewing other people's pictures online"), active versus passive (e.g., "I approve photos of myself before anyone can tag them" vs. "I am often dissatisfied with my weight or looks in my social media pictures"), and negative responses (e.g., "Seeing pictures of others makes me feel down on myself"). To the creation and wording of such items, both literature on social media use and existing measures related to sociocultural and body image theories of social grooming (Dunbar, 1996; Tufekci, 2008), social comparison (Festinger, 1954; Wheeler & Miyake, 1992), self-presentation (Goffman, 1959; Leary, 1996; Manning, 1992), and self-objectification (Frederickson & Roberts, 1997; Noll & Fredrickson, 1998) were considered. Additionally, attention was also given to represent a mix of body image concerns such as weight and diet, fitness, health and muscularity, as well as general appearance in the wording of the 21 items. Furthermore, 10 additional items were included as filler items that asked about general social media use (seven items), personal trolling behavior (one item), and interactions with friends online (two items). Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicated the tendency to participate in these online activities and to experience stronger feelings associated with these online interactions.

Results

Item reduction and factor analyses. The 21 items were evaluated to assess whether they met two assumptions of exploratory factor analysis (Hair, Black, Babin, Anderson, & Tatham, 2006). First, Bartlett's test of sphericity was significant, $\chi^2(210) = 4{,}594.3$, $p < .001$, indicating an acceptable number of significant correlations among variables. Second, the Kaiser Meyer Olkin Measure of Sampling Adequacy for the overall sample was good (.93).

The exploratory factor analysis was conducted using principle axis factoring (PAF) with oblique rotation. PAF was used given that this method is recommended for psychological data because it allows for measurement error (Xia, Green, Xu, & Thompson, 2019). In line with best practices, the number of factors to extract was based on Velicer's minimum average parcel (MAP) test and parallel analysis (Hayton, Allen, & Scarpello, 2004; O'Connor, 2000). When we conducted a PAF, three factors were extracted with eigenvalues over 1 (10.63, 2.02, and 1.46) and Velicer's MAP test and parallel analysis supported the extraction of three factors, with all three eigenvalues greater than the first three eigenvalues

calculated using parallel analysis (O'Connor, 2000). The variance accounted for in the items was 67.20%. As shown in Table 1, the pattern matrix showed loadings above .5 for all but two items and no high cross-loadings for all items, with the exception of one item. Thus, we removed this cross-loading item and removed the two items with loadings below .50 and the PAF was repeated.

In the final PAF with 18 items, three factors were extracted with eigenvalues of 9.18, 1.93, and 1.43; 69.64% of the variance in the items was accounted for by the factors (see Table 2). Also, all 18 items had high loadings on only one of the three factors, with low crossloadings on other factors (<|.30|). Seven items loaded highly on the first factor only. This factor was labeled Online Self-Presentation, as all items tapped aspects of conveying positive appearance information (authentic or inauthentic) through photo posts on social media. Five items loaded highly on only the second factor, labeled Appearance-Related Activity, which was characterized by the amount of behavior by the participant and their online network of friends that included commenting on, sharing and liking appearance-related social media content. Finally, six items loaded highly on only the third and final factor. The third factor was labeled Appearance Comparison, as all items represented participants' tendency to evaluate their appearance compared with others on social media. Cronbach's αs for the items loading on each of the three factors were .91, .87, and .93, respectively.

Important to note here were some differences in the item content across the three factors. Although items were designed to include both active and more passive online behavior, these items tended to load together and, on the Self-Presentation factor, the active items had somewhat stronger loadings than the passive items. Regarding negative reactions to social media, all items maintained on the Appearance Social Comparison factor include some aspect of reacting to social media, rather than simply engaging in comparison.

Descriptive statistics and associations with age and gender. To create scores for each of the subscales of Online Self-Presentation (seven items), Appearance-Related Activity (five items), and Appearance Comparison (six items), we averaged the corresponding items. As shown in Table 3, Online Self-Presentation had the highest average score ($M = 3.66$) among all three subscales (which had a possible range from 1 to 7), followed by Appearance Comparison ($M = 3.05$) and Appearance Activity ($M = 2.55$). When comparing average levels of SMAPS subscales, young women reported more online self-presentation, appearance-related activity, and appearance comparison than young men (see Table 3). As shown in Table 4, there were significant correlations between the three subscales, rs ranged from .54 to .70. Correlations of the SMAPS subscale scores with age were small and mostly nonsignificant, $r = .12$ ($p = .038$) for Online Self-Presentation, $r = .08$ ($p = .201$) for Appearance-Related Activity, and $r = .09$ ($p = .130$) for Appearance Comparison.

Study 2

The aim of Study 2 was to confirm the three-factor structure of the final 18-item SMAPS in a large group of older adolescents and young adults. In addition, the SMAPS subscales were validated with measures of appearance anxiety symptoms, social anxiety and depressive symptoms, appearance-related support from others, general interpersonal stress, coping flexibility, sexual harassment,

Table 1
Study 1 EFA Loadings for the Initial Set of 21 SMAPS Items (N = 281)

Items	Online self-presentation	Appearance activity	Appearance comparison
I prefer to only upload photos of myself to social media where I look physically attractive.	.92		
I prefer to only upload photos of myself to social media where I look fit and healthy.	.87		
When others upload photos of me to social media, I focus on whether I looked good.	.86		
I check to see who is commenting on, liking, or viewing photos of me or my body on social media.	.72		
When others upload photos of me to social media, I get upset when I don't look my best.	.58		
I approve photos of myself before anyone can tag them.	.58		
When I upload photos of myself, I usually use filters or alter/change them to make myself look better.	.50		
I make judgements of others based on their social media pages.	.45		
When on social media my friends post, comment on, share or like content about getting or staying fit and/or muscular.		.81	
When on social media I post, comment on, share or like content about what and when to eat.		.72	
When on social media my friends post, comment on, share or like content about what and when to eat.		.72	
When on social media I post, comment on, share or like content about getting or staying fit and/or muscular.		.72	
When on social media my friends post, comment on, share or like content about what they would like their bodies to look like.		.62	
When on social media I post, comment on, share or like content about what I would like my body to look like.		.51	−.37
I am often dissatisfied with my weight or looks in my social media pictures.			−.89
I feel inadequate in appearance compared to my friends on social media.			−.85
How I feel about my body and appearance is influenced by other people's social media pictures.			−.76
I feel like I want to change my diet after viewing other people's pictures online.			−.75
Seeing pictures of others tends to make me feel down on myself.			−.72
I feel like I want to change my exercise routine or fitness level after viewing other people's pictures online.			−.62
I tend to look at pictures of others to see if they look the way I do.			−.47
Eigenvalue	10.63	2.02	1.46
Variance accounted for	50.61%	9.63%	6.96%

Note. EFA = exploratory factor analysis; SMAPS = Social Media Appearance Preoccupation Scale. Values less than |.30| are not shown. Standardized loadings are reported.

disordered eating, social media appearance teasing experienced and witnessed, and general social media use.

Method

Participants and procedure. The participants were 327 university students aged 17 to 25 years ($M = 20.1$, $SD = 1.1$; 68% female; note: Two participants were just under age 17). To measure sociocultural background, 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. Participants also reported on their mother and father educational levels: Mother's education: 21% did not graduate high school, 15% graduated high school, 22% completed vocational training, 39% undertook some university study. Father's education: 16% did not graduate high school, 24% graduated high school, 22% completed vocational training, 38% undertook some university study. Overall 344 students attempted the questionnaire, but 15 participants were removed for missing data on all measures (i.e., they only completed one or two pages of the questionnaire) and two were removed because they were over age 25. The upper age limit was 25, given that most university students are below this age and because social media use and patterns can

change as individuals get older (Olson, O'Brien, Rogers, & Charness, 2012).

Measures.

Social media appearance preoccupation. The final 18-item SMAPS from Study 1 was used to measure social appearance online self-presentation (seven items), appearance-related activity (five items), and appearance comparison (six items). Responses options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). See the results section for further details.

Depressive symptoms. Depressive symptoms were assessed using the Mood and Feelings Questionnaire—Short Version (Angold & Costello, 1987), consisting of a series of 13 descriptive phrases about how the adolescent has been feeling or behaving recently (e.g., "I felt miserable or unhappy"). Items are rated from 1 (*not true*) to 5 (*very true*), and the total score was calculated by averaging all items. Higher scores indicate more depressive symptoms, Cronbach's $\alpha = .95$.

Social anxiety. The Social Anxiety Scale for Adolescents (La Greca & Lopez, 1998) assessed symptoms of social anxiety. 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*). A total score was calculated by averaging all items, with higher scores indicating higher social anxiety symptoms, Cronbach's $\alpha = .95$.

Appearance anxiety symptoms. The Appearance Anxiety Inventory (Roberts et al., 2018; Veale et al., 2014) was used to

Table 2

Study 1 and 2 Loadings for the Final 18-Item SMAPS

Items	Study 1 EFA (N = 281)			Study 2 CFA (N = 327)		
	Online self-presentation	Appearance activity	Appearance comparison	Online self-presentation	Appearance activity	Appearance comparison
I prefer to only upload photos of myself to social media where I look physically attractive.	.92			.80		
I prefer to only upload photos of myself to social media where I look fit and healthy.	.87			.72		
When others upload photos of me to social media, I focus on whether I looked good.	.85			.86		
I check to see who is commenting on, liking, or viewing photos of me or my body on social media.	.70			.80		
When others upload photos of me to social media, I get upset when I don't look my best.	.57			.82		
I approve photos of myself before anyone can tag them.	.56			.66		
When I upload photos of myself, I usually use filters or alter/change them to make myself look better.	.51			.71		
When on social media my friends post, comment on, share, or like content about getting or staying fit and/or muscular.		.82			.89	
When on social media my friends post, comment on, share, or like content about what and when to eat.		.75			.60	
When on social media I post, comment on, share, or like content about what and when to eat.		.71			.48	
When on social media I post, comment on, share, or like content about getting or staying fit and/or muscular.		.68			.72	
When on social media my friends post, comment on, share, or like content about what they would like their bodies to look like.		.57			.80	
I am often dissatisfied with my weight or looks in my social media pictures.			−.91			.84
I feel inadequate in appearance compared to my friends on social media.			−.86			.85
I feel like I want to change my diet after viewing other people's pictures online.			−.78			.87
How I feel about my body and appearance is influenced by other people's social media pictures.			−.75			.88
Seeing pictures of others tends to make me feel down on myself.			−.70			.79
I feel like I want to change my exercise routine or fitness level after viewing other people's pictures online.			−.63			.79
Eigenvalue	9.18	1.93	1.43	—	—	—
Variance accounted for	50.97%	10.72%	7.94%	—	—	—
Cronbach's α	.91	.87	.93	.91	.85	.94

Note. SMAPS = Social Media Appearance Preoccupation Scale; EFA = exploratory factor analysis; CFA = confirmation factor analysis. Values less than |.30| are not shown. Fit for Study 2, CFA: $\chi^2(128) = 318.35$, $p < .001$, comparative fit index = .96, root mean square error of approximation = .067 (90% confidence interval [.058, .077], $p = .001$). Standardized loadings are reported.

measure symptoms of body image anxiety. The Appearance Anxiety Inventory 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 summing all items, where higher scores reflected greater appearance symptoms, Cronbach's α = .93.

Disordered eating and related behaviors. Six items from the Eating Attitudes Test-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982) were used to measure disordered eating and related behaviors in adolescents. Questions related to eating binges, vomiting, laxative and diet pills, excessive exercise, use of pills or powders to control muscle mass and skipping meals (e.g., "In the past 6 months have you. . . . Gone on eating binges where you feel that you may not be able to stop eating?"). Participants responded on a scale measuring the frequency of these behaviors that ranged from 1 (*never*) *to* 6 (*once a day or more*). A

composite score was formed by averaging the item responses. Higher scores indicate more disordered eating, Cronbach's α = .74.

General interpersonal stress. Using items from the Responses to Stress Questionnaire (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000), participants reported their personal experience with 10 interpersonal stressors in the past 6 months (e.g., "Being around people who are rude or mean; Having problems with a friend"). Responses ranged from 1 (*not at all*) to 4 (*very much*). The items were averaged to form a composite interpersonal stress score, Cronbach's α was. .84.

Coping flexibility. One six-item scale from Self-Perceived Flexible Coping with Stress (Zimmer-Gembeck et al., 2018) was used to measure the perceived capacity to use multiple coping strategies when facing stressful events (e.g., "I can come up with lots of ways to make myself feel better if I am stressed"). Response options ranged from 1 (*not at all true*) to 7 (*totally true*). A

Table 3
Correlations, Means, and SDs of the SMAPS, and Comparisons Between Young Men and Women in Study 1 (N = 281) and Study 2 (N = 327)

Study no.	SMAPS subscales	Online self-presentation	Appearance activity	Appearance comparison
1	Online Self-Presentation	—		
	Appearance activity	.54**	—	
	Appearance comparison	.70**	.56**	—
	M (*SD*)	3.66 (1.59)	2.55 (1.39)	3.05 (1.65)
	Young men, *M* (*SD*) (*N* = 130)	3.03 (1.49)	2.21 (1.20)	2.30 (1.17)
	Young women, *M* (*SD*) (*N* = 151)	4.20 (1.48)	2.84 (1.48)	3.69 (1.73)
	Gender, *t*(1,279)	−6.60**	−3.94**	−7.98**
2	Online Self-Presentation	—		
	Appearance activity	.47**	—	
	Appearance comparison	.73**	.46**	—
	M (*SD*)	3.65 (1.62)	2.50 (1.41)	3.24 (1.74)
	Young men, *M* (*SD*) (*N* = 104)	2.96 (1.52)	2.23 (1.25)	2.71 (1.59)
	Young women, *M* (*SD*) (*N* = 223)	3.98 (1.60)	2.63 (1.46)	3.49 (1.76)
	Gender, *t*(1,325)	−5.53**	−2.42*	−3.90**

Note. SMAPS = Social Media Appearance Preoccupation Scale.
* $p < .05$. ** $p < .01$.

composite was formed by averaging the items, Cronbach's α was .84.

Sexual harassment. Sexual harassment was measured using five items similar to the 14-item American Association of University Women (AAUW) Education Foundation questionnaire (AAUW, 2001). To produce five items, AAUW items were condensed so that much of the content of the 14 items was contained in the five items. However, one item deemed too sensitive (e.g., sexual assault) was removed. Four items gathered reports of verbal and/or nonphysical sexual harassment experiences ("made sexual comments, jokes, gestures or looks at you"; "showed, given, or left you sexual pictures, photos, notes or messages"; "written sexual graffiti about you on a wall or other place"; "spread sexual rumours about you") and one item related to physical sexual harassment ("flashed you some sexual part of their body"; "touched,

grabbed, or pinched you in a sexual way"; or "grabbed you or pulled at your clothing in a sexual way"). Response options ranged from 1 (*never*) to 5 (*very often*). Items were averaged so that a higher score indicated greater variety and frequency of sexual harassment, Cronbach's α was .81.

Social media appearance teasing experienced and witnessed. One item, with two parts, based on the Perceptions of Teasing Scale (Thompson, Cattarin, Fowler, & Fisher, 1995), assessed frequency of appearance-related teasing from the same- and other-sex ("In the past year, how often have you been teased about the way you look on social media?"). The two parts involved reporting about teasing by the same-sex separately from other-sex peers. A second item with two parts asked about witnessing online appearance-related teasing by the same- and the other-sex ("In the past year, how often have you witnessed but not taken part in

Table 4
Correlations of Study 1 (N = 281) and Study 2 (N = 327) SMAPS Subscale Scores With Other Measures

		SMAPS subscales		
Study no.	Measure	Online self-presentation	Appearance activity	Appearance comparison
1	Age	.12*	.08	.09
2	Age	.00	.05	.01
	Social anxiety	.39**	.10	.50**
	Depression	.36**	.12*	.50**
	Appearance anxiety	.55**	.31**	.71**
	Disordered eating	.32**	.39**	.41**
	General interpersonal stress	.33**	.17**	.37**
	Coping flexibility	−.23**	−.08	−.27**
	General social media use	.49**	.30**	.37**
	Sexual harassment	.28**	.33**	.26**
	SMA experienced teasing	.28**	.32**	.31**
	SMA witnessed teasing	.34**	.37**	.39**
	Appearance-related support	.01	−.02	−.04

Note. SMAPS = Social Media Appearance Preoccupation Scale; SMA = social media appearance-related.
* $p < .05$. ** $p < .01$.

teasing on social media?") Responses ranged from 1 (*never*) to 5 (*very often*). Items were averaged to form a composite to indicate online appearance-related teasing separate from a composite of witnessing online appearance-related teasing, Cronbach's α was .85 for online appearance-related teasing and .93 for witnessing online appearance-related victimization.

Appearance-related support from others. Support about appearance from important others was measured with a four-item scale adapted from the Important Other Climate Questionnaire (Williams et al., 2006) and the Body Acceptance by Others Scale (Avalos & Tylka, 2006) and was used to assess participants' perceptions of the support they receive from important others in their lives when they feel bad about their appearance (e.g., "Important people in my life make me feel important regardless of how I look"). Participants responded on a scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*), where the total score was formed using the average of the items. Higher scores indicate greater perceived support from significant others, Cronbach's α = .92.

Social media use. Four items from the Facebook Intensity Scale (Ellison, Steinfield, & Lampe, 2007) were modified (to focus on social media rather than Facebook specifically) to measure emotional connectedness and integration of social media use 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 produce a total use score, Cronbach's α = .87.

Results

Confirmatory factor analyses. The confirmatory factor analyses of the 18-item SMAPS was conducted using MPlus with robust maximum likelihood estimation. The three latent factors of Online Self-Presentation, Appearance-Related Activity, and Appearance Comparison were free to covary with each other. The results supported the three-factor structure. As shown in Table 2, all loadings were .60 or above, with one exception. After freeing four covariances between errors, the model had an adequate fit to the data, $\chi^2(128) = 323.60$, $p < .001$, comparative fit index (CFI) = .96, root mean square error of approximation (RMSEA) = .068 (90% confidence interval [CI; .059, .078], $p = .001$).

The factor structure was invariant by gender. More specifically, when the loadings of all items on the three factors were freed to differ (as well as the covariances between factors) for young women and men, the model had an adequate fit to the data, $\chi^2(260) = 511.51$, $p < .001$, CFI = .94, RMSEA = .055 (90% CI [.048, .062], $p = .139$). However, when all loadings were fixed to gender equality and the fit of these two models were compared, there was no significant difference in the model fits, $\chi^2_{\text{diff}}(132) = 187.91$, $p > .05$. Thus, there was no indication that the loadings or the covariances between factors differed significantly for young women and men. For example, the correlation between online self-presentation and appearance comparison was $r = .78$ for young women and $r = .76$ for young men. The correlation between online self-presentation and appearance-related activity was $r = .41$ for young women and $r = .45$ for young men, and the correlation between appearance comparison and appearance-related activity was $r = .39$ for young women and $r = .43$ for young men.

Finally, given the high correlation between online self-presentation and appearance comparison, we also fit a two-factor model with all online self-presentation and appearance comparison items freed to load only on one factor, whereas other items were freed to load only on a second factor of appearance-related online activity. The fit of this model was poor, $\chi^2(130) = 624.23$, $p < .001$, CFI = .89, RMSEA = .108 (90% CI [.100, .117], $p < .001$).

SMAPS descriptive statistics and correlations of SMAPS subscales with other measures. As can be seen in Table 3, the average scores and correlations between the three subscales in Study 2 were similar to those found in Study 1. Online self-presentation had the highest average score (3.65), followed by appearance comparison (3.24) and appearance activity (2.50). Correlations between SMAPS subscales formed by averaging items ranged from $r = .46$ to $r = .73$.

Table 4 shows correlations between the three SMAPS subscales and all other measures. Of all investigated measures, only appearance-related support from others was not significantly correlated with any of the three SMAPS subscales. Also, coping flexibility was the only measure to be negatively correlated, with two of the three SMAPS subscales significantly correlated with it: online self-presentation ($r = -.23$) and appearance comparison ($r = -.27$). Correlations were significant between all other measures and the three SMAPS subscales: Online Self-Presentation (ranging from $r = .28$ to $r = .55$), Appearance Comparison (ranging from $r = .26$ to $r = .71$), and Appearance Activity (ranging from $r = .12$ to $r = .39$); the only exception was social anxiety, as it was not significantly associated with the SMAPS Appearance Activity subscale.

Age associations and gender differences in the SMAPS subscales. As shown in Table 4, correlations of the SMAPS subscale scores with age were small and nonsignificant for Online Self-Presentation, $r = .00$, $p = .967$, for Appearance-Related Activity, $r = .05$, $p = .364$, and for Appearance Comparison, $r = .01$, $p = .872$. As in Study 1, young women reported more online self-presentation, appearance-related activity, and appearance comparison than young men (see Table 3).

Incremental validity of the three SMAPS subscales. Table 5 presents the results of the regression analyses used to test incremental validity of the three SMAPS subscales. The results showed incremental validity for two of the three subscales, namely, Appearance-Related Activity and Appearance Comparison. More specifically SMAPS Appearance-Related Activity and Appearance Comparison were significantly associated with depression, social anxiety, appearance anxiety, and disordered eating when controlling for social media use, interpersonal stress, coping flexibility, sexual harassment, SMA teasing, SMA witnessing teasing, appearance support, age, and gender. Of note, the SMAPS subscale of Appearance Comparison had detrimental effects in all models, being associated with more depression, social anxiety, appearance anxiety, and disordered eating behaviors. However, once all other measures were considered, the SMAPS subscale of Appearance-Related Activity was associated with lower levels of depression and social anxiety symptoms, but more disordered eating behaviors; it was not significantly associated with appearance anxiety. The third SMAPS subscale of Online Self-Presentation was not uniquely associated with depression, social

Table 5

Results of Regression Models Testing the Incremental Validity of the SMAPS Subscales (N = 327)

	Dependent variables							
	Social anxiety		Depression		Appearance anxiety		Disordered eating	
Independent variables	B (SE B)	β	B (SE B)	β	B (SE B)	β	B (SE B)	β
SMAPS: Online self-presentation	.03 (.04)	.06	.01 (.04)	.01	.48 (.33)	.09	.02 (.04)	.03
SMAPS: Activity	−.10 (.04)	−.14**	−.11 (.04)	−.15**	−.13 (.29)	−.02	.11 (.03)	.18**
SMAPS: Comparison	.20 (.04)	.37**	.22 (.04)	.36**	2.93 (.30)	.56**	.12 (.04)	.25**
General social media use	−.02 (.05)	−.02	.00 (.05)	.00	−.69 (.40)	−.08	−.10 (.05)	−.12*
General interpersonal stress	.47 (.07)	.34**	.39 (.07)	.25**	2.92 (.56)	.22**	−.02 (.07)	−.02
Coping flexibility	−.12 (.04)	−.15**	−.20 (.04)	−.23**	−.67 (.30)	−.09*	−.01 (.04)	−.02
Sexual harassment	−.09 (.07)	−.07	−.01 (.07)	−.01	−.03 (.53)	.00	.20 (.06)	.17**
SMA teasing	.02 (.02)	.05	.01 (.02)	.04	.07 (.12)	.03	.04 (.01)	.18**
SMA witness teasing	.01 (.01)	.03	.03 (.01)	.14**	.04 (.08)	.02	.01 (.01)	.03
Appearance support	.05 (.05)	.05	−.15 (.05)	−.14**	−.52 (.37)	−.06	−.01 (.04)	−.01
Age	−.07 (.04)	−.08	−.03 (.04)	−.03	−.19 (.31)	−.02	.04 (.04)	.05
Female gender	−.01 (.10)	.00	−.22 (.10)	−.10*	−.63 (.79)	−.03	−.18 (.09)	−.10*

Note. SMAPS = Social Media Appearance Preoccupation Scale; SMA = social media appearance-related. Social anxiety: R^2 = .42, $F(12, 314)$ = 19.21, $p < .001$. Depression: R^2 = .45, $F(12, 314)$ = 21.79, $p < .001$. Appearance anxiety: R^2 = .57, $F(12, 314)$ = 35.19, $p < .001$. Extreme behaviors: R^2 = .32, $F(12, 314)$ = 12.18, $p < .001$.
* $p < .05$. ** $p < .01$.

anxiety, appearance anxiety, or disordered eating in these multivariate models.

Moderators of SMAPS effects: Social media use, gender, and age.

Social media use. We tested 12 interaction effects to investigate whether social media use moderated the associations of the three SMAPS subscales with the four outcomes (social anxiety, depression, appearance anxiety, and disordered eating). Overall, four interactions were significant. First, the interaction, Social Media Use × Self-Presentation, was significantly associated with social anxiety, $B = .05$ (.02), $p = .048$. Follow-up analyses showed that the association of self-presentation with social anxiety was stronger when use was high relative to low, but the association was not significant at any level. Second, the interaction, Social Media Use × Self-Presentation, was significantly associated with appearance anxiety, $B = .43$, $p = .034$, and the association between self-presentation and appearance anxiety was stronger when use was high, $B = .92$, $p = .018$, relative to low, $B = .06$, $p = .878$.

Third, the interaction, Social Media Use × Appearance-Related Activity, was significantly associated with appearance anxiety, $B = .57$, $p = .016$; the association between appearance-related activity and appearance anxiety was positive but not significant when use was high, $B = .22$, $p = .504$, but the association was negative and significant when use was low, $B = -.92$, $p = .035$. Fourth and finally, the interaction, Social Media Use × Appearance Comparison, was significantly associated with appearance anxiety, $B = .38$, $p = .050$; the association between appearance comparison and appearance anxiety was stronger when use was high, $B = 3.22$, $p < .001$, than when use was low, $B = 2.46$, $p < .001$.

Gender. We next tested 12 interaction effects to investigate whether gender moderated the associations of the three SMAPS subscales with the four outcomes (social anxiety, depression, appearance anxiety, and disordered eating). Only two interactions were significant and both involved depression. First, the interac-

tion, Gender × Self-Presentation, was significantly associated with depressive symptoms, $B = -.17$, $p = .006$; the association between self-presentation and depressive symptoms was significant among young men, $B = .13$, $p = .038$, but was not significant among young women, $B = -.05$, $p = .325$. Second, the interaction, Gender × Appearance Comparison, was significantly associated with depressive symptoms, $B = -.17$, $p = .003$; the association between appearance comparison and depressive symptoms was stronger among young men, $B = .35$, $p < .001$, than among young women, $B = .17$, $p < .001$.

Age. Finally, we tested 12 interaction effects to investigate whether age moderated the associations of the three SMAPS subscales with the four outcomes (social anxiety, depression, appearance anxiety, and disordered eating). No interactions were significant, B ranged from $-.01$ to $.18$, p ranged from .051 to .996.

Discussion

Many adolescents and young adults report a great deal of concern about their appearance, including being judged by others or not conforming to societal ideals (Fardouly & Vartanian, 2015; Holland & Tiggemann, 2016; Ricciardelli & Yager, 2016; Webb & Zimmer-Gembeck, 2014). Such concerns can result in excessive appearance anxiety, body dysmorphia, body dissatisfaction, or disordered eating, all of which can interfere with tasks of daily living, health, and happiness (Roberts et al., 2018; Veale et al., 2014; Zimmer-Gembeck, Webb, Farrell, & Waters, 2018). This preoccupation with appearance may be fuelled even more today by the excessive social comparison and image displays that are a basic part of using social media. Despite this apparent appearance preoccupation and the evidence that it is tied to historical change in social media platforms and their use (Saunders & Eaton, 2018; Seabrook et al., 2016), we could locate no standard measure to assess appearance-related social media use and preoccupation, which could be applied across a range of contemporary social media platforms while also being founded in social theories. Such

a measure was needed, as it may be appearance-related use and preoccupation with social media self-presentation and comparisons that will help to identify adolescents and young adults at the highest risk of appearance-related clinical disorders and other related problems. Thus, in this study, a new measure, the SMAPS, was developed and tested in high school (Study 1) and university (Study 2) students. Once developed and confirmed, the SMAPS subscales were validated against a range of measures of social media use and appearance sensitivities, and the subscales were also examined as correlates of emotional maladjustment. Attention was also given to gender differences and invariance, age associations, and the possible of interactions of SMAPs subscales with other social media measures when predicting emotional and appearance-related adjustment problems.

Three SMAPS subscales were found in exploratory analyses with high school students and were confirmed in a second study with university students. The SMAPS subscales included Online Self-Presentation, Appearance-Related Online Activity, and Appearance Comparison. These subscales, which were assessed with only 18 items, will allow for consideration of general appearance-related social media use separate from preoccupation in the forms of spending time engaged in self-presentational activities and comparing oneself to others online. As would be expected, appearance-related online activity had moderate correlations with self-presentation and appearance comparison, whereas self-presentation and appearance comparison were more highly correlated with each other. Nevertheless, analyses supported three rather than two factors. Moreover, providing evidence of the validity of all three SMAPS subscales, appearance-related activity was associated with appearance-related problems including disordered eating, but had only small associations with general emotional adjustment (social anxiety and depression). The other two SMAPS subscales tapping preoccupation seemed to generate more risk across a range of problems including appearance-related anxiety, disordered eating, engaging in and witnessing social media teasing about appearance, as well as having moderate positive associations with both general social anxiety and depressive symptoms. In addition, multivariate models showed that SMAPS appearance-related activity and appearance comparison had incremental validity when the outcomes were social anxiety, depression, appearance anxiety, and disordered eating; they had unique associations with all of these outcomes even after considering a range of other social media and appearance-related behaviors, as well as stress, coping, and sexual harassment.

Our analyses of gender shows that the SMAPS can be successfully used with both young men and women, with invariance found for the three-subscale factor structure in Study 2. In addition, age tended to show nonsignificant associations with the three SMAPS subscales, across the age range of 13 to 18 years in Study 1 and age 17 to 25 years in Study 2. Yet, as is usually found in studies of body image and appearance (Ricciardelli & Yager, 2016; Webb et al., 2017; Webb & Zimmer-Gembeck, 2014), young women (both high school students and university students) did endorse more appearance-related social media activity and more preoccupation with online self-presentation relative to young men. Young women also engaged in more appearance comparison than young men. In fact, young women scored about 0.5 points higher on activity and about 1 point higher (on a 7-point scale) than young men for self-presentation and appearance comparison. However, rarely were the SMAPS subscale scores more strongly associated with emotional adjustment in one gender relative to the other. In fact, we found only two interaction effects, with both supporting the possibility that greater preoccupation with self-presentation is more strongly associated with emotional maladjustment in young men relative to young women. Given that some research has identified that females are more likely than males to receive emotional support online (from their same-sex friends; Joiner et al., 2014, 2016), it may be that preoccupation with self-presentation is more problematic for young men because they do not get the same level of support received by young women online, which could serve to balance or temper the negative effect of preoccupation.

Overall, the findings support the use of the three SMAPS subscales as separate aspects of appearance-related social media use and preoccupation to examine their unique correlations with other behaviors, attitudes, or disorders in youth. Yet, we also showed in the current analyses that they may interact with other existing measures, focusing here on interactions with general level of social media use, to better explain variation in adjustment among youth. In particular, we found that the general level of social media use interacted with all three SMAPS subscales to better explain why some youth reported more elevated appearance anxiety symptoms than others. The consideration of other interaction effects (i.e., between existing measures and the SMAPS subscales) will be a useful addition to future research. For example, future research could examine risk factors for appearance-related preoccupation, to identify whether preexisting vulnerabilities might explain both social media preoccupation and symptom development. Also important, developmental research is needed focusing on social media use and appearance-related preoccupation, ideally beginning in late childhood and continuing all the way throughout adolescence and into young adulthood to capture data within the age periods when body image and eating disorders first onset for both women and men (McCabe & Ricciardelli, 2004; Menzel et al., 2010; Pearson et al., 2017; Sharpe et al., 2018).

There is one primary limitation of the present research to note here. The participants in the two studies were Australian young people with the majority endorsing White or Asian race/ethnicity. This may limit the generalizability of the findings. It will be important to test the SMAPS with groups of adolescents and young adults from other countries and from a diversity of other background. Despite the possibility of limited generalizability, the findings provide access to a new measure of appearance-related use and preoccupation, the SMAPS. The SMAPS has three subscales relevant to understanding emotional adjustment and social experiences of young men and young women across the ages of 12 to 25 years. Also, scores derived from the SMAPS were found to be both reliable and valid measure. Future research could build on the findings here to focus on development of appearance-related concerns and disordered eating as potentially related to social media use.

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