



# The Appearance-Related Social Media Consciousness Scale: Development and validation with adolescents

Sophia Choukas-Bradley<sup>a,\*</sup>, Jacqueline Nesi<sup>b,c</sup>, Laura Widman<sup>d</sup>, Brian M. Galla<sup>e,f</sup>

<sup>a</sup> University of Pittsburgh, Department of Psychology, 210 S. Bouquet St., Pittsburgh, 15206, USA

<sup>b</sup> Warren Alpert Medical School of Brown University, Department of Psychiatry and Human Behavior, 222 Richmond St., Providence, RI, 02903, USA

<sup>c</sup> Bradley Hasbro Research Center, Rhode Island Hospital, 1 Hoppin St., Suite 204, Providence, RI, 02903, USA

<sup>d</sup> North Carolina State University, Department of Psychology, Campus Box 7650, Raleigh, NC, 27695-7650, USA

<sup>e</sup> School of Education, University of Pittsburgh, 5940 Wesley W. Posvar Hall, Pittsburgh, PA, 15260, USA

<sup>f</sup> Learning Research and Development Center, University of Pittsburgh, 723 LRDC, 3939 O'Hara Street, Pittsburgh, PA, 15260, USA

## ARTICLE INFO

### Article history:

Received 7 May 2019

Received in revised form 29 February 2020

Accepted 29 February 2020

### Keywords:

Social media  
Body image  
Self-objectification  
Disordered eating  
Depression  
Adolescence

## ABSTRACT

Appearance-related social media consciousness (ASMC) is defined as the extent to which individuals' thoughts and behaviors reflect ongoing awareness of whether they might look attractive to a social media audience. In this 3-study paper, we report the development and validation of the ASMC Scale for adolescents. In Study 1, we developed 18 items and received input from adolescent focus groups and content experts, resulting in 13 items. In Study 2, we administered these items to a high school sample ( $N = 1227$ ; 51.8 % girls;  $M_{\text{age}} = 15.72$ ), completing an exploratory factor analysis and a confirmatory factor analysis on two split halves. Results supported a single-factor solution with configural, metric, and partial scalar gender invariance. In Study 3, we administered the scale to a second high school sample ( $N = 226$ ; 58.4 % girls;  $M_{\text{age}} = 16.25$ ). ASMC scores demonstrated strong internal consistency, convergent and incremental validity, and test-retest reliability (measure re-administered for  $n = 207$ ). Higher ASMC was associated with higher depressive and disordered eating symptoms, controlling for time on social media, gender, race/ethnicity, and body surveillance. Girls reported higher mean scores than boys. Findings support the use of this 13-item scale in reliably assessing adolescents' ASMC, which may have important implications for mental health in the age of social media.

© 2020 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

The use of photo-based social media sites is now a central part of adolescents' lives. In a nationally representative U.S. study in 2018, more than half of youth aged 13–17 reported checking photo-based social media sites such as Instagram, Snapchat, and Facebook at least once an hour (Rideout & Robb, 2018). Teens report using the highly visual sites of Instagram and Snapchat more than any other type of social media (Rideout & Robb, 2018). Such photo-based social media sites, which emphasize physical appearance, allow the possibility that at any moment, an individual's photograph could be broadcast to an audience of peers (de Vries, Peter, de Graaf, & Nikken, 2016; Fox & Vendemia, 2016). In this social media environment, young people may frequently imagine the online audience and engage in behaviors aimed at maximizing their physical attrac-

tiveness on social media (e.g., Zheng, Ni, & Luo, 2019). To capture this process, a recent study of U.S. young women introduced the construct of *appearance-related social media consciousness (ASMC)*, defined as the extent to which individuals' thoughts and behaviors reflect ongoing awareness of whether they might look attractive to a social media audience (Choukas-Bradley, Nesi, Widman, & Higgins, 2018). College women reported frequently experiencing ASMC, and higher ASMC was associated with body dissatisfaction and depressive symptoms (Choukas-Bradley et al., 2018). The purpose of the current research was to develop and validate a theory-based and psychometrically sound measure that captures adolescents' experiences of ASMC, and examine preliminary associations between ASMC and mental health correlates. We focus on high-school aged adolescents given their high frequency of checking photo-based social media platforms (Rideout & Robb, 2018), as well as unique features of the adolescent developmental period that may heighten the impact of social media (e.g., Nesi, Choukas-Bradley, & Prinstein, 2018).

\* Corresponding author at: University of Pittsburgh, Department of Psychology, 3413 Sennott Square, 210 S. Bouquet St., Pittsburgh, 15206, USA.  
E-mail address: [schoukas@gmail.com](mailto:schoukas@gmail.com) (S. Choukas-Bradley).

### 1.1. Theoretical perspectives on body image: developmental and sociocultural perspectives

Several theories from developmental and social psychology highlight the intersecting biopsychosocial processes that may impact adolescents' body image. These theoretical perspectives set the stage for social media's role in physical appearance concerns, as well as for the development of ASMC as a critical new construct with relevance for young people.

Adolescence is a developmental period during which individuals are acutely attuned to social status and feedback from peers, and social media may tap into these key adolescent motivators (Nesi et al., 2018; Sherman, Payton, Hernandez, Greenfield, & Dapretto, 2016). One developmental phenomenon common during adolescence is the *imaginary audience*, which describes the sense that others are watching one's every move (Zheng et al., 2019). Young people are especially attuned to physical appearance evaluations of oneself and others, and attractiveness is often central to a sense of self-worth, especially among young women (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). An "appearance culture" among adolescent boys and girls involves discussions about physical appearance and how to improve it (Jones, 2004; Jones, Vigfusdottir, & Lee, 2004). In this way, cultural beauty standards are transmitted by peers, perhaps exacerbating body dissatisfaction by encouraging social comparison and internalization of beauty ideals (Jones, 2004; Thompson et al., 1999). Social media sites may exacerbate these concerns, as they frequently emphasize physical attractiveness and provide unprecedented opportunities for social comparison and peer feedback on appearance.

Outside of the developmental literature, broader self-presentation theories have posited that individuals are motivated to present themselves in a positive light and often engage in impression management strategies to do so (Leary, 1995; Schlenker & Pontari, 2000). When people engage in self-presentation, they create an idealized persona for a real or imagined audience. Young people's self-presentational strategies often focus on impression management related to physical appearance (Leary, 1995; Mills, Musto, Williams, & Tiggemann, 2018). Social media sites offer ample opportunities for adolescents to engage in selective self-presentation focused on physical appearance, given frequent posting of photos and the presence of an audience of peers (Fox & Vendemia, 2016; Manago, Graham, Greenfield, & Salimkhan, 2008).

The sociocultural or tripartite model of body image describes how sociocultural influences contribute to body dissatisfaction. Thompson et al. (1999) described "omnipresent" societal standards for beauty that are difficult (if not impossible) to achieve, and which are conveyed by mass media, parents, and peers. Individuals internalize these beauty ideals, and because most people do not meet these beauty standards, body dissatisfaction results. Importantly, in the two decades since this theory was discussed, cultural beauty standards have become increasingly unrealistic for the majority of young people in the U.S. For example, young women are now socialized to pursue not only thinness but also a fit and toned body (Deighton-Smith & Bell, 2018), and young men are socialized to pursue a higher degree of muscularity than in prior generations (Edwards, Tod, Molnar, & Markland, 2016). Adolescents are now exposed to idealized bodies at unprecedented rates through social media sites and apps (Kleemans, Daalmans, Carbaat, & Anschütz, 2018).

Finally, Fredrickson and Roberts' (1997) objectification theory suggests that the unrelenting focus on women's physical appearance creates a cultural context in which girls and women internalize an observer's perspective on their bodies and perpetually monitor their physical selves (i.e., self-objectification). Furthermore, young women learn that their attractiveness is a currency that can be used for positive treatment, and that their interpersonal

value is based on physical appearance. At roughly the same time, McKinley and Hyde (1996) described the construct of objectified body consciousness—women's tendency to internalize cultural beauty standards, to believe that achieving these standards is within their control, and to view their bodies as outside observers in order to monitor compliance with these standards (i.e., engage in body surveillance). While the media objectification of women's bodies is a pervasive cultural phenomenon, individuals differ in the degree to which they engage in self-objectification, with implications for mental health. Young women who engage in higher levels of self-objectification report higher body shame, greater depressive symptoms, more disordered eating, and other maladaptive outcomes (see Calogero, Tantleff-Dunn, & Thompson, 2011). Furthermore, self-objectification may be relevant for understanding young men's body image as well (e.g., Vandenbosch & Eggermont, 2016). The context of social media likely facilitates self-objectification, as young people can frequently monitor their own physical appearance in photos.

### 1.2. Social media use and appearance concerns in adolescence

In the two decades since these sociocultural theories were introduced, social media has become a dominant source through which adolescents receive information about beauty standards (Perloff, 2014). This requires an updated understanding of prior theories, and necessitates the recognition of new constructs, such as ASMC, that are specific to the social media context.

Social media use likely has important psychological implications for body image, given its combination of features that tap directly into key adolescent motivators. Social media has been described as a transformative social context for adolescents, with features that differentiate it from offline interactions (Nesi et al., 2018), and which may exacerbate appearance concerns (Cohen, Newton-John, & Slater, 2018). According to the transformation framework, social media's *visualness* encourages a focus on physical appearance and its *quantifiability* creates peer feedback (often based on appearance in photos) that is new in its nature and frequency. In addition, social media's *availability*, *publicness*, and *permanence* create a new interpersonal reality, in which individuals can view photos of themselves and peers at any time and place, and images can be viewed, disseminated, and permanently accessed by a broad network of peers (Nesi et al., 2018).

While young people have always been attuned to their own and their peers' physical appearance and engaged in appearance-focused social comparisons, these processes may be exacerbated through social media (Manago, Ward, Lemm, Reed, & Seabrook, 2015). Social media provides the opportunity to carefully curate one's image through generating and selecting photos that present oneself as maximally attractive, and then editing those photos to further increase attractiveness (e.g., applying filters to look thinner, Fox & Vendemia, 2016; McLean, Paxton, Wertheim, & Masters, 2015). Social comparisons with peers' idealized photos on social media may breed body dissatisfaction (e.g., Fox & Vendemia, 2016; Kleemans et al., 2018). Furthermore, social media sites may increase youths' focus on their *own* images, given the possibility that at any moment, a photo could be taken and posted for a peer audience (Choukas-Bradley et al., 2018). Once photos are posted, adolescents are often directly subjected to the objectifying gaze and comments of peers, and they also witness peers' receipt of such comments (de Vries, Peter, Nikken, & de Graaf, 2014). Even during their offline moments, young people may find themselves monitoring their bodies to prepare for the possibility that photos will be taken or posted (Choukas-Bradley et al., 2018). The link between social media use and self-objectification has been demonstrated among both young women and men (e.g., Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Manago et al., 2015; Vandenbosch &

Eggermont, 2012). Taken together, theory and empirical research suggest that social media may provide the perfect storm for exacerbating the peer appearance culture.

### 1.3. Appearance-Related Social Media Consciousness (ASMC)

The features of social media and the societal emphasis on physical appearance collectively give rise to ASMC. A pilot study by Choukas-Bradley et al. (2018) used four preliminary items to measure ASMC in a sample of college women, finding that ASMC was common and that higher levels of ASMC were linked to lower body esteem and higher depressive symptoms. While this study provided preliminary evidence for ASMC as an important construct in young women's lives, it focused only on college women. Research is needed that examines ASMC among adolescent boys and girls.

Moreover, there is a strong need for a reliable and valid scale that assesses adolescents' ASMC. Existing scales that assess self-objectification and objectified body consciousness (e.g., Objectified Body Consciousness Scale [OBCS], McKinley & Hyde, 1996; Self-Objectification Questionnaire [SOQ], Noll & Fredrickson, 1998; Self-Objectification Behaviors and Beliefs Scale [SOBBS], Lindner & Tantleff-Dunn, 2017) tap into similar constructs but do not assess social media-specific behaviors that now reflect normative experiences among young people. With social media use now representing an integral part of adolescents' interpersonal and phenomenological experiences, and with more than half of high-school aged teens checking photo-based social media sites at least once an hour, we must understand adolescents' appearance-related consciousness that is specific to social media. A social media-specific scale will allow the assessment of cognitions, behaviors, and emotions that are specific to the social media context, such as imagining one's body through the lens of a social media audience even when offline, editing photos before posting them to social media, and zooming into social media photos to see what body parts look like. Importantly, while scales have recently been developed that capture some of adolescents' appearance-related social media behaviors (e.g., McLean et al., 2015), no scale captures the full range of ASMC experiences. To the extent that ASMC is a common experience with mental health implications, a reliable and valid ASMC Scale could serve as a valuable assessment tool for researchers and practitioners.

In the current set of studies, we aimed to develop a comprehensive yet brief ASMC Scale and assessed its reliability and validity in samples of adolescents. Based on theory and prior empirical work, we aimed to capture multiple behavioral, emotional, and cognitive experiences that reflect ASMC. First, given ideas proposed by Fredrickson and Roberts (1997) and McKinley and Hyde (1996) regarding the internalization of an observer's perspective on the body, and more recent empirical work indicating that social media may exacerbate young people's concerns about the online audience (Choukas-Bradley et al., 2018), we expected ASMC to involve the imagined audience—the tendency to imagine one's body through the lens of a social media audience. Additionally, the checking, surveilling, and self-monitoring behaviors that were highlighted in earlier theories regarding women's self-objectification (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996), and documented in recent empirical work on young people's social media use (e.g., Fox & Vendemia, 2016; McLean et al., 2015), may manifest in behaviors indicating vigilance to and surveillance of one's own photos on social media. Furthermore, based on prior research (Fox & Vendemia, 2016; McLean et al., 2015), we expected adolescents to report behaviors related to carefully selecting and editing photos in order to create a maximally attractive image on social media.

In addition to our primary scale development and validation goals, we had two secondary goals. First, we investigated whether

ASMC was associated with mental health symptoms. While some support has been found for correlations between overall time spent on social media and negative body image and disordered eating (Holland & Tiggemann, 2016) and between overall time on social media and depressive symptoms (Lin et al., 2016; Twenge, Joiner, Rogers, & Martin, 2017), several studies suggest that specific social media behaviors and cognitions focused on physical appearance—rather than overall time on social media—drive these associations (Butkowski, Dixon, & Weeks, 2019; Cohen, Newton-John, & Slater, 2017, 2018; Lamp et al., 2019; Mills et al., 2018). ASMC reflects adolescents' behaviors, cognitions, and emotions related to photo-based social media experiences, with potential implications for mental health. We examined associations between ASMC and adolescents' body surveillance, self-objectification, body comparison, body shame, depressive symptoms, and disordered eating. Second, we examined gender differences in mean levels of ASMC and in its association with mental health correlates. Based on theories and empirical work indicating that adolescent girls are more attuned to physical appearance concerns than adolescent boys, we hypothesized that girls would be higher than boys in mean levels of ASMC. However, given limited prior work on the mental health correlates of adolescent boys' appearance focus on social media (for an exception, see Vandenberg & Eggermont, 2016), no *a priori* hypotheses were generated regarding gender differences in the strength of associations between ASMC and mental health correlates.

Three studies were conducted with separate samples of U.S. adolescents. In Study 1, we developed 18 items that reflected ASMC and then received feedback from adolescent focus groups and content experts, resulting in a final set of 13 items. In Study 2, we administered these 13 items to a large sample of adolescents. We conducted an exploratory factor analysis (EFA) and then a confirmatory factor analysis (CFA), using random assignment to split the sample in half. We also examined the internal consistency of scale items and conducted tests for gender invariance. Finally, in Study 3, we administered the ASMC Scale to a new sample of adolescents. We examined the scale's internal consistency, convergent validity (associations with body shame, self-objectification, body surveillance, and body comparison), and incremental validity (through hierarchical regression analyses examining associations between ASMC, disordered eating, and depressive symptoms, controlling for demographic variables, time on social media, and body surveillance). We also examined test-retest reliability with adolescents from Study 3; 92 % of youth in this sample were available for re-administration of the measure approximately one week later. Finally, we examined the role of gender in mean levels of ASMC and as a moderator of the associations between ASMC and mental health correlates.

## 2. Study 1

The purpose of Study 1 was (1) to develop an initial pool of items, (2) to receive feedback from adolescents regarding these items, and (3) to receive feedback from content experts, in order to develop a set of ASMC items that could then be administered to adolescents and examined through factor analysis.

Several steps were taken to generate items for the ASMC scale. First, we drew upon objectification theory (Fredrickson & Roberts, 1997) and the transformation framework (Nesi et al., 2018) to identify theory-based concepts related to how adolescents may experience ASMC. We also adapted several items based on language from the OBCS Body Surveillance Subscale (McKinley & Hyde, 1996), the Self-Objectification Behaviors and Beliefs Scale (Lindner & Tantleff-Dunn, 2017), and the Self Photo Investment Scale and Self Photo Manipulation Scale (McLean et al., 2015). Finally, we

**Table 1**  
Item and Scale Descriptive Statistics for the Final 13-item ASMC Scale in Study 2 and Study 3.

Item	Study 2			Study 3		
	<i>M</i> ( <i>SD</i> )	Skewness	Kurtosis	<i>M</i> ( <i>SD</i> )	Skewness	Kurtosis
1. When people take pictures of me, I think about how I will look if the pictures are posted on social media.	3.65 (2.03)	0.15	−1.12	4.75 (1.81)	−0.45	−0.67
2. I think about how specific parts of my body will look when people see my pictures on social media.	3.26 (2.08)	0.41	−1.06	4.13 (2.02)	−0.12	−1.14
3. Even when I'm alone, I imagine how my body would look in a social media picture.	2.65 (1.94)	0.88	−0.40	2.98 (1.88)	0.63	−0.65
4. During the day, I spend time thinking about how attractive I might look when people see pictures of me on social media.	2.74 (1.87)	0.77	−0.46	3.03 (1.76)	0.47	−0.65
5. I try to guess how people on social media will react to my physical appearance in my pictures.	3.26 (2.03)	0.42	−1.01	3.23 (1.84)	0.28	−0.95
6. My attractiveness in pictures is more important than anything else I do on social media.	2.79 (1.87)	0.71	−0.52	2.38 (1.53)	0.91	0.12
7. When I go to social events, I care more about looking attractive in pictures people might post on social media than I care about having a fun time.	2.60 (1.74)	0.85	−0.13	2.17 (1.29)	0.87	−0.20
8. If an unattractive picture of me is posted on social media, I feel bad about myself.	3.24 (2.02)	0.47	−0.92	3.01 (1.87)	0.66	−0.60
9. I look at pictures of myself on social media again and again.	3.14 (2.00)	0.54	−0.83	3.55 (1.93)	0.25	−0.97
10. I zoom into social media pictures to see what specific parts of my body look like.	3.02 (2.07)	0.62	−0.87	2.61 (1.87)	0.99	−0.14
11. If someone takes a picture of me that might be posted on social media, I ask to look at it first to make sure I look good.	3.94 (2.14)	−0.01	−1.27	4.36 (2.00)	−0.26	−1.04
12. Before I post pictures on social media, I crop them or apply filters to make myself look better.	3.31 (2.08)	0.39	−1.09	3.46 (1.93)	0.32	−0.92
13. If someone takes a picture of me that might be posted on social media, I pose in a particular way so that I'll look as attractive as possible.	3.37 (2.05)	0.32	−1.07	3.00 (2.02)	0.67	−0.80
Full ASMC Scale	3.15 (1.60)	0.42	−0.58	3.28 (1.31)	0.22	−0.55

Note: Range for all items was 1–7. 1 = *Never*, 2 = *Almost Never*, 3 = *Rarely*, 4 = *Sometimes*, 5 = *Often*, 6 = *Almost Always*, 7 = *Always*. The full scale instructions were as follows: "The next questions ask about your experience with social media. When we say 'social media,' for this scale, we are referring to photo-based social media sites and apps like Facebook, Snapchat, and Instagram. We are NOT talking about dating websites or apps such as Tinder. Please read each statement and decide how frequently this happens for you." Five items from the original ASMC scale were omitted from the final 13-item version. These omitted items were as follows: (1) When I look at social media pictures, I notice areas of my appearance that I think others will view negatively; (2) I spend time looking through pictures of myself that are posted on social media and thinking about whether I look attractive in them; (3) I take lots of pictures of myself before posting one, so I can find one that looks as attractive as possible; (4) I take pictures of myself throughout the day, to increase my chances of finding an attractive picture to post on social media; (5) I do "photo shoots" with my friends, where we take lots of pictures in a row, so that I will look my best in social media photos.

adapted four items that had been pilot-tested in an earlier study of ASMC administered to college women (Choukas-Bradley et al., 2018). This process led to the generation of 18 items that reflect ASMC. See Table 1 for all scale items. Detailed information on item generation can be found in the Online Supplemental Material.

Focus group work involved gathering feedback on preliminary ASMC items from two focus groups with adolescents: one in a high school setting ( $n = 7$ ; 57 % male;  $M_{age} = 16.3$ ) and one in a middle school setting ( $n = 7$ ; 43 % male;  $M_{age} = 12.4$ ). Parents provided consent and adolescents provided assent before participating. The focus groups were approved by the University Human Research Protection Office. We used focus group feedback to finalize the wording of all items. Participants reported that the items captured behaviors, cognitions, and emotions that they and their peers experienced on a regular basis.

Finally, we asked three content experts to review the 18-item measure and to report whether they believed the items clearly and comprehensively represented the constructs it was designed to measure. Specifically, we reached out via email to three content experts selected based on their expertise in and extensive publishing in the areas of adolescent body image, media and social media influences, and the role of gender in body image concerns. Each expert was an independent reviewer and none had collaborated on the original ASMC paper or with the current authors on any other project. We asked each expert to review our 18-item measure and offer feedback on clarity and comprehensiveness, along with any other feedback. Each expert replied via email with their feedback, summarized below.

All three experts reported that the ASMC Scale comprehensively assessed the construct of ASMC. The experts also expressed enthusiasm about the construct and scale. However, the experts also raised concerns about the clarity and/or content validity of specific items. Based on their feedback, we removed five items. These included the item: "When I look at social media pictures, I notice areas of my appearance that I think others will view negatively."

Specifically, an expert noted that because ASMC reflects consciousness, its valence should be neutral. We also removed this item: "I spend time looking through pictures of myself that are posted on social media and thinking about whether I look attractive in them," based on an expert pointing out that it was a double-barreled item. Furthermore, we removed three final items: "I take lots of pictures of myself before posting one, so I can find one that looks as attractive as possible;" "I take pictures of myself throughout the day, to increase my chances of finding an attractive picture to post on social media;" and "I do 'photo shoots' with my friends, where we take lots of pictures in a row, so that I will look my best in social media photos," based on feedback that these items tapped behaviors and thoughts within single items. More specifically, an expert noted that it was not possible to determine whether the behavior (e.g., "I spend time looking through pictures of myself that are posted on social media") or the thought (e.g., "thinking about whether I look attractive in them") was providing more explanatory power.

Thus, based on feedback obtained during Study 1, we retained 13 ASMC items, which we administered to a large sample of adolescents in Study 2.

### 3. Study 2

Following the development of items in Study 1, the goal of Study 2 was to administer these items to a sample of U.S. adolescents to develop a final version of the scale. We examined the factor structure and internal consistency of the items, as well as testing for gender invariance.

#### 3.1. Method

##### 3.1.1. Participants

The analytic sample included  $N = 1227$  adolescents in the 9th through 12th grades ( $M_{age} = 15.72$  years,  $SD = 1.13$ ; range = 14–19) attending a public, suburban high school in the Southeastern United



States. These participants were drawn from a sample of 1875, who participated in a larger intervention study on the topic of social media. The main intervention outcomes are the subject of another paper that is separate to the aims of the current study. Based on official school records, 51.8 % of the analytic sample were girls; 47.0 % were Caucasian, 36.0 % were Hispanic/Latino, 8.4 % were Asian, 6.0 % were African American, and 2.4 % were of mixed or other races/ethnicities (race data were missing for 0.1 % of participants); and 24.3 % were eligible for free or reduced-price lunch. The analytic sample included 556 (45.3 %) 9th graders, 325 (26.5 %) 10th graders, 228 (18.6 %) 11th graders, and 118 (9.6 %) 12th graders.

### 3.1.2. Procedure

Study 2 was approved by the University of Pittsburgh's Human Research Protection Office and by the Character Lab Research Network. All data for Study 2 were collected and de-identified by Character Lab Research Network (and for school record data, Mathematica) before being shared with our team. At no point did students have contact with a member of our research team. Schools sent an informational letter about the study to parents, along with an opt-out permission form. Students provided assent before completing the study materials. Classroom teachers introduced the study to students and helped administer study materials. All activities were completed by students during regular school hours and on school computers using Qualtrics Survey Software.

The analysis for Study 2 uses data collected in April, approximately three months after participants completed the aforementioned intervention materials.<sup>1</sup> During the April survey, participants completed the Appearance-Related Social Media Consciousness Scale, in addition to other measures as part of the intervention evaluation (but which are not reported here). Of the 1,875 participants who accessed the intervention survey, 1,296 (69.1 %) accessed the follow-up April survey used in the current study. Of these 1,296 participants, 1,227 (94.7 % of follow-up sample) provided complete data on the ASMC scale. Our analyses reported below were run with these 1,227 participants.

### 3.1.3. Measures

**3.1.3.1. Demographic information.** School records were used to gather basic information about each participant's gender, age, race/ethnicity, and eligibility for free or reduced-price lunch.

**3.1.3.2. ASMC Scale.** Students completed the ASMC Scale that was developed in Study 1 (see Table 1). The full instructions for the ASMC Scale were as follows: "The next questions ask about your experience with social media. When we say "social media," for this scale, we are referring to photo-based social media sites and apps like Facebook, Snapchat, and Instagram. We are NOT talking about dating websites or apps such as Tinder. Please read each state-

<sup>1</sup> Three months prior to the collection of data used in Study 2, participants were randomly assigned to one of three experimental conditions, delivered via Qualtrics in the context of school classrooms: (1) a brief message that focused on the potential long-term benefits of eliminating or reducing social media use; (2) a brief message that framed reducing social media use as being aligned with autonomy and social justice; (3) a no-treatment control condition. Because two of these conditions involved messages that focused on social media use, we tested to ensure that no main effects of condition on ASMC scores were observed; indeed, we found no main effects,  $F(2, 1224) = .51, p = .604$ , or interactive effects with gender,  $F(2, 1221) = 0.59, p = .555$ . In other words, these brief messages did not have a significant main or interactive effect on ASMC scores assessed three months later. We nevertheless conducted sensitivity analyses to ensure that a similar pattern of results would remain when restricting our sample to the participants who had been randomly assigned to the no-treatment control condition ( $n = 393$ ). Results with this subsample revealed a similar pattern of results reported for Study 2 (i.e., results of the EFA, CFA, tests of gender invariance, internal consistency). Thus, to maximize statistical power, only results from the full sample of 1,227 participants are presented. Results from the no-treatment control analyses are available upon request from the first author.

ment and decide how frequently this happens for you." Participants responded to items on a 7-point Likert Scale (1=Never, 2=Almost Never, 3=Rarely, 4=Sometimes, 5=Often, 6=Almost Always, 7=Always).

## 3.2. Results

### 3.2.1. Item- and scale-level descriptive statistics

Item-level and full-scale descriptive statistics were conducted in SPSS 25.0 (see Table 1). No items were significantly skewed, with all skewness values below an absolute value of 1 and all kurtosis scores below 1.5 (Tabachnick & Fidell, 2018). No univariate outliers were detected (all z-scores < 3.0, range -1.37 to 2.52). For the full sample, the ASMC mean was 3.15 ( $SD = 1.60$ ). Higher mean scores were observed for girls ( $M = 3.64, SD = 1.50$ ) compared to boys ( $M = 2.63, SD = 1.55; t(1,225) = 11.57, p < .001$ ).

### 3.2.2. Exploratory factor analysis (EFA)

We conducted an EFA using full information maximum likelihood estimation in MPlus 8 (Muthen & Muthen, 1998–2017). Data from Study 2 were randomly split into two halves. In order to ensure that random assignment was successful, we tested for differences between the two halves in gender, race, grade, and free/reduced price lunch; no differences were revealed. The first half was used for exploratory factor analysis (EFA;  $n = 613$ ) and the second for confirmatory factor analysis (CFA;  $n = 614$ ). Gorsuch (1983) recommended never including less than 100 participants and a minimum of five participants per measured variable for EFA. Based on these guidelines, the sample size within the split-half sample was more than adequate for EFA. Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy (MSA) was conducted via SPSS and indicated these items had a high degree of common variance suitable for factor analysis,  $KMO = .97$ , and the significance of Bartlett's test of sphericity,  $\chi^2(78) = 6662.11, p < .001$ , indicated that the correlation matrix was factorable (Tabachnick & Fidell, 2018).

EFA was conducted using geomin rotation with 30 random start values. Oblique rotation was used to allow factors to be correlated, should more than one factor emerge. However, results of the EFA revealed a unidimensional solution. Only one factor emerged with an eigenvalue greater than 1.00 ( $\lambda = 8.28$ ), whereas eigenvalues for a second and third factor were only 0.76 and 0.55, respectively. Model fit for the single factor model was good,  $\chi^2(65) = 322.34, p < .001$ ; CFI = .956; TLI = .947; RMSEA = .080; SRMR = .031. The single factor explained 60.7 % of the total item variance. Factor loadings for all items on this single factor were excellent, with each standardized loading exceeding .69 (Tabachnick & Fidell, 2018; See Table 2).

### 3.2.3. Confirmatory factor analysis (CFA)

The single-factor structure of the ASMC Scale was assessed using a CFA in the second half of the sample (MPlus 8; Muthen & Muthen, 1998–2017). The single-factor model showed adequate fit to the data:  $\chi^2(65) = 402.16, p < .001$ ; CFI = .948; TLI = .938; RMSEA = .092; SRMR = .033. All items' standardized loadings were higher than .70, and error variances ranged from .28 to .50. The single ASMC factor explained 63.3 % of the total item variance.

### 3.2.4. Tests of measurement invariance

After confirming the single-factor structure of the ASMC scale, measurement invariance by gender was examined within a multiple-group CFA framework. Model fit indices were examined, including the model chi-square value, CFI, TLI, SRMR, and RMSEA. Given the high sensitivity of the chi-square statistic to large sample sizes (Bentler & Bonett, 1980), we relied on comparison of all model fit indices in determining measurement invariance across groups, guided by prior recommendations for acceptable change criteria by Chen (2007), i.e., -.01 for CFI, .015 for RMSEA, and .015 for scalar invariance. All results are shown in Table 3.

**Table 2**  
Factor Loadings of Retained Items in Study 2.

Item	Factor Loadings	
	EFA	CFA
1. When people take pictures of me, I think about how I will look if the pictures are posted on social media.	.774	.802
2. I think about how specific parts of my body will look when people see my pictures on social media.	.813	.851
3. Even when I'm alone, I imagine how my body would look in a social media picture.	.776	.795
4. During the day, I spend time thinking about how attractive I might look when people see pictures of me on social media.	.775	.785
5. I try to guess how people on social media will react to my physical appearance in my pictures.	.816	.849
6. My attractiveness in pictures is more important than anything else I do on social media.	.780	.808
7. When I go to social events, I care more about looking attractive in pictures people might post on social media than I care about having a fun time.	.754	.741
8. If an unattractive picture of me is posted on social media, I feel bad about myself.	.781	.787
9. I look at pictures of myself on social media again and again.	.796	.841
10. I zoom into social media pictures to see what specific parts of my body look like.	.811	.823
11. If someone takes a picture of me that might be posted on social media, I ask to look at it first to make sure I look good.	.690	.713
12. Before I post pictures on social media, I crop them or apply filters to make myself look better.	.735	.705
13. If someone takes a picture of me that might be posted on social media, I pose in a particular way so that I'll look as attractive as possible.	.817	.826

Note: Standardized item loadings are presented. All item loadings were significant at  $p < .001$ .

**Table 3**  
Tests of Measurement Invariance Across Gender in Study 2.

Model	Model Fit Indices				Model Comparisons	Model Fit Comparisons				
	$\chi^2$	<i>df</i>	CFI	RMSEA		$\Delta\chi^2$	$\Delta df$	<i>p</i>	$\Delta CFI$	$\Delta RMSEA$
M1: Configural Invariance	515.89	130	.939	.098						
M2: Metric Invariance	554.95	142	.935	.097	M2 vs. M1	39.06	12	< .001	-.004	-.001
M3: Scalar Invariance	660.89	154	.920	.104	M3 vs. M2	105.94	12	< .001	-.015	.007
M3b: Partial Scalar Invariance	581.02	149	.932	.097	M3b vs. M2	26.07	7	< .001	-.003	.000

Notes:  $\chi^2$  = chi-square; *df* = degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation;  $\Delta$  = change in parameter. Model 1 (M1) = baseline model (without invariance); Model 2 (M2) = invariant factor loadings; Model 3 (M3) = invariant factor loadings and item intercepts; Model 3b (M3b): invariant factor loadings and some (but not all) item intercepts.

First, we tested for configural invariance, or equivalence of model form, by examining overall fit statistics for the multiple-group, single-factor model with all factor loadings, item intercepts, and item residuals free to vary across gender groups. Model fit was acceptable,  $\chi^2(130) = 515.89$ ,  $p < .001$ ; CFI = .939; TLI = .927; RMSEA = .098; SRMR = .038, indicating that the basic organization of a single ASMC construct with 13 item loadings is appropriate for both boys and girls.

Next, we tested for metric invariance by constraining factor loadings to be equivalent across gender groups, and then comparing model fit between the constrained and unconstrained models. The metric invariance model revealed very similar model fit to the configural invariance model,  $\chi^2(142) = 554.95$ ,  $p < .001$ ; CFI = .935; TLI = .928; RMSEA = .097; SRMR = .052, supporting the equivalence of item loadings on the ASMC factor for boys and girls.

Finally, we tested for scalar invariance by constraining item intercepts to equality across groups, and comparing this model to the metric invariance model. The fully constrained model showed a slight decrement in fit compared to the metric invariance model,  $\chi^2(154) = 660.89$ ,  $p < .001$ ; CFI = .920; TLI = .919; RMSEA = .104; SRMR = .060. Thus, item intercept constraints were released, and model fit re-examined, until acceptable model fit was achieved. Ultimately, a solution in which 5 item intercepts were allowed to freely vary across gender was retained,  $\chi^2(149) = 581.02$ ,  $p < .001$ ; CFI = .932; TLI = .929; RMSEA = .097; SRMR = .053. Prior research has suggested that the majority of items on a factor should be invariant for partial scalar invariance (Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000); thus, partial scalar invariance was supported for the ASMC Scale.

### 3.2.5. Internal consistency

Cronbach's alpha estimates for ASMC scores were .95 for the full sample, .94 for girls, and .96 for boys. Thus, results support the ASMC scores' strong internal consistency for girls and boys.

### 3.3. Discussion

Study 2 revealed through an EFA and CFA that the 13 ASMC items loaded onto a single factor. Internal consistency was strong for the 13-item scale, both for the full sample and for boys and girls separately. Measures of skewness and kurtosis were acceptable and no univariate outliers were revealed. Tests of gender invariance revealed configural invariance, metric invariance, and partial scalar invariance. Girls reported higher levels of ASMC than boys. Thus, Study 2 provides evidence for strong psychometric properties of the ASMC Scale in a large sample of adolescents, and suggests that scale scores can be compared between boys and girls.

## 4. Study 3

The goal of Study 3 was to examine the reliability and validity of the 13-item ASMC Scale in a new sample of adolescents. The ASMC Scale was administered to a sample of U.S. high school students on two occasions, approximately one week apart, to assess test-retest reliability. In addition, we examined internal consistency, convergent validity, and incremental validity (associations with depressive symptoms and disordered eating, controlling for demographic variables, time on social media, and body surveillance).

### 4.1. Method

#### 4.1.1. Participants and procedures

Participants were 226 adolescents ( $M_{age} = 16.25$ ; 58.4 % girls, 39.8 % boys, 1.8 % transgender or other gender identity; 45.6 % White/Caucasian, 24.3 % African American/Black, 25.2 % Hispanic/Latinx, and 4.9 % other race/ethnicity) attending a rural public high school. All 10th and 11th graders ( $N = 754$ ) were invited to participate and were asked to return a parent permission form regardless of whether their parent granted consent ( $n = 309$  forms returned). Among youth who returned the form, 237

parents granted consent. The final sample included 226 students who assented to the study and completed the baseline assessment.

All self-report questionnaires for the current study were completed as part of the baseline assessment and one-week follow-up for a larger study of a health intervention (Widman et al., 2019), before any intervention had been delivered. Participants completed surveys on laptop computers in their classrooms, administered through Qualtrics. Privatizing dividers were used to protect confidentiality of student responses during study procedures. Participants received a \$10 gift card for their participation in the overall study. All procedures were approved by the Institutional Review Board.

#### 4.1.2. Measures

**4.1.2.1. Demographics.** A demographic form was included to gather basic information about gender identity, age, and race/ethnicity.

**4.1.2.2. Appearance-related social media consciousness.** We administered the final 13 ASMC items to participants ( $\alpha = .92$  in the full sample;  $\alpha = .90$  for girls and  $\alpha = .91$  for boys).

**4.1.2.3. Time on social media.** Participants reported their daily time on social media using a scale from 0 (*Less than 1 h*) to 10 (*10 or more hours*).

**4.1.2.4. Body surveillance and body shame.** Body surveillance and body shame were assessed with the established Body Surveillance and Body Shame subscales of the OBCS (McKinley & Hyde, 1996). Items are measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). Scores derived from each of the subscales have adequate reliability and validity (McKinley & Hyde, 1996; Moradi & Varnes, 2017). A mean of items from each subscale was computed, with higher scores indicating higher levels of body surveillance ( $\alpha = .86$  in the current sample;  $\alpha = .86$  for girls and  $\alpha = .85$  for boys) and body shame ( $\alpha = .84$ ;  $\alpha = .85$  for girls and  $\alpha = .71$  for boys).

**4.1.2.5. Self-objectification.** Self-objectification was assessed with the Self-Objectification Behaviors and Beliefs Scale (Lindner & Tantleff-Dunn, 2017). This scale consists of 14 items and has previously been validated for use with young adult women (Lindner & Tantleff-Dunn, 2017). Items are measured on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). A mean of items was computed, with higher values indicating higher levels of self-objectification ( $\alpha = .91$  in the current sample;  $\alpha = .90$  for girls and  $\alpha = .92$  for boys).

**4.1.2.6. Body comparison.** Body comparison among same-gender peers was assessed using a modified version of the Body Comparison Orientation scale of the Body, Eating, and Exercise Comparison Orientation Measure (BEECOM; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012). The 6-item scale assesses body-related social comparison with peers. BEECOM scores from the original version of this scale have been shown to have strong reliability and validity in samples of college women (e.g., Fitzsimmons-Craft et al., 2012). To adapt the scale for the current mixed-gender sample, we made several modifications to the scale, with the goal of using gender-neutral language. Specifically, we changed the word “figure” to “body”; removed examples of gendered body parts; changed a description of “revealing clothing” to “minimal or revealing clothing”; and changed an item about being “toned” to include “toned or muscular.” Items were rated on a 7-point scale (1 = *never* to 7 = *always*). A mean score was computed, with higher scores indicating higher levels of body comparison ( $\alpha = .95$  in the current sample;  $\alpha = .95$  for girls and  $\alpha = .92$  for boys).

**Table 4**

Correlations among ASMC Scale and Primary Study Variables for Study 3.

	1	2	3	4	5	6	7
1. ASMC Full Scale	–						
2. Self-Objectification	.69**	–					
3. Body Surveillance	.53**	.52**	–				
4. Body Shame	.46**	.56**	.58**	–			
5. Body Comparison	.67**	.70**	.56**	.55**	–		
6. Disordered Eating	.49**	.53**	.39**	.61**	.60**	–	
7. Depressive Symptoms	.32**	.40**	.29**	.37**	.41**	.40**	–

Note. \* $p < .01$ ; \*\* $p < .001$ .

**4.1.2.7. Disordered eating.** Symptoms of disordered eating were assessed using the Eating Disorder Examination Questionnaire –Short Form (EDE-QS; Gideon et al., 2016). This 12-item scale has been shown to have reliability and validity in a university sample (Gideon et al., 2016). A mean of the items was calculated, with higher scores indicating higher levels of disordered eating ( $\alpha = .87$ ;  $\alpha = .87$  for girls;  $\alpha = .85$  for boys).

**4.1.2.8. Depressive symptoms.** Participants reported on depressive symptoms over the past two weeks through the Short Mood and Feelings Questionnaire (SMFQ; Angold, Costello, Messer, & Pickles, 1995), a widely used 13-item measure in which adolescents report symptoms on a Likert scale (0 = *Not True*, 1 = *Sometimes*, 2 = *True*). A mean of items was computed, with higher scores indicating higher depressive symptoms ( $\alpha = .92$  in the current sample;  $\alpha = .92$  for girls and  $\alpha = .91$  for boys).

#### 4.2. Results

##### 4.2.1. Item- and scale-level descriptive statistics

There were no missing data on ASMC scale items. Descriptives for each item and the full scale are presented in Table 1 (item means ranged from 2.17 to 4.75). No items were significantly skewed. For the full ASMC Scale, measures of skewness and kurtosis were acceptable, both for the full sample and for boys and girls separately. No univariate outliers were detected. As in Study 2, mean levels of ASMC were higher for girls ( $M = 3.81$ ,  $SD = 1.23$ ) compared to boys ( $M = 2.54$ ,  $SD = 1.07$ ;  $t(220) = 7.91$ ,  $p < .001$ ).

##### 4.2.2. Internal consistency, convergent validity, and test-retest reliability

Strong internal consistency was again confirmed in this sample (full sample  $\alpha = .92$ ; girls  $\alpha = .90$ ; boys  $\alpha = .91$ ). Convergent validity was demonstrated with moderate to large bivariate correlations between the ASMC Scale and each of body surveillance, body shame, self-objectification, and body comparison (see Table 4). In examining convergent validity by gender, both girls and boys showed moderate to large correlations between ASMC and each body image variable ( $r$ s for girls from .35 to .68, for boys from .32 to .65). Test-retest reliability was examined by calculating the Pearson bivariate correlation between mean values of the ASMC Scale, administered approximately one week apart. Of the original 226 participants, 207 (91.6%) completed the measure at both time points; the resulting  $r = .83$  ( $p < .001$ ) indicated good test-retest reliability.

##### 4.2.3. Incremental validity

Two hierarchical regression analyses were conducted to test the incremental validity of the ASMC Scale in predicting mental health correlates. Power analyses were conducted using G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) for the proposed regression models consisting of five predictors (gender, race, time on social media, body surveillance, and ASMC), with a sample size of 226, alpha value of .05, and desired power of .80. Results sug-



**Table 5**  
Hierarchical Linear Regression Analyses for Study 3.

	Depressive Symptoms					Disordered Eating				
	Step Statistics			Final Statistics		Step Statistics			Final Statistics	
	$\Delta R^2$	<i>B</i> ( <i>se</i> )	$\beta$	<i>B</i> ( <i>se</i> )	$\beta$	$\Delta R^2$	<i>B</i> ( <i>se</i> )	$\beta$	<i>B</i> ( <i>se</i> )	$\beta$
Step 1, Covariates	.12***					.20***				
Gender		-.22 (.08)	-.20**	-.19 (.20)	-.18		-.18 (.09)	-.14*	.34 (.21)	.27
Race		-.01 (.07)	.03	.02 (.07)	.02		-.06 (.08)	-.05	-.05 (.07)	-.04
Time on Social Media		-.01 (.01)	-.02	-.02 (.01)	-.10		.03 (.01)	.14*	.01 (.01)	.06
Body Surveillance		.10 (.03)	.25***	.06 (.03)	.15		.15 (.03)	.32***	.07 (.03)	.16*
Step 2, Main Effect	.03**					.07***				
ASMC		.09 (.04)	.23**	.09 (.04)	.22*		.17 (.04)	.36***	.22 (.04)	.46***
Step 3, Interaction Effect	.00					.01*				
ASMC × Gender		–	–	.02 (.06)	.04		–	–	-.13 (.07)	-.31*
Total $R^2$	.15***					.28***				

Note: Gender coded 0 = female, 1 = male; Race coded 0 = non-white, 1 = white.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

gested adequate power to detect small to medium effect sizes ( $f^2 \geq 0.035$ ) for the association between ASMC and depressive symptoms and disordered eating, based on Cohen's (1988) guidelines for local effect sizes in multiple regression. Gender, race, time spent on social media, and body surveillance were added in a first step; ASMC was added in the second step. One participant was missing data on the OBCS scale, and two were missing data on the EDE-QS and SMFQ scales. Four participants who did not identify as male or female were excluded from analyses due to small sample sizes. Missing data were handled using listwise deletion in SPSS. Notably, ASMC was associated with depressive symptoms and disordered eating, controlling for race, gender, time spent on social media, and body surveillance (Table 5). Exploratory analyses were also conducted to determine whether gender moderated the associations between ASMC and each of depressive symptoms and disordered eating. An interaction term was created by multiplying gender (coded as 0 for female and 1 for male) by ASMC. This product term was entered into hierarchical regression models in the final step. Results revealed no significant gender moderation for the model predicting depressive symptoms, as the interaction term was not a significant predictor,  $b(se) = .02 (.06)$ ,  $p = 0.81$ . However, a significant interaction term was revealed in predicting disordered eating,  $b(se) = -.13(.07)$ ,  $p = .044$ . This interaction was further probed using PROCESS in SPSS 25.0 (Hayes, 2012). Results suggested that for girls, the effect of ASMC on disordered eating was significant,  $b(se) = .22 (.04)$ ,  $p < .001$ , whereas no significant effect of ASMC on disordered eating was found for boys,  $b(se) = .08 (.06)$ ,  $p = .144$ .

#### 4.3. Discussion

Study 3 findings provide support for the reliability and validity of the ASMC Scale items among adolescents, suggesting that it is an appropriate measure of ASMC in adolescents. Specifically, these results provided evidence for the internal consistency, test-retest reliability, convergent validity, and incremental validity of scores on this scale. Finally, results suggest that ASMC is associated with negative mental health outcomes in both boys and girls, but that associations between ASMC and disordered eating may be particularly relevant for girls.

### 5. General discussion

The goal of this paper was to describe the development and validation of the Appearance-Related Social Media Consciousness Scale. ASMC is a construct that captures the extent to which individuals' thoughts and behaviors reflect ongoing awareness of whether

they might look attractive to a social media audience (Choukas-Bradley et al., 2018). In the current set of studies, we aimed to develop a theory-based and psychometrically sound measure that captures adolescents' experiences of ASMC. In three studies, we provide evidence for the reliability, validity, and acceptability of the ASMC scale. Results suggest the importance of this construct for young people's psychological experiences: adolescents reported frequently experiencing ASMC, and higher levels of ASMC were associated with maladaptive mental health correlates (depressive symptoms and disordered eating). Finally, gender analyses revealed that adolescent girls reported higher mean levels of ASMC than boys. For both girls and boys, higher ASMC was associated with depressive symptoms. However, higher ASMC was significantly associated with disordered eating among girls only. Results have important theoretical and practical implications.

#### 5.1. The ASMC Scale: evidence of reliability and validity of an important new construct

With social media use now a ubiquitous part of life for adolescents (Rideout & Robb, 2018), it is vitally important to understand young people's subjective experiences with social media. ASMC experiences appear to be common among adolescents. In fact, only 10 % of the first sample (15.7 % of boys, 4.9 % of girls) and 4% of the second sample (8.9 % boys, 0.8 % girls) responded with *Never* to all ASMC items. In other words, 90 % of the first sample and 96 % of the second sample reported some degree of ASMC. This suggests that young people often engage in behaviors and cognitions that reflect a focus on social media physical appearance, including carefully curating photos before posting them, scrutinizing photos that have already been posted, and imagining how one would hypothetically look to a social media audience, with emotional and mental health implications. Importantly, our findings also highlight the ways that young people think about their attractiveness on social media during their *offline* moments.

It is not surprising that ASMC is common among adolescents, given key features of social media and this developmental period. During adolescence, individuals are highly attuned to physical appearance judgments and are motivated to present themselves as attractive (Noser & Zeigler-Hill, 2014). Young women are especially socialized to equate self-worth with physical attractiveness and to monitor their bodies for compliance to cultural beauty norms (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996). These cognitive, emotional, and behavioral experiences are likely exacerbated through social media, given its high levels of *visualness*, *quantifiability*, *availability*, *publicness*, and *permanence* (Nesi et al.,



2018). These social media features provide the perfect context for adolescents to engage in ASMC.

The current studies provide support for ASMC as an important construct and address the need for a psychometrically sound scale to assess these experiences. One published study provided preliminary evidence for the importance of ASMC among undergraduate women, but relied solely on four items and did not include samples of males or younger adolescents (Choukas-Bradley et al., 2018). Existing self-objectification and objectified body consciousness scales assess similar constructs—as is suggested by the correlations between the ASMC Scale and two of these scales (Lindner & Tantleff-Dunn, 2017; McKinley & Hyde, 1996)—but they do not assess social media-specific behaviors or contexts. Additionally, existing scales assessing social media appearance-related behaviors (e.g., McLean et al., 2015) had not yet assessed the full spectrum of ASMC experiences. Results suggest the reliability and validity of scores from the ASMC Scale, for adolescent girls and boys.

### 5.2. Mental health correlates of ASMC

ASMC may have important implications for young people's mental health. Our results suggest that after controlling for time spent on social media, gender, race, and body surveillance, higher ASMC was associated with higher depressive symptoms among both boys and girls, and with disordered eating among girls. The current studies add to a growing body of work suggesting that specific social media behaviors and cognitions, rather than overall time spent on social media, may be more strongly associated with mental health (e.g., Cohen et al., 2017, 2018; Meier & Gray, 2014). A recent systematic review of the literature found that appearance-focused activities on social media were associated with body image dissatisfaction and disordered eating (see Holland & Tiggemann, 2016), and a recent meta-analytic review found associations between specific appearance-focused social media behaviors and internalization of the thin ideal (Mingoia, Hutchinson, Wilson, & Gleaves, 2017). Prior work indicates associations between social media "appearance exposure" (i.e., photo-based activities) and weight dissatisfaction (Meier & Gray, 2014), and between social media-based social comparison and body dissatisfaction (e.g., Fardouly et al., 2015) and depressive symptoms (e.g., Nesi & Prinstein, 2015). Studies have also shown that manipulating one's photos mediates associations between self-objectification and depressive symptoms (Lamp et al., 2019), and that investment in selfies is associated with thin-ideal internalization, body dissatisfaction, and disordered eating (Butkowski et al., 2019; Cohen et al., 2017, 2018). This growing body of work highlights a notable shift in the field of social media research. Studies that focus solely on overall social media use may fail to capture important individual differences in subjective experiences of social media—both on and offline. ASMC reflects a set of social media experiences that are worthy of further investigation.

### 5.3. Gender and ASMC

An exploratory aim of these studies was to examine gender differences in ASMC. Results suggest that across both samples, adolescent girls reported higher mean ASMC scores than boys. Greater than 95 % of girls in our first sample and 99 % of girls in our second sample reported some degree of ASMC. In addition, while higher ASMC was associated with depressive symptoms for both girls and boys, it was also associated with disordered eating among girls only. Decades of theory and research indicate that young women are more affected than young men by appearance ideals conveyed via mass media (Fredrickson & Roberts, 1997; Thompson et al., 1999; van den Berg et al., 2007) and recent research highlights gender differences in the focus on physical appearance on social media as well (Haferkamp, Eimler, Papadakis, & Kruck, 2012;

Perloff, 2014; Seidman & Miller, 2013). Our findings suggest that ASMC may be especially common among adolescent girls. This is consistent with objectification theory, which asserts that women's self-objectification creates a shared set of experiences that are essential to understanding the psychology of women (Fredrickson & Roberts, 1997). Today's young women have a shared set of experiences imagining how attractive they may look to a social media audience, with critical implications for their mental health.

However, ASMC impacts young men as well. The vast majority of adolescent boys in our samples (84 % and 91 %, respectively) reported at least some degree of ASMC, and higher ASMC was associated with poor body image and depressive symptoms. These findings are consistent with prior work describing the effect of physical appearance ideals on young people. For example, for both adolescent boys and girls, appearance-related conversations with friends have been linked to body dissatisfaction via internalization of beauty ideals (Jones et al., 2004). Additionally, a review found that young men's experimental exposure to mass media images of idealized male bodies had a small but statistically significant negative impact on body dissatisfaction (Blond, 2008). Several studies have also revealed connections between social media experiences and greater body dissatisfaction and self-objectification among young men (e.g., de Vries et al., 2016; Manago et al., 2015; Vandenbosch & Eggermont, 2016). It is important to note that a different pattern of associations between ASMC and disordered eating among boys may have emerged if we had used a disordered eating measure that tapped into muscularity-related behaviors. The impact of social media on young men's body image remains an important and understudied area of research.

### 5.4. Limitations and future directions

This set of studies makes a critical contribution to the literature on social media use and body image, and also highlights a number of potential future directions for research. First, without a longitudinal or experimental study design, we cannot determine whether ASMC leads to or is caused by mental health concerns. Examining associations between ASMC and mental health outcomes over time is a critical next step in this line of work. Additionally, all measures in the current studies were self-reported. While many items of the ASMC Scale reflect subjective experiences that would be difficult to assess without self-report measures, future work should employ experimental designs and objective measures to the extent possible. For example, experimental designs could examine whether exposure to idealized social media photos leads to greater increases in body shame among individuals higher in ASMC. Furthermore, our measure of time spent on social media did not differentiate between time spent on social media overall, versus on photo-based sites specifically. In contrast, the ASMC Scale instructions ask participants to consider photo-based social media sites specifically. Future research should distinguish between these types of social media use when considering overall time on social media. Additionally, our scale anchors did not allow an examination of whether some adolescents who responded "never" to our ASMC items were using social media in a distinct way from other participants, or perhaps that they were not currently active on social media. Furthermore, we focused on symptoms of depression and disordered eating in community samples of high school students, and future work will need to assess the role of ASMC in clinical populations – for example, among individuals at risk for eating disorders who may be involved in "pro-Ana" (i.e., pro-eating disorder) communities that emphasize "thinspiration" on social media (see Griffiths et al., 2018). Future work should also examine whether ASMC is associated with young men's disordered eating using measures that capture excessive muscle-seeking behavior. Finally, while our analyses did not reveal any intervention effects on ASMC (see footnote

1), it is possible that the ASMC measure was not sensitive enough to pick up on changes in ASMC. Future studies should build on our preliminary work, investigating the psychometric properties of this scale across a wider age range, and in more diverse samples in terms of race/ethnicity, sexuality, gender identity, and geographic region.

### 5.5. Implications

Given the mental health risks that may be associated with ASMC—and with the broader societal over-emphasis on physical attractiveness (Fredrickson & Roberts, 1997; McKinley & Hyde, 1996; Thompson et al., 1999)—adolescents' frequent use of photo-based social media sites is worthy of future study. The ASMC Scale provides a valid and reliable tool for future work in this area. The current studies highlight how concerns about physical appearance on social media may not only affect adolescents when they are actively using social media, but also during their “offline” moments. Individuals may find themselves perpetually attuned to and “camera-ready” for the social media audience (Choukas-Bradley et al., 2018). Our findings highlight the need for interventions that target young people's problematic social media use. Preliminary work suggests the potential efficacy of social media literacy interventions for adolescent girls in reducing eating disorder risk (McLean, Wertheim, Masters, & Paxton, 2017).

Sexual objectification has been described as a system that is perpetuated by cultural beliefs about how women enjoy being objectified (Calogero & Tylka, 2014). Similarly, broad systematic factors likely perpetuate young people's—and especially young women's—focus on their attractiveness in social media photos. Today's adolescents have grown up in a world in which a great proportion of their interpersonal interactions occur online, and in which social media sites offer an ever-present platform for self-presentational tactics focused on physical appearance. These experiences may negatively affect adolescents' psychological development and perpetuate problematic societal messages regarding the importance of physical attractiveness. The ASMC Scale offers a critical step forward in understanding, and ultimately intervening, in the complex role of social media in young people's body image.

### CRedit authorship contribution statement

**Sophia Choukas-Bradley:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Project administration, Resources, Writing - original draft. **Jacqueline Nesi:** Conceptualization, Data curation, Formal analysis, Methodology, Writing - original draft. **Laura Widman:** Conceptualization, Data curation, Investigation, Methodology, Supervision, Project administration, Resources, Writing - review & editing. **Brian M. Galla:** Data curation, Formal analysis, Supervision, Project administration, Resources, Writing - review & editing.

### Acknowledgements

We are grateful to Chloe Bryen and Emily Carrino for their coordination of data collection and feedback on this scale; to other research assistants and staff who assisted with data collection; to our three content experts, Marika Tiggemann, L. Monique Ward, and Jennifer Stevens Aubrey, who each provided valuable feedback on the scale; to Mitch Prinstein, for his assistance with the Study 3 data collection; and to the adolescent and young adult participants who made this research possible. Study 2 was supported by Character Lab, and facilitated through the Character Lab Research Network, a consortium of schools across the country working collaboratively with scientists to advance character devel-

opment research. We are grateful for their support. This study was funded in part by fellowships from the National Science Foundation (DGE-1144081) and American Foundation for Suicide Prevention (PDF-010517) awarded to Jacqueline Nesi, and a grant from the Templeton Foundation (54929) to Brian M. Galla. Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the authors and do not necessarily reflect the views of NSF, AFSP, or the Templeton Foundation. Declarations of interest: none.

### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.bodyim.2020.02.017>.

### References

- Angold, A., Costello, E. J., Messer, S. C., & Pickles, A. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, 5(4), 237–249.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606. <http://dx.doi.org/10.1037/0033-2909.88.3.588>
- Blond, A. (2008). Impacts of exposure to images of ideal bodies on male body dissatisfaction: A review. *Body Image*, 5(3), 244–250. <http://dx.doi.org/10.1016/j.bodyim.2008.02.003>
- Butkowski, C. P., Dixon, T. L., & Weeks, K. (2019). Body surveillance on Instagram: Examining the role of selfie feedback investment in young adult women's body image concerns. *Sex Roles*, 81, 385–397. <http://dx.doi.org/10.1007/s11199-018-0993-6>
- Calogero, R. M., & Tylka, T. L. (2014). Sanctioning resistance to sexual objectification: An integrative system justification perspective. *Journal of Social Issues*, 70(4), 763–778. <http://dx.doi.org/10.1111/josi.12090>
- Calogero, R. M., Tantleff-Dunn, S., & Thompson, J. K. (2011). *Self-objectification in women: Causes, consequences, and counteractions*. Washington, DC: American Psychological Association.
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, 14, 464–504. <http://dx.doi.org/10.1080/10705510701301834>
- Choukas-Bradley, S., Nesi, J., Widman, L., & Higgins, M. K. (2018). Camera-ready: Young women's appearance-related social media consciousness. *Psychology of Popular Media Culture*, 8(4), 473–481. <http://dx.doi.org/10.1037/ppm0000196>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
- Cohen, R., Newton-John, T., & Slater, A. (2017). The relationship between Facebook and Instagram appearance-focused activities and body image concerns in young women. *Body Image*, 23, 183–187. <http://dx.doi.org/10.1016/j.bodyim.2017.10.002>
- Cohen, R., Newton-John, T., & Slater, A. (2018). 'Selfie'-objectification: The role of selfies in self-objectification and disordered eating in young women. *Computers in Human Behavior*, 79, 68–74. <http://dx.doi.org/10.1016/j.chb.2017.10.027>
- de Vries, D. A., Peter, J., de Graaf, H., & Nikken, P. (2016). Adolescents' social network site use, peer appearance-related feedback, and body dissatisfaction: Testing a mediation model. *Journal of Youth and Adolescence*, 45(1), 211–224. <http://dx.doi.org/10.1007/s10964-015-0266-4>
- de Vries, D. A., Peter, J., Nikken, P., & de Graaf, H. (2014). The effect of social network site use on appearance investment and desire for cosmetic surgery among adolescent boys and girls. *Sex Roles*, 71(9–10), 283–295. <http://dx.doi.org/10.1007/s11199-014-0412-6>
- Deighton-Smith, N., & Bell, B. T. (2018). Objectifying fitness: A content and thematic analysis of #fitspiration images on social media. *Psychology of Popular Media Culture*, 7(4), 467–483. <http://dx.doi.org/10.1037/ppm0000143>
- Edwards, C., Tod, D., Molnar, G., & Markland, D. (2016). Perceived social pressures and the internalization of the mesomorphic ideal: The role of drive for muscularity and autonomy in physically active men. *Body Image*, 16, 63–69. <http://dx.doi.org/10.1016/j.bodyim.2015.11.003>
- Fardouly, J., Diedrichs, P. C., Vartanian, L. R., & Halliwell, E. (2015). Social comparisons on social media: The impact of Facebook on young women's body image concerns and mood. *Body Image*, 13, 38–45. <http://dx.doi.org/10.1016/j.bodyim.2014.12.002>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). *Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses*. *Behavior Research Methods*, 41, 1149–1160.
- Fitzsimmons-Craft, E. E., Bardone-Cone, A. M., & Harney, M. B. (2012). Development and validation of the Body, Eating, and Exercise Comparison Orientation Measure (BEECOM) among college women. *Body Image*, 9(4), 476–487. <http://dx.doi.org/10.1016/j.bodyim.2012.07.007>

- Fox, J., & Vendemia, M. A. (2016). Selective self-presentation and social comparison through photographs on social networking sites. *Cyberpsychology, Behavior, and Social Networking*, 19(10), 593–600. <http://dx.doi.org/10.1089/cyber.2016.0248>
- Fredrickson, B. L., & Roberts, T. (1997). Objectification Theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, 21, 173–206. <http://dx.doi.org/10.1111/j.1471-6402.2008.00452.x>
- Gideon, N., Hawkes, N., Mond, J., Saunders, R., Tchanturia, K., & Serpell, L. (2016). Development and psychometric validation of the EDE-QS, a 12 item short form of the Eating Disorder Examination Questionnaire (EDE-Q). *PLoS One*, 11(5), e0152744 <http://dx.doi.org/10.1371/journal.pone.0152744>
- Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Griffiths, S., Castle, D., Cunningham, M., Murray, S. B., Bastian, B., & Barlow, F. K. (2018). How does exposure to thinpiration and fitspiration relate to symptom severity among individuals with eating disorders? Evaluation of a proposed model. *Body Image*, 27, 187–195. <http://dx.doi.org/10.1016/j.bodyim.2018.10.002>
- Haferkamp, N., Eimler, S. C., Papadakis, A.-M., & 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(2), 91–98. <http://dx.doi.org/10.1089/cyber.2011.0151>
- Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]* Retrieved from. <http://www.afhayes.com/public/process2012.pdf>
- 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>
- Jones, D. C. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology*, 40(5), 823–835. <http://dx.doi.org/10.1037/0012-1649.40.5.823>
- Jones, D. C., Vigfusdottir, T. H., & Lee, Y. (2004). Body image and the appearance culture among adolescent girls and boys. *Journal of Adolescent Research*, 19(3), 323–339. <http://dx.doi.org/10.1177/0743558403258847>
- Kleemans, M., Daalman, S., Carbaat, I., & Anschutz, D. (2018). Picture perfect: The direct effect of manipulated Instagram photos on body image in adolescent girls. *Media Psychology*, 21(1), 93–110. <http://dx.doi.org/10.1080/15213269.2016.1257392>
- Lamp, S. J., Cugle, A., Silverman, A. L., Thomas, M. T., Liss, M., & Erchull, M. J. (2019). Picture perfect: The relationship between selfie behaviors, self-objectification, and depressive symptoms. *Sex Roles*, 81, 704–712. <http://dx.doi.org/10.1007/s11199-019-01025-z>
- Leary, M. R. (1995). *Self-presentation: Impression management and interpersonal behavior*. Boulder, CO: Westview.
- 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(4), 323–331. <http://dx.doi.org/10.1002/da.22466>
- Lindner, D., & Tantleff-Dunn, S. (2017). The development and psychometric evaluation of the Self-Objectification Beliefs and Behaviors Scale. *Psychology of Women Quarterly*, 41(2), 254–272. <http://dx.doi.org/10.1177/0361684317692109>
- Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology*, 29(6), 446–458. <http://dx.doi.org/10.1016/j.appdev.2008.07.001>
- Manago, A. M., Ward, L. M., Lemm, K. M., Reed, L., & Seabrook, R. (2015). Facebook involvement, objectified body consciousness, body shame, and sexual assertiveness in college women and men. *Sex Roles*, 72(1–2), 1–14. <http://dx.doi.org/10.1007/s11199-014-0441-1>
- McKinley, N. M., & Hyde, J. S. (1996). The Objectified Body Consciousness Scale: Development and validation. *Psychology of Women Quarterly*, 20(2), 181–215. <http://dx.doi.org/10.1111/j.1471-6402.1996.tb00467.x>
- McLean, S. A., Paxton, S. J., Wertheim, E. H., & Masters, J. (2015). Photoshopping the selfie: Self photo editing and photo investment are associated with body dissatisfaction in adolescent girls. *The International Journal of Eating Disorders*, 48(8), 1132–1140. <http://dx.doi.org/10.1002/eat.22449>
- McLean, S. A., Wertheim, E. H., Masters, J., & Paxton, S. J. (2017). A pilot evaluation of a social media literacy intervention to reduce risk factors for eating disorders. *The International Journal of Eating Disorders*, 50(7), 847–851. <http://dx.doi.org/10.1002/eat.22708>
- Meier, E. P., & Gray, J. (2014). Facebook photo activity associated with body image disturbance in adolescent girls. *Cyberpsychology, Behavior and Social Networking*, 17(4), 199–206. <http://dx.doi.org/10.1089/cyber.2013.0305>
- 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>
- Mingoa, J., Hutchinson, A. D., Wilson, C., & Gleaves, D. H. (2017). The relationship between social networking site use and the internalization of a thin ideal in females: A meta-analytic review. *Frontiers in Psychology*, 8, 1351. <http://dx.doi.org/10.3389/fpsyg.2017.01351>
- Moradi, B., & Varnes, J. R. (2017). Structure of the Objectified Body Consciousness Scale: Reevaluated 20 years later. *Sex Roles*, 77(5–6), 325–337. <http://dx.doi.org/10.1007/s11199-016-0731-x>
- L.K. Muthén, B.O. Muthén. (1998–2017), Mplus user's guide. Eighth edition. Los Angeles, CA: Muthén & Muthén.
- 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(8), 1427–1438. <http://dx.doi.org/10.1007/s10802-015-0020-0>
- Nesi, J., Choukas-Bradley, S., & Prinstein, M. J. (2018). Transformation of adolescent peer relations in the social media context: Part 1—A theoretical framework and application to dyadic peer relationships. *Clinical Child and Family Psychology Review*, 21(3), 267–294. <http://dx.doi.org/10.1007/s10567-018-0261-x>
- Noll, S. M., & Fredrickson, B. L. (1998). A mediational model linking self-objectification, body shame, and disordered eating. *Psychology of Women Quarterly*, 22(4), 623–636. <http://dx.doi.org/10.1111/j.1471-6402.1998.tb00181.x>
- Noser, A., & Zeigler-Hill, V. (2014). Investing in the ideal: Does objectified body consciousness mediate the association between appearance contingent self-worth and appearance self-esteem in women? *Body Image*, 11(2), 119–125. <http://dx.doi.org/10.1016/j.bodyim.2013.11.006>
- Perloff, R. M. (2014). Social media effects on young women's body image concerns: Theoretical perspectives and an agenda for research. *Sex Roles*, 71(11–12), 363–377. <http://dx.doi.org/10.1007/s11199-014-0384-6>
- Rideout, V., & Robb, M. B. (2018). *Social media, social life: Teens reveal their experiences* Retrieved from Common Sense Media. [https://www.common SenseMedia.org/sites/default/files/uploads/research/2018\\_cs-socialmediasociallife\\_fullreport-final-release\\_2\\_lowres.pdf](https://www.common SenseMedia.org/sites/default/files/uploads/research/2018_cs-socialmediasociallife_fullreport-final-release_2_lowres.pdf)
- Schlenker, B. R., & Pontari, B. A. (2000). *The strategic control of information: Impression management and self-presentation in daily life*. In A. Tesser, R. B. Felson, & J. M. Suls (Eds.), *Psychological perspectives on self and identity* (pp. 199–232). Washington, DC: US: American Psychological Association.
- Seidman, G., & Miller, O. S. (2013). Effects of gender and physical attractiveness on visual attention to Facebook profiles. *Cyberpsychology, Behavior and Social Networking*, 16(1), 20–24. <http://dx.doi.org/10.1089/cyber.2012.0305>
- Sherman, L. E., Payton, A. A., Hernandez, L. M., Greenfield, P. M., & Dapretto, M. (2016). The power of the like in adolescence: Effects of peer influence on neural and behavioral responses to social media. *Psychological Science*, 27(7), 1027–1035. <http://dx.doi.org/10.1177/0956797616645673>
- Steenkamp, J., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *The Journal of Consumer Research*, 25(1), 78–107. <http://dx.doi.org/10.1086/209528>
- Tabachnick, B. G., & Fidell, L. S. (2018). *Using multivariate statistics* (7th ed.). London, UK: Pearson.
- 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.
- Twenge, J. M., Joiner, T. E., Rogers, M. L., & Martin, G. N. (2017). Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clinical Psychological Science*, 6(1), 3–17. <http://dx.doi.org/10.1177/2167702617723376>
- van den Berg, P., Paxton, S. J., Keery, H., Wall, M., Guo, J., & Neumark-Sztainer, D. (2007). Body dissatisfaction and body comparison with media images in males and females. *Body Image*, 4(3), 257–268. <http://dx.doi.org/10.1016/j.bodyim.2007.04.003>
- Vandenberg, R. J., & Lance, C. L. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3, 4–70. <http://dx.doi.org/10.1177/109442810031002>
- Vandenbosch, L., & Eggermont, S. (2012). Understanding sexual objectification: A comprehensive approach toward media exposure and girls' internalization of beauty ideals, self-objectification, and body surveillance. *The Journal of Communication*, 62(5), 869–887. <http://dx.doi.org/10.1111/j.1460-2466.2012.01667.x>
- Vandenbosch, L., & Eggermont, S. (2016). The interrelated roles of mass media and social media in adolescents' development of an objectified self-concept: A longitudinal study. *Communication Research*, 43(8), 1116–1140. <http://dx.doi.org/10.1177/0093650215600488>
- Widman, L., Kamke, K., Evans, R., Stewart, J. L., Choukas-Bradley, S., & Golin, C. E. (2019). Feasibility, acceptability, and preliminary efficacy of an online sexual health program for adolescents. *Journal of Sex Research*, 57, 145–154. <http://dx.doi.org/10.1080/00224499.2019.1630800>
- Zheng, D., Ni, X., & Luo, Y. (2019). Selfie posting on social networking sites and female adolescents' self-objectification: The moderating role of imaginary audience ideation. *Sex Roles*, 80(5–6), 325–331. <http://dx.doi.org/10.1007/s11199-018-0937-1>