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QUALITATIVE REVIEW

# Development and Validation of the Motivations for Social Media Use Scale (MSMU) Among Adolescents

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**Abstract**
Theoretical accounts of the relationship between social media use and body image among adolescents have highlighted motivations as an important factor. However, motivations for social media use has received little attention in extant research in the area of body image. The aim of this study was therefore to develop a measure of motivations for social media use among adolescents, with a focus on appearance motivations. Data from 770 adolescents (49% female), mean (SD) age = 12.76 (0.74) were used to examine the psychometric properties of the new Motivations for Social Media Use scale (MSMU). Exploratory and confirmatory factor analyses revealed a four-factor structure including Connection, Popularity, Appearance, and Values and Interests subscales. All subscales revealed acceptable internal reliability, and convergent validity with internalization of appearance ideals, self-esteem, and social media use. The MSMU is a useful tool for assessing appearance motivations for social media use among adolescent girls and boys.

**Keywords** Social media · Adolescents · Motivations · Body image · Gender

## Introduction

Consistent with theoretical frameworks highlighting the visual and appearance-focused nature of social media platforms and content (Rodgers 2016), social media use has been found to be related to body image concerns among adolescents (McLean Paxton et al. 2015; Slateret al. 2017; Tiggemann and Slater 2013) and youth (Cohen et al. 2017). However, the understanding of the individual-level factors that modulate this relationship is poor, particularly for adolescents. It has been proposed that motivations for use may play an important role in determining ways in which youth engage with social media (Rodgers 2016). While emerging research has supported this proposal among young adults (e.g. Dhir et al.2017; Papacharissi and Mendelson 2010), to date, few studies have explored motivations for social media use among adolescents (Teppers et al. 2014). In part, this has been due to the absence of appropriate measures to assess motives. Therefore, the aim of the current study was to develop a measure of motivations for social media use among adolescents, to inform future work examining the relationship between adolescent social media use and body image concerns and related disordered behaviors.

Adolescents are a group of particular interest in relation to social media use. Due to their cohort, many adolescents have grown up in a digital environment, and may therefore experience social media use in a different way from older individuals (Gardner and Davis 2013). In addition, developmental factors may also affect adolescents' experiences of social media in that understanding of marketing and self-presentation intent may emerge only gradually (van Reijmersdal and van Dam 2020). Furthermore, engagement with social media during developmental periods that are critical to identity formation may also constitute a specific of the adolescent online experience (Barry et al. 2017). Moreover, gender differences may exist in

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the ways that adolescents engage with social media, as well as within the relationships among adolescents' social media use and wellbeing, with, for example, girls tending to engage with photo-related activities and appearance-related content to a greater extent (McLean et al. 2019a, b) as well as being reported to be most vulnerable to detrimental effects of social media use on wellbeing (Twigg et al. 2020).

Such evidence for individual differences in outcomes related to social media use have increased the research interest related to inter-individual factors that may modulate the effects of engagement with social media among adolescents, with motivations for use emerging as a key factor. A number of theoretical models have been applied to understanding motives for social media use, but the most frequently considered is the uses and gratifications theory (Katz et al. 1973). In line with this theory, it has been hypothesized that specific motives for social media use will lead to specific types of engagement with different platforms that may in turn lead to different outcomes for users as they are exposed to different content or interactions (Rodgers 2016). In support of this theory, among college students, different motivations for Facebook use have been found to be associated with different patterns of the use of various features offered by the platform, as well as associations with the overall time spent engaging with the platform (Smock et al. 2011). For example, seeking social interaction was associated with making a greater number of comments. Thus, preliminary evidence suggests that motivations for social media use would be important to consider when seeking to understand social media engagement in adolescents.

Despite the recognition of motivations as a theoretically important component of models aiming to describe factors that potentiate and mitigate relationships between social media use and outcomes (Rodgers 2016), to date, little empirical attention has been paid to this dimension. Among adolescents, previous work has explored the role of social connection motivations, as well as distraction, with findings suggesting that social connection was the stronger motivation among adolescents (Floros and Siomos 2013). In addition, reporting using social media for social connection, or boredom was differently connected to increases in outcomes in adolescents over the course of three years such that use of social media for both reasons were associated with increases in problematic social network use, anxiety and empathy but only use for social connection was associated with increases in delinquency, while only use to alleviate boredom was associated with increases in financial stress (Stockdale and Coyne 2020). Other authors, assessing similar aspects of motivations specific to Facebook use, found that different types of motivations were differentially associated with increases in Facebook use over a year and a half (Frison and Eggermont 2016). Thus, increasing support for the usefulness of accounting for motivations for social media use has emerged.

Recently, several scales aiming to assess motivations or gratifications received through specific social media platforms have been developed. To a large extent, these have focused specifically on Facebook use (Dhir et al. 2017; Frison and Eggermont 2016; Hunt et al. 2012; Joinson 2008; Orosz et al. 2016; Ross et al. 2009; Smock et al. 2011), which is infrequently used by contemporary adolescents, who favor other platforms such as Snapchat or Instagram (McLean et al. 2015). Others have focused on social media more broadly (Pertegal et al. 2019); however, these scales have been limited as they have neglected to examine critical dimensions such as appearance-related motivations.

Indeed, poor body image and heightened eating concerns have been highlighted as important problematic outcomes of social media use among adolescents (Cohen et al. 2017; McLean et al. 2015). Sociocultural theories of influences on body image have emphasized how exposure to pressures to conform to societal appearance ideals from a range of sources, including media, increases risk of body dissatisfaction and related eating disorders (Thompson et al. 1999). It has been proposed that exposure to media content, including social media content, that promotes unrealistic and unattainable appearance ideals, increases individual endorsement of appearance ideals, that is their internalization of appearance ideals, and feelings of body dissatisfaction stemming from unfavorable comparisons with the idealized images among both adolescent girls (McLean et al. 2017) and boys (Tamplin et al. 2018). In addition, it has been suggested that engaging in photo-based activities such as taking, selecting, filtering, and posting images of oneself on social media, increases preoccupation with appearance (McLean et al. 2015). This then reinforces beliefs about the centrality of appearance to identity, and thus may contribute to low self-esteem (McLean et al. 2019a, b).

Consistent with these proposals, research among adolescents indicates that both exposure to appearance-focused social media content (Tiggemann and Slater 2013) and engagement in photo-based activities on social media reveal some of the strongest associations with body image related variables (Cohen et al. 2017; Mingoia et al. 2019), as compared to general amount of social media use. Thus, understanding adolescents' motivations to use heavily photo-based, appearance ideal promoting content would be useful for identifying individuals at higher risk of negative outcomes from social media engagement, and informing efforts to help youth use social media in positive ways.

To date, however, almost none of the work focused on motivations has explored those related to appearance. In addition, none of the scales reviewed above have included appearance-related motivations which are likely to be especially relevant in understanding relationships between social

media use and body dissatisfaction, and other indicators of psychological functioning. This is an important gap, and motives such as seeking social support, popularity, and seeking appearance feedback have been proposed to foster more engagement with appearance-based social media, such as the primarily photo based platforms, and thereby may be most strongly associated with poor body image outcomes (Rodgers 2016). Some qualitative work among adolescents has identified peer comparisons, including appearance comparisons, as being important motivational components of social media use (Throuvala et al. 2019). However, these aspects have not been explored quantitatively. One study, conducted among U.S. and Korean youth, assessed the frequency with which college students gathered or shared information related to body image and appearance on social media, and found that interacting on social media about appearance-related matters was related to body image outcomes (Lee et al. 2014). However, most of the measures used in this study assessed the frequency with which appearance-related social media practices occurred, rather than whether social media use occurred specifically for *this purpose*.

Thus, there is a gap in the understanding of adolescents' motivations for engaging with social media, as well as the available resources for assessing motivations, especially motivations related to appearance. Given the accumulating research evidence highlighting ways in which social media use is related to body image concerns among adolescents and youth (Cohen et al. 2017), this is a critical area for development.

## Current Study

Building on previous work in the area of motivations for social media use (Dhir et al. 2017; Papacharissi and Mendelson 2010), as well as theoretical accounts of the role of motivations in the relationship between social media use and body image concerns (Rodgers 2016), and developmental considerations, this study aimed to develop a tool capable of assessing adolescents' motivations to use social media, including appearance motivations. The previous work examining motivations for social media use has highlighted two broad overarching categories: motivations pertaining to social relationships such as connecting with others, or increasing and maintaining social status; as well as those pertaining to affect regulation, entertainment etc. Given the focus on social and relational aspects in theoretical accounts linking social media to body image, the decision was made to focus on the former category, and thus, did not include motivations related to affect regulation or entertainment. Thus, this study aimed to develop subscales to tap motivations related to maintaining social connections and popularity, seeking appearance information and promoting issues of concern to the individual. In addition, the convergent and divergent validity of the subscales by examining relationships between motives for social media use and two attributes related to psychological well-being and body image (self-esteem and internalization of media appearance ideals), and two different types of social media use, text-based (Twitter) and image-based (Instagram) were examined. These two platforms have previously been identified as differing in their focus on images, and hence appearance, and revealing differential associations with indicators of mental health (Pittman and Reich 2016). Therefore it was hypothesized that use of these platforms would be differentially related with different types of motivations, specifically, that Instagram use would be correlated with most motivations including appearance motivations, while Twitter use would be mainly correlated with motivations related to information/connection and interests, and not with appearance motivations.

## Methods

### Participants

A sample of 770 adolescents (49% female), mean (SD) age = 12.76 (0.74) years old, range 11–15, was recruited as part of a larger intervention study and baseline data were used. Participants were from eight schools in Melbourne, Victoria ($n = 5$ public schools; $n = 3$ independent schools). For six of the schools, only participants with parent-informed active consent took part in the study. For two of the independent schools, participants with parent-informed opt-out consent took part in the study. The majority of participants (79.5%) were born in Australia. Four-percent were born in Eastern Asia, 3.6% in Southern Asia, 3.0% in New Zealand, 2.2% in Northern Europe, 1.5% in South-eastern Asia, 1.3% in Northern America, and 5% indicated coming from other regions or did not provide data.

### Measures

#### Social Media Use Motivations

The Motivations for Social Media Use (MSMU) scale was created drawing on previous research (Dhir et al. 2017; Papacharissi and Mendelson 2010), and guided by both uses and gratifications theory (Katz et al. 1973) and theoretical models of the relationships between social media use and body image (Rodgers 2016). An initial pool of 39 items was generated based on previous descriptions of social identity and relationally oriented motivations for social media use, as well as the underlying framework predicting that appearance motivations are an important component of adolescent social media use. The 39 items were reviewed by the

research team, and covered the areas of social sharing, peer pressure, popularity, vicarious fame, self-presentation, appearance comparisons, appearance feedback, and values and social activism (see Table 1). Participants were invited to rate items describing motivations for social media use on a 5-point Likert-type scale with responses ranging from (1) *Never* to (5) *Always*. An example item is, "I use social media to increase my popularity."

### Social Media Use

To examine divergent validity of motivation subscales, frequency of use of two distinct types of social media, Twitter (being largely text based) and Instagram (being largely image based) was identified by asking adolescents to describe their use of these platforms on a 5-point Likert-type scale ranging from (1) *Never* to (5) *Always*. Responses were then dichotomized into (0) *Never* and (1) *Rarely-Always* due to somewhat skewed response distributions (AlBahri et al. 2018).

### Internalization of Media Appearance Ideals

To assess internalization of media appearance ideals, a modified 5-item version of the Internalization General subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-3 was used (Thompson et al. 2004). The modifications included removing four of the original nine items that assess comparisons with media and modifying the remaining questions to be specific to social media, e.g., "I would like my body to look like the models who appear on social media." (McLean et al. 2019a, b; Thompson et al. 2004). Items are scored on a 5-point Likert-scale ranging from (1) *Definitely Disagree* to (5) *Definitely Agree,* with two of the items reverse-scored. In the present sample, the scale revealed good internal reliability: $\alpha = 0.75$ among male and $\alpha = 0.84$ among female adolescents.

### Self-esteem

Self-esteem was assessed with a well-established single item measure (Robins et al. 2001). The single item measure

**Table 1** Final pattern coefficients from exploratory factor analysis, for the MSMU among sample 1 (N = 390)

| I use social media… | Factor | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 1. Might miss out on what is going on with friends | **0.74** | − 0.02 | 0.01 | 0.18 |
| 2. Would feel left out | **0.67** | 0.05 | 0.14 | − 0.02 |
| 3. So friends know what I am doing | **0.53** | 0.14 | − 0.12 | 0.35 |
| 4. To increase my popularity | 0.17 | **0.58** | 0.24 | − 0.14 |
| 5. So more people know and like me | 0.07 | **0.83** | 0.08 | − 0.10 |
| 6. To impress people | 0.02 | **0.67** | 0.25 | − 0.15 |
| 7. So people see me the way I want | − 0.13 | **0.56** | 0.15 | 0.29 |
| 8. To know if my pictures look attractive | − 0.01 | 0.12 | **0.72** | 0.01 |
| 9. To learn how to improve how I look | 0.01 | 0.12 | **0.77** | 0.07 |
| 10. To compare how I look with friends | 0.16 | 0.02 | **0.74** | − 0.02 |
| 11. To get my friends' opinion on how I look | − 0.44 | 0.12 | **0.72** | 0.06 |
| 12. To filter the photos I post | − 0.06 | − 0.01 | **0.73** | 0.13 |
| 13. To campaign for things I care about | − 0.01 | − 0.06 | 0.10 | **0.76** |
| 14. To connect with people who care about the same | 0.12 | − 0.08 | 0.01 | **0.78** |
| 15. To promote issues that matter to me | 0.06 | − 0.15 | 0.22 | **0.69** |
| Items not included in final scale | | | | |
| 16. To compare my appearance with celebrities | − 0.01 | 0.01 | **0.80** | 0.01 |
| 17. So people see me looking my best | − 0.01 | 0.14 | **0.75** | 0.11 |
| 18. To share pictures where I look attractive | 0.06 | − 0.01 | **0.83** | 0.04 |
| 19. Stay connected | **0.58** | − 0.06 | − 0.20 | **0.40** |
| 20. So that my peers like me | 0.25 | **0.48** | **0.30** | − 0.18 |
| 21. To show the cool aspects of my life | − 0.09 | **0.64** | − 0.13 | **0.50** |
| 22. To show that I am popular | 0.08 | **0.60** | 0.26 | − 0.22 |
| 23. To follow celebrities | 0.12 | − 0.07 | 0.23 | **0.46** |
| 24. To edit my profile to look good | − 0.17 | **0.40** | **0.46** | 0.18 |
| 25. To show the best things in my life | − 0.02 | **0.56** | − 0.17 | **0.52** |

Bolded values indicate the principal factor loadings

revealed strong psychometric properties in college students as well as male and female community members (Robins et al. 2001), and has previously been successfully used with children (Bird et al. 2013). Participants are asked to indicate on a scale ranging from (1) *Not very true of me* to (5) *Very true of me,* the item "I have high self-esteem".

### Data Analyses

To minimize conceptual overlap, 25 of the initial pool of 39 items were included in the factor analysis, following examination of the response distribution, overlap of concept, and wording. Thus, items were considered for removal if only a small proportion (< 5%) of the sample had rated them as "always" suggesting that the item was not highly endorsed, and if their conceptual overlap with another item was high. In addition, items were preferred when the wording was judged most gender neutral and age-appropriate.

The sample was randomly split into two and Exploratory Factor Analysis (EFA) was conducted on the first half, and Confirmatory Factor Analysis (CFA) was conducted on the second. Bartlett's test of sphericity and the Kaiser–Meyer–Olkin measure of sampling adequacy were used to assess the factorability of the items. A significant Bartlett's test and a Kaiser–Meyer–Olkin value of 0.60 or higher indicate that items are appropriate for factor analysis (Tabachnick et al. 2007). SPSS 24.0 was used to conduct the EFA using principal axis factoring with Promax rotation to examine the factor structure of the MSMU and to identify items for deletion. The number of factors to be retained was based on an examination of the scree plot and application of the Kaiser–Guttman criterion, which suggests that factors be retained if they produce an eigenvalue of 1.0 or greater (Guttman 1954; Kaiser 1960). Items with low primary factor loadings (primary loading of 0.40 or less) and cross-loading items (a secondary loading of 0.30 or higher and items with a difference of 0.20 or less between the primary and secondary loading) were deleted from the scale (Rodgers et al. 2016).

To assess the structure of the model established using EFA, Confirmatory factor analysis was conducted using Mplus Version 8.0 (Muthén and Muthén 2017) with a Maximum Likelihood Robust estimator which adjusts the standard errors and chi-square statistic for non-normality (Yuan and Bentler 2000). Model fit was assessed using the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Guidelines suggest that CFI values of 0.90 or higher indicate acceptable model fit and CFI values of 0.95 indicate good fit, while RMSEA values of 0.08 or less and SRMR values of 0.05 or less indicate good model fit (Bentler 1990; Browne and Cudeck 1993; Hu and Bentler 1999).

## Results

### Exploratory Factor Analysis

In support of the factorability of the items, Barlett's test of sphericity was significant, $\chi^2\,(325) = 7070.44$, $p < 0.001$ and the Kaiser–Meyer–Olkin value was 0.94. In the EFA, both the eigenvalues and scree plot suggested a four-factor solution for the scale, explaining 70% of the variance. Eighteen items exhibited strong loadings onto their primary factor with no cross-loadings and were retained in the scale (Table 1). Seven items presented high levels of cross-loadings and therefore were excluded from the final scale (Table 1). Each factor was clearly interpretable. The first factor, labeled Connection motivations, was comprised of three items reflecting a desire to be connected with friends by staying up to date with their news, and sharing one's own updates. The second factor, labeled Popularity motivations, was comprised of four items illustrating a desire to increase popularity and reflecting impression management. The third factor labeled Appearance motivations, was comprised of eight items reflecting uses of social media in ways that were related to the pursuit of appearance ideals, body image, and self-presentation. Finally, the fourth factor labeled, Values and Interests motivations, included three items related to using social media as a platform for promoting the things that individuals cared about, and engaging with others with similar values and interests.

### Confirmatory Factor Analysis

The structure of the MSMU, where the four latent constructs of Connection, Popularity, Appearance, and Values and Interests motivations were intercorrelated and indicated by three, four, eight, and three items respectively, was tested with a Maximum Likelihood Robust estimator. This initial model was not a good fit with the data, $\chi 2(129) = 398.453$, $p < 0.001$, $CFI = 0.885$, $SRMR = 0.058$, $RMSEA = 0.081$ (90% CI 0.072, 0.090). Inspection of the model modification indices suggested that an improvement of fit could be achieved through additional parameters. That is, there would be a reduction in Chi-square for the addition of a single parameter, where 3.84 is the value that should be exceeded at the 0.05 level for a change in one degree of freedom. Large improvements in fit were suggested by modification indices to intercorrelate the residuals of several Appearance items. For example, the largest change in model fit ($\Delta\chi 2 = 77.84$) was proposed by intercorrelating the residuals of the 17th ("people see me looking my best")

and 18th item ("share pictures where attractive"). Close scrutiny of additional modification indices showed that there were various improvements in fit by intercorrelating the residuals of these items, as well as item 16. For example, substantial improvements of fit ($\Delta\chi 2 = 24.61–35.74$) were suggested by intercorrelating the residual of item 16 ("compare appearance celebrities") with other appearance items. Rather than intercorrelating these residuals post-hoc to improve fit, the content of these items was inspected prior to their removal, and the analysis conducted a second time (Brown 2014).

The new model with 15 items was now an excellent fit with the data $\chi 2(84) = 185.673$, $p < 0.001$, $CFI = 0.944$, $SRMR = 0.059$, $RMSEA = 0.061$ (90% CI 0.049, 0.073). Standardized Regression Weights for all scale items (i.e., an indication of how much variance is shared with the other items, or is accounted for by the factor), and a calculation of variance explained by 4-factor models (i.e., construct reliability) overall are presented in Table 2. Further, intercorrelations between latent factors were all significant and are presented in the supplementary materials. In sum, the findings from the new model revealed good construct reliability in both boys and girls as well as the combined sample.

## Multi-Sample Confirmatory Factor Analyses (MSCFA)

A MSCFA was used to test the factorial validity of the MSMU by examining the degree of equivalence, or invariance, in the factor loadings and correlations across gender. The aim of these analyses was to demonstrate equivalency across gender in order to demonstrate the utility of the scale for both females and males. It was expected that there would be no differences between responses across gender on the subscales.

A Maximum Likelihood Robust estimator was used (to account for multivariate skewness) to test a 4-factor model with these latent variables represented by Connection, Popularity, Appearance, and Values and Interests motivations. Invariance of the model was tested across the samples to provide evidence that participants interpreted and responded to items in a similar manner, with the same factor structure across gender (Van de Schoot et al. 2012).

In accordance with the process outlined by Van de Schoot et al. (2012), a number of nested models, each with increasingly strict constraints were assessed. First, the model was assessed separately in each sample to determine whether model fit is similar. Next, a baseline or configural model (configural variance) was assessed by examining a model with no constraints (i.e., all parameters vary freely between

**Table 2** Standardized regression weights for MSMU items

| Item | | Female | Male | Overall |
|---|---|---|---|---|
| Connections 1 | Might miss out on what is going on with friends | 0.742 | 0.682 | 0.725 |
| Connections 2 | Would feel left out | 0.843 | 0.812 | 0.810 |
| Connections 3 | So friends know what I am doing | 0.631 | 0.604 | 0.645 |
| Connection construct reliability | | .786 | 0.744 | 0.772 |
| Popularity 1 | To increase my popularity | 0.824 | 0.869 | 0.842 |
| Popularity 2 | So more people know and like me | 0.866 | 0.848 | 0.859 |
| Popularity 3 | To impress people | 0.879 | 0.832 | 0.842 |
| Popularity 4 | So people see me the way I want | 0.624 | 0.709 | 0.652 |
| Popularity construct reliability | | .879 | 0.889 | 0.878 |
| Appearance 1 | To know if my pictures look attractive | 0.897 | 0.919 | 0.915 |
| Appearance 2 | To learn how to improve how I look | 0.845 | 0.912 | 0.856 |
| Appearance 3 | To compare how I look with friends | 0.835 | 0.717 | 0.802 |
| Appearance 4 | To get my friends' opinion on how I look | 0.874 | 0.953 | 0.896 |
| Appearance 5 | To filter the photos I post | 0.625 | 0.661 | 0.645 |
| Appearance construct reliability | | .911 | 0.922 | 0.915 |
| Values and interests 1 | To campaign for things I care about | 0.894 | 0.796 | 0.920 |
| Values and interests 2 | To connect with people who care about the same | 0.658 | 0.638 | 0.700 |
| Values and interests 3 | To promote issues that matter to me | 0.800 | 0.637 | 0.830 |
| Values and interests construct reliability | | .831 | 0.734 | 0.860 |
| Overall construct reliability | | 0.962 | 0.958 | 0.964 |
| *N* | | 158 | 159 | 321 |

All loadings are significant at $p < .001$. The total sample in the multi sample confirmatory analysis was smaller than the overall sample as we had to exclude 4 participants who did not identify with either gender

groups) in the combined dataset to determine if the model provides good model fit. The baseline the model was a good fit with the data $\chi^2(168) = 329.705$, $p < 0.001$, $CFI = 0.916$, $SRMR = 0.069$, $RMSEA = 0.078$ (90% CI = 0.065, 0.090).

Then, weak factorial invariance (i.e., metric invariance) was assessed by holding factor loadings constant across gender. This indicates whether female and male participants interpreted items in the same way, thus attributing the same level of meaning to the latent construct. Again, this model was a good fit with the data: $\chi^2(179) = 340.098$, $p < 0.001$, $CFI = 0.916$, $SRMR = 0.074$, $RMSEA = 0.075$ (90% CI = 0.063, 0.087). Strong invariance (scalar invariance) was assessed by holding factor loadings and intercepts equal and tests whether participants scored similarly on each item (Van de Schoot et al. 2012). That is, respondents in both samples genuinely high in social media motivations should select "Always" for the same item. Strong invariance indicates that means can be compared between samples (Milfont and Fischer 2010), and this proved to be a good fit with the data, $\chi^2$ (190) = 366.133, $p < 0.001$, $CFI = 0.908$, $SRMR = 0.075$, $RMSEA = 0.076$ (90% CI = 0.065, 0.088).

Evidence of invariance generally comes from likelihood ratio tests (difference in $\chi^2$ between two models). Metric invariance, or the difference between the configural model and the constrained factor loadings model was non-significant: $\Delta\chi^2(11) = 14.656$, $p = 0.198$. The difference between the scalar and metric models, known as scalar invariance was significant, $\Delta\chi^2(11) = 27.447$, $p = 0.004$. While scalar invariance was significant, this $\Delta\chi^2$ is sensitive to sample size (Brannick 1995; Cheung and Rensvold 2002; Kelloway 1995). It is suggested (Chen 2007; Cheung and Rensvold 2002) that invariance between nested models is observed if $\Delta CFI \leq 0.01$, and $\Delta SRMR \leq 0.01$ or $\Delta RMSEA \leq 0.015$. Using these criteria, scalar and metric invariance were therefore demonstrated across gender. Standardized Regression Weights for all scale items across gender are presented in Table 2. Intercorrelations between latent factors represented in the MSCFA were all significant and are presented in the supplementary materials.

## Internal Consistency, Subscale Means, and Intercorrelations Between subscales

The descriptive statistics and intercorrelations between scales are presented in Table 3. The internal reliability of all scales was acceptable among both boys and girls, ranging from $\alpha = 0.78$ to $\alpha = 0.95$. The mean values for all subscales were significantly higher among girls than boys.

**Table 3** Descriptive statistics and intercorrelations between motivations subscales, self-esteem and internalization, and social media use among boys and girls

| | Cronbach alpha | Mean (SD) | Connection | Popularity | Appearance | Values and interests |
|---|---|---|---|---|---|---|
| Girls | | | | | | |
| Connection | 0.78 | 8.19 (3.38) | | | | |
| Popularity | 0.87 | 7.23 (3.97) | 0.60*** | | | |
| Appearance | 0.91 | 7.81 (4.39) | 0.53*** | 0.80** | | |
| Values and interests | 0.84 | 7.21 (3.22) | 0.39*** | 0.34*** | 0.31*** | |
| Self-esteem | | 3.54 (1.01) | − 0.20** | − 0.28*** | − 0.34*** | − 0.04 |
| Internalization | | 2.56 (1.09) | 0.37*** | 0.48*** | 0.53*** | 0.21** |
| Twitter use | | | 0.01 | 0.06 | 0.09 | 0.14* |
| Instagram use | | | 0.20*** | 0.18*** | 0.14** | 0.17** |
| Boys | | | | | | |
| Connection | 0.78 | 6.75 (3.26) | | | | |
| Popularity | 0.89 | 6.30 (3.36) | 0.62*** | | | |
| Appearance | 0.89 | 6.42 (2.99) | 0.54*** | 0.69*** | | |
| Values and interests | 0.84 | 5.62 (3.19) | 0.56*** | 0.46*** | 0.45*** | |
| Self-esteem | | 3.78 (.91) | − 0.14* | − 0.11 | − 0.17** | -01 |
| Internalization | | 2.17 (.94) | 0.32** | 0.39*** | 0.38*** | 0.16** |
| Twitter use | | | 0.20** | 0.02 | 0.04 | 0.14* |
| Instagram use | | | 0.40*** | 0.31*** | 0.18** | 0.22*** |

*$p < .05$

**$p < .01$

***$p < .001$

All correlations used Pearson's coefficient with the exception of those among self-esteem and other variables that relied on Spearman coefficients given it was a single item

All subscales were intercorrelated, with correlations ranging from small to large in magnitude. Among girls, the range of magnitude of correlations was somewhat larger than among boys for whom all scales were moderately to strongly correlated. The pattern of correlations between motivations subscales revealed large positive correlations between Connection, Popularity, and Appearance in both boys and girls. The correlations between Values and Interests and each of the other motivation subscales were moderate in girls and moderate to large in boys.

### Convergent and Divergent Validity

In support of convergent validity of subscales, as expected, internalization of media appearance ideals was associated with all four motivations subscales, but most strongly with Popularity and Appearance motivations among both boys and girls (Table 3). Supporting divergent validity of the subscales, self-esteem was weakly and negatively correlated with Connection and Appearance motivations among both boys and girls, and with Popularity among girls. Values and Interests was not correlated with self-esteem among either boys or girls. In addition, correlations were conducted to explore whether motivations were related to different types of social media use. As expected adolescent boys who reported using text-based Twitter also reported higher levels of Connection motivations and Values and Interests motivations, but not Appearance or Popularity motivations. In contrast, image-based Instagram use was associated with all four motivations subscales for boys. Among adolescent girls, Twitter use was associated with Values and Interests motivations but also, unexpectedly with Appearance motivations. However, Instagram use was weakly associated with all four motivations subscales.

## Discussion

Motivations for social media use have been increasingly identified as a key contributor to inter-individual differences in outcomes from social media engagement among adolescents (Dhir et al. 2017). However, few tools for assessing motivations across social media platforms are available. Furthermore, although poor body image has been identified as an important negative outcome associated with social media use among younth (Cohen et al. 2017), to date little is known regarding appearance-related motivations for social media use among adolescents, and no tools are available for assessing them. The present study aimed to bridge this gap in the understanding of adolescents' motivations for engaging with social media, as well as the available resources for assessing motivations, including those related to appearance. The new MSMU scale revealed a four-factor structure, and good psychometric properties among both adolescent boys and girls. These findings suggest it will be a useful instrument for the field. Further research using this measure will contribute to informing the understanding of the vulnerability factors for negative outcomes from social media engagement, including body image concerns. social media engagement.

The findings from the exploratory and confirmatory factor analyses revealed that the MSMU was best characterized as including four subscales, namely motivations related to social connection, popularity, appearance, and values and interests. Other work has highlighted the importance of social connection and interaction in motivations for social media use (Dhir et al. 2017; Joinson 2008; Papacharissi and Mendelson 2010), as well as seeking popularity (Dhir et al. 2017). Furthermore, the findings confirm that these are important areas of motivation for social media engagement among adolescents. To date however, the MSMU is the first to have included elements related to motivations for social media use specific to appearance. In addition, the findings revealed that the new scale has good convergent validity, with appearance and seeking popularity motivations for social media use most strongly associated with higher internalization of media appearance ideals and low self-esteem. Furthermore, as expected (Pittman and Reich 2016), the use of Instagram, a heavily photo-based social media platform, was more highly associated with popularity and appearance motivations than was Twitter, a more text-based platform.

The findings revealed that the scale had similar psychometric properties among both girls and boys, supporting its use across gender. Some gender differences in the patterns of associations did emerge, however, with relationships among the motivation subscales and between the motivation subscales and other personal dimensions overall stronger among girls. These are consistent with previous research findings documenting gender differences in the ways that adolescents engage with social media (Rousseau et al. 2017). Thus, for example, gender differences have been documented in adolescents' levels of perceived belongingness when using social media, as well as in the magnitude of the relationship between social media use and wellbeing (Lai et al. 2019). It has been suggested that these differences may reflect gender roles and socialization, as girls may perceive themselves as being expected to engage in more relational and appearance-related activities on social media, in line with typical gender roles (Frison and Eggermont 2016). The present findings would tend to support this interpretation, as stereotypical gender roles cast appearance concerns, and the need to pursue appearance ideals, as predominantly feminine preoccupations.

The new scale represents a valuable contribution to the literature in view of the hypothesized importance of motivations in guiding social media use, as well as its relationship

to types of social media consumption. Motivations for media use and consumption have historically not received a large amount of attention in the body image literature, likely because of the perception that only a small amount of traditional media consumption is influenced by user preferences (Bell and Dittmar 2011). Magazine consumption, or the choice to watch reality television shows or not, may be examples of ways in which individuals can deliberately modulate their exposure to traditional media (Tiggemann 2003); however, the barrage of appearance-related advertising and content that is present in the media environment of most youths in Western settings is somewhat independent of consumer media choices. Online, in contrast, youths' media environment is to a great extent determined by both deliberate choices in terms of the content and users that are followed, or the platforms that are used, as well as machine learning from past use, in particular regarding advertising (Radesky et al. 2020). Thus, online, user motivations are likely to be far more tightly related to media environment, and therefore exposure to appearance pressures, than is the case with traditional offline media.

This study includes several limitations that are important to note. First, data utilized were taken from a larger intervention study and included only early adolescents, and therefore do not represent a generalizable sample, and suggest caution regarding whether findings would extend to other age groups. Second, test–retest reliability was not able to be examined over a meaningful timespan. Third, the motives assessed by the new measure are likely not exhaustive given the primary focus on appearance-related motivations, and are general to social media rather than being-platform specific, which might be interesting to explore in the future.

Nevertheless, despite these limitations, the present study makes an important and novel contribution by developing a measure of appearance and social motivations for social media use that can be used among adolescent girls and boys alike. Such a measure will fill an important gap in available tools to advance understanding of the role of motivations for different types of social media engagement among adolescents. In addition, it is possible that the new MSMU scale will improve the field's capacity to identify ways of engaging with social media that are associated with positive outcomes among youth, an overlooked area of work to date, as well as those who might benefit most from interventions designed to increase literacy and skills related to social media use (McLean et al. 2017).

## Conclusion

The present study aimed to develop a tool to assess adolescents' motivations to engage with social media to support programs of research that aim to clarify relationships between social media engagement and detrimental outcomes among adolescents, including appearance motivations that may be relevant to body image adolescents. The findings revealed the new MSMU scale to be valid and reliable and a useful tool to bridge the gap in available assessment resources among adolescents. Further research aiming to clarify the role of motivations in adolescents' social media engagement and its impact on their wellbeing is warranted, and the MSMU will be a valuable tool in supporting such a program.

## Data Sharing Declaration

This manuscript's data will not be deposited.

## Preregistration

The study is registered with the Australian New Zealand Clinical Trials Registry (ACTRN12617000137392; www.anzctr.org.au).

**Author Contributions** RFR conceived of the study, participated in its design, conducted the analysis, and drafted the manuscript; SJP participated in the design and interpretation of the data, and helped to draft the manuscript; CG participated in the design and coordination of the study and performed the measurement; HKJ participated in the design of the study coordination; AS and SAM participated in the study design and interpretation of the data. All authors read and approved the final manuscript.

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## Compliance with Ethical Standards

**Conflict of Interests** The authors declare that they have no conflict of interests.

**Research Involving Human Participants and/or Animals** The research involved Human Participants and was approved by the appropriate Institutional Review Board for ethical compliance.

**Informed Consent** All participants' parents provided consent, and participants provided assent.

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