Incorporating social media and muscular ideal internalization into the tripartite influence model of body image: Towards a modern understanding of adolescent girls' body dissatisfaction

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ABSTRACT

The tripartite influence model stipulates that appearance pressures from three sources (family, peers, traditional media) lead adolescent girls to internalize a thin appearance ideal and engage in social appearance comparisons, resulting in body dissatisfaction (Thompson et al., 1999). Social media is a modern source of appearance pressure and, increasingly, adolescent girls desire an appearance that is both thin and muscular. The current study of U.S. adolescent girls (n = 543, M_{age} = 15.58, 49.17% Latina, 28.18% White, 8.66% Black, 7.55% Asian, 6.45% multiracial/another race/ethnicity) incorporates social media appearance pressures and muscular ideal internalization into the tripartite influence model using structural equation modeling. Findings provided support for this adapted model: family, peers, traditional media, *and* social media contributed to body dissatisfaction. All appearance pressure sources were associated with appearance esteem via thin ideal internalization. Peer and social media pressures were both related to greater muscular ideal internalization, which was not significantly associated with appearance esteem. Social media was the only source of pressure associated with appearance esteem through both thin ideal internalization and body comparison. Findings highlight adolescent girls' pressure to look both thin and muscular, as well as the role of social media as a prominent source of appearance socialization.

1. Introduction

Body dissatisfaction is a significant problem for adolescent girls. Adolescent girls tend to have worse body image than boys (Bearman, Presnell, Martinez, & Stice, 2006; Ferreiro et al., 2014), and their body dissatisfaction grows across adolescence (Calzo *et al.* 2012). Adolescence is a sensitive period for body image development, as most girls continue to experience heightened body dissatisfaction into adulthood, when it stabilizes (Wang *et al.* 2019). The tripartite influence model, proposed in the late 1990s with cisgender girls in mind, posits that three sources of appearance pressure—family, peers, and traditional media—cause adolescent girls to internalize a thin appearance ideal and engage in social appearance comparisons, resulting in body dissatisfaction (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). While this model has received widespread empirical support (see Keery, Van den Berg, & Thompson, 2004; Rodgers, McLean, & Paxton, 2015; Shroff & Thompson, 2006), the sociocultural context of girls' appearance pressures and beauty ideals has evolved over time. In addition to family, peers, and traditional media, girls now receive messages about beauty ideals from *social* media, and appearance ideals now encourage girls to aspire to both thinness *and* muscularity. The current study incorporates social media appearance pressures and muscular ideal internalization into the tripartite influence model to investigate the most relevant sources of adolescent girls' body dissatisfaction in the current era.

1.1. Body Dissatisfaction and Adolescent Development

On average, girls and women become most dissatisfied with their weight and appearance during adolescence (Calzo et al., 2012; Wang et al., 2019), when a combination of biological, psychological, and social factors leads to heightened body dissatisfaction—defined as a negative attitude towards one's appearance due to a discrepancy between one's actual and desired appearance or weight (Grogan,

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2017). In Western society, female attractiveness is largely equated with thinness (Cawley, Joyner, & Sobal, 2006; Halpern, King, Oslak, & Udry, 2005). Pubertal development during adolescence causes rapid physical changes and weight gain and is associated with concurrent body dissatisfaction (McCabe & Ricciardelli, 2004; Stice, 2003). Adolescent girls are socialized to derive self-esteem from their attractiveness and engage in social comparison to determine how attractive they are in relation to their peers (D. C. Jones, Vigfusdottir, & Lee, 2004). Adolescents also participate in a peer "appearance culture," evaluating one another based on their attractiveness (D. C. Jones et al., 2004; J. M. Jones, Bennett, Olmsted, Lawson, & Rodin, 2001) and exacerbating the salience of appearance ideals.

Importantly, body dissatisfaction is associated with the development of a wide range of psychiatric concerns among adolescents. These include concurrent and long-term depressive symptoms (Ohring, Graber, & Brooks-Gunn, 2002), suicidal ideation (Perkins & Brausch, 2019), and suicide attempts—even after accounting for the influence of depressive symptoms (Crow, Eisenberg, Story, & Neumark-Sztainer, 2008). Body dissatisfaction is a robust predictor of developing an eating disorder among adolescents (Stice, Marti, & Durant, 2011). Given the rising rates of adolescent depression, suicide, and eating disorders in recent years, particularly among adolescent girls (Galmiche, Déchelotte, Lambert, & Tavolacci, 2019; Geiger & Davis, 2019; Mojtabai, Olfson, & Han, 2016; National Institutes of Mental Health, 2021; Ruch et al. 2019), there is a pressing need to understand the factors contributing to adolescents' body dissatisfaction.

1.2. Social Media as a Source of Adolescent Girls' Appearance Pressure

In addition to the original sources proposed in the tripartite influence model, a major source of appearance pressure in adolescent girls' lives today is social media. Social media is broadly defined as digital platforms and applications that allow for online social interaction (Nesi, Choukas-Bradley, & Prinstein, 2018). Social media is nearly ubiquitous among adolescents today, with approximately 95% of teenagers having smartphone access (Anderson & Jiang, 2018) and 70% checking social media multiple times per day (Rideout & Robb, 2018). Adolescent girls primarily use highly-visual forms of social media, such as Instagram and Snapchat (Anderson & Jiang, 2018). These photo- and video-based applications center physical appearance, are constantly accessible for most adolescents, and allow for quantifiable metrics of peer approval (e.g., "likes"; Nesi et al., 2018)—which some girls report interpreting as peer approval (or in the case of few "likes," disapproval) of their appearance (Chua & Chang, 2016). Likely due to girls' socialization to prioritize their appearance as well as adolescents' motivation for peer status that is partly based on attractiveness (D. C. Jones et al., 2004; J. M. Jones et al., 2001), appearance-related social media cognitions and behaviors are especially common among adolescent girls (Choukas-Bradley, Nesi, Widman, & Galla, 2020; McLean, Paxton, Wertheim, & Masters, 2015). The intersection of appearance-focused social media and gender socialization during this vulnerable developmental stage likely contributes to adolescent girls' body dissatisfaction (Choukas-Bradley, Roberts, Maheux, & Nesi, 2021).

Recent research suggests that social media is associated with thin ideal internalization and social appearance comparisons, the mechanisms linking sources of appearance pressure to body dissatisfaction in the tripartite influence model. Prior work has found that specific appearance-related social media behaviors such as posting photos (McLean et al., 2015; Meier & Gray, 2014) are associated with adolescent girls' internalization of the thin ideal. Further, in qualitative work, adolescent girls report comparing themselves to social media photos with many "likes" (Chua & Chang, 2016). The tripartite influence model aligns with social comparison theory, which posits that people are apt to compare themselves to similar others (i.e., peers; Festinger, 1954), possibly explaining why young adult women report engaging in appearance comparisons more via social media than traditional media, which presents dissimilar celebrities and models (e.g., Fardouly, Pinkus, & Vartanian, 2017). Among adolescent girls, appearance comparisons have been found to mediate the associations between body dissatisfaction and appearance-related social media use (Jarman, Marques, McLean, Slater, & Paxton, 2021; Scully, Swords, & Nixon, 2020), including photo-based social media behaviors such as browsing and editing photos (Chang, Li, Loh, & Chua, 2019). Experimental evidence has also found that adolescent girls' exposure to edited, rather than unedited, Instagram photos of young women led directly to lower body image, with effects particularly strong among participants high in trait social comparison (Kleemans, Daalmans, Carbaat, & Anschütz, 2018).

1.3. Adolescent Girls' Internalization of the Muscular Ideal

While body image research has traditionally considered how adolescent girls and women are exposed to the thin ideal, the ideal body type for girls and women is becoming increasingly muscular, meaning that adolescent girls now feel pressured to appear thin *and* fit. The muscular ideal has traditionally been studied among samples of boys and men due to its associations with steroid use, eating to gain muscle and lose body fat, and compulsive exercise (Cafri *et al.* 2005), a pattern of behaviors called "muscularity-oriented disordered eating" (Lavender, Brown, & Murray, 2017). However, young women now report desiring a thin, muscular body over a solely thin body (Bozsik, Whisenhunt, Hudson, Bennett, & Lundgren, 2018; Gruber, 2007). The muscular ideal was previously thought to be a healthier alternative to the thin ideal, with a supposed focus on health (Uhlmann, Donovan, Zimmer-Gembeck, Bell, & Ramme, 2018). Interestingly, in isolation, the muscular ideal has been found to be associated with lower body dissatisfaction, yet this association is no longer significant when simultaneously including thin ideal internalization (Uhlmann et al., 2018). This pattern of results suggests that muscular ideal internalization does not mitigate the risk for body dissatisfaction and disordered eating behaviors, as most women desire both a thin and muscular appearance (Uhlmann et al., 2018). Indeed, work with young adult women suggests that internalization of the muscular ideal and engaging in muscle-building behaviors are associated with body image concerns and concurrent drive for thinness (Rodgers *et al.* 2018).

Social media may be a particularly relevant source of muscularity-related appearance pressure, given the emergence of "fitspiration" content on social media, which markets a thin and muscular appearance ideal to adolescent girls via objectifying images of young, thin, toned women (Carrotte, Prichard, & Lim, 2017). Fitspiration content is popular on social media and experimental exposure to fitspiration content among young women has been shown to cause subsequently higher body dissatisfaction via social appearance comparisons (Tiggemann & Zaccardo, 2015). However, one study found that social media use was associated with internalization of the muscular ideal for adolescent boys, but not girls (Rodgers *et al.* 2020). Therefore, it is critical to examine how both traditional forms of appearance pressures and social media may, or may not, be contributing to adolescent girls' internalization of the thin *and* muscular ideal, and in turn, body dissatisfaction.

1.4. Prior Studies of Social Media and the Tripartite Influence Model

Prior work has examined social media as a potential source of appearance pressure, contributing to adolescents' body dissatisfaction via internalization of appearance ideals and social comparison, consistent with the tripartite influence model. For example, Rodgers and colleagues (2020) developed a biopsychosocial model of social media use, finding that social media use was associated with body

dissatisfaction via internalization of appearance ideals and social comparison among adolescent girls and boys. Among girls specifically, thin ideal internalization mediated the association between social media use and body dissatisfaction, whereas muscular ideal internalization did not. Another study of adolescent boys and girls found that social media intensity, or the degree of importance adolescents placed on social media, was associated with body dissatisfaction via thin and muscular ideal internalization and social comparison (Jarman, Marques, et al., 2021). An additional study with adolescents found social media to be a source of appearance pressure that contributed to body dissatisfaction; authors argued that social media may be an additional source of appearance pressure that resembled the original three sources in the model (de Vries, Peter, de Graaf, & Nikken, 2016). Further, using serial multiple mediation, a recent study found that among adolescent girls, social comparison mediated the association between appearance-related social media use and body dissatisfaction, and that thin ideal internalization further mediated the relationship between social comparison and body dissatisfaction (Scully et al., 2020). Similar results were found in a recent longitudinal study with adolescents, such that higher social media use predicted higher social comparison over time, and in turn, lower body satisfaction (Jarman, McLean, Slater, Marques, & Paxton, 2021). These prior studies offer preliminary support for considering social media as an additional source of appearance pressure relevant to adolescent girls' body dissatisfaction. However, none examined the effect of social media *in relation to* the original sources of influence proposed in the model: peers, parents, and traditional media. Therefore, the current study is the first to our knowledge to offer a comprehensive adaptation of the tripartite influence model that considers a fourth source of appearance pressure, social media, while simultaneously recognizing internalization of the muscular ideal as a novel appearance ideal.

1.5. The Current Study

With adolescent girls exposed to appearance pressures from a range of sources—including family, peers, traditional media, and now social media—and desiring a thin *and* muscular appearance, it is important that empirically-supported body image theories are adapted to reflect contemporary realities. The current study fills an important gap in the prior literature by considering how appearance pressures on social media, relative to pressures from peers, family, and traditional media, may uniquely contribute to adolescent girls' body dissatisfaction through both thin ideal internalization *and* muscular ideal internalization.

2. Methods

2.1. Participants

The current study represents a subset of data from a U.S. sample of 543 adolescent girls (ages 13–18, M_{age} = 15.58; SD_{age} = 1.23), recruited from a large, diverse suburban high school district in Florida as part of an overarching study assessing social media use, character development, and wellbeing among adolescents. Data collection occurred before the COVID-19 pandemic began in the U.S. (October 2019). All participants self-identified as girls. The sample was 49.17% Hispanic/Latina, 28.18% White, 8.66% Black, 7.55% Asian, 6.45% multiracial or another race/ethnicity. Roughly a third of participants (32.97%) indicated that they were eligible for free or reduced-price lunch. The Character Lab Research Network (CLRN), a consortium of schools and researchers working together to collect school-based data and facilitate developmental research, collected and de-identified data before sharing it with the research team. Online surveys were completed by students during regular school hours. The university's Institutional Review Board approved all study procedures.

2.2. Measures

2.2.1. Demographics

School information systems provided sample demographic information regarding age, race/ethnicity, and free and reduced-priced lunch eligibility, a proxy for socioeconomic status (SES). Participants self-reported their weight and height, which was used to calculate body mass index (BMI). For BMI values that suggested error (i.e., below 1 or above 130), participants were given a missing BMI score (*n* = 5).

2.2.2. Sources of Appearance Pressure: Family, Peers, and Traditional Media

Sources of appearance pressure were measured using the Sociocultural Attitudes Towards Appearance Questionnaire – 4 (SATAQ-4; Schaefer et al., 2015), a measure of appearance pressures that demonstrates good reliability and validity for use with adolescent girls (Yamamiya et al., 2016). The SATAQ-4 includes 3 subscales, each composed of 4 items, designed to assess the societal and interpersonal sources of influence that convey appearance ideals: pressure from family, pressure from peers, pressure from (traditional) media. An example item from the (traditional) media subscale includes: "Answer the following questions with relevance to the MEDIA (include television, magazines, movies, billboards, and advertisements): I feel pressure from the media to look thinner." Responses are provided on a 5-point Likert scale ranging from *definitely disagree* (1) to *definitely agree* (5). Higher scores on each of the three subscales indicate greater appearance pressure from family, peers, and traditional media, respectively. Current sample α for subscales = 0.89–0.95.

2.2.3. Source of Appearance Pressure: Social Media

For the current study, items from the (traditional) media subscale of the SATAQ-4 (Schaefer et al., 2015) were adapted to ask about pressure from social media, creating a new, fourth subscale that consisted of 4 items. An example item includes: "Answer the following questions with relevance to SOCIAL MEDIA: I feel pressure from social media to look thinner." Participants responded to the items on a 5-point Likert scale from *definitely disagree* (1) to *definitely agree* (5). Higher scores on the subscale indicate greater appearance pressure from social media. Current sample α = 0.96.

2.2.4. Internalization of Appearance Ideals

Internalization of appearance ideals was also measured using two SATAQ-4 subscales, each consisting of 5 items, designed to assess internalization of the thin ideal and internalization of the muscular ideal, respectively (Schaefer et al., 2015). Participants responded to items such as "I think a lot about looking thin" and "I think a lot about looking muscular" on a 5-point Likert scale ranging from *definitely disagree* (1) to *definitely agree* (5). Higher scores indicate greater thin and muscular ideal internalization. Current sample α for thin ideal subscale = 0.88, for muscular ideal subscale = 0.91.

2.2.5. Body Comparison

Social appearance comparisons, one of the proposed mechanisms of the tripartite influence model, were measured using a version of the Body Comparison Orientation subscale of the Body, Eating, and Exercise Comparison Orientation Measure (BEECOM; Fitzsimmons-Craft, Bardone-Cone, & Harney, 2012) previously adapted for adolescent body image research (see Choukas-Bradley et al., 2020). The Body Comparison subscale consists of 6 items that ask participants how often they compare their body to those of same-sex peers. An example item includes, "I pay attention to whether or not I am as thin as, or thinner, than my peers." Response

options range from *Never* (1) to *Always* (7) on a 7-point Likert scale. Current sample α = 0.95.

2.2.6. Appearance Esteem

Appearance esteem was measured using the Appearance sub-scale of the Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson, Mendelson, & White, 2001), a 10-item measure that assesses general feelings about one's appearance. Participants are asked how frequently they agree with a given statement, ranging from *Never* (1) to *Always* (5) on a 5-point Likert scale. An example item includes: "I like what I look like in pictures." Negatively-phrased items (e.g., "There are lots of things I'd change about my looks if I could") are reverse scored. Higher scores are indicative of higher levels of appearance esteem. Current sample α = 0.90.

2.2.7. Data Analytic Plan

All statistics were conducted in R version 3.6.1 with structural equation models estimated using the *lavaan* package (Rosseel, 2012). Model estimation proceeded in two steps. First, a measurement model was constructed with saturated covariances among the latent factors. The measurement model was re-specified according to modification indices and theory, with each successive iteration of the model evaluated and compared to the prior model. Once the measurement model was established to have adequate fit while remaining consistent with theory, a structural model was estimated. The structural model imposed a structure on the latent factors consistent with the tripartite influence model (Thompson et al., 1999) and was again evaluated for overall model fit and re-specified as necessary. Our hypothesized model is presented in Fig. 1. To evaluate models in the model building process, several metrics were used (see Little, 2013): Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), root mean square error approximation (RMSEA), and standardized root mean square residual (SRMR). Strict cut-off scores for these metrics have been widely critiqued, yet general guidelines suggest acceptable model fit for CFI and TLI ≥.90, and RMSEA and SRMR ≤.08 (Little, 2013). Likelihood ratio tests were also used to compare nested models (van der Hoeven, 2005). In the final structural model, standard errors for indirect effects were estimated using 10,000 bootstrapped samples (Cheung & Lau, 2008). All models were estimated using full-information maximum likelihood to account for missing data (Enders & Bandalos, 2001). Across all

variables included in the final model, only 1.90% of data were missing.

3. Results

3.1. Measurement Model

The first measurement model was specified consistent with the tripartite influence model, with items from each scale or subscale loading on a single factor, covariances estimated among all latent factors, and no residual covariances estimated among indicators. A correlation matrix of all variables is presented in Table 1. The model showed relatively poor fit to the data, χ^2 (791) = 3550.47, p < .001, TLI = 0.85, CFI = 0.86, RMSEA = 0.09, SRMR = 0.06.

Modification indices indicated residual covariances between the media pressure and social media pressure items. Given that the social media items were adapted for the present study and are identical to the media items in the SATAQ-4 except for the term "social media," the phonological similarity of these items likely explains the association between these variables that was not accounted for by the latent factors. The addition of freely estimated residual covariances between the media and social media items with identical sentence structure (e.g., residual for media item 1 covaries with residual for social media item 1) led to a significant improvement in model fit, $\Delta\chi^2$(4) = 619.25, p < .001. This model was compared to a model with these residual covariances fixed to be equal, but the model fit was significantly worse than the model allowing these parameters to be freely estimated, $\Delta\chi^2$(3) = 20.00, p < .001.

Modification indices then indicated residual covariances between the positively phrased (i.e., not reverse-coded) BESAA items. Positively-phrased and reverse-coded items often function differently in confirmatory factor analysis, and method effects based on item wording can justify correlated errors (Brown & Moore, 2012). For these reasons, residual covariances between all positively-phrased BESAA items were added into the model, resulting in a significant improvement in model fit, $\Delta\chi^2$(6) = 582.12, p < .001. Constraining these covariances to be equal did not significantly worsen model fit, $\Delta\chi^2$(5) = 10.50, p = .062, and thus these constraints were kept for parsimony. Modification indices also indicated the need for residual covariances between the negatively-phrased BESAA items. This addition also yielded significant improvement in model fit, $\Delta\chi^2$(15) = 103.03, p < .001. Constraining these residual
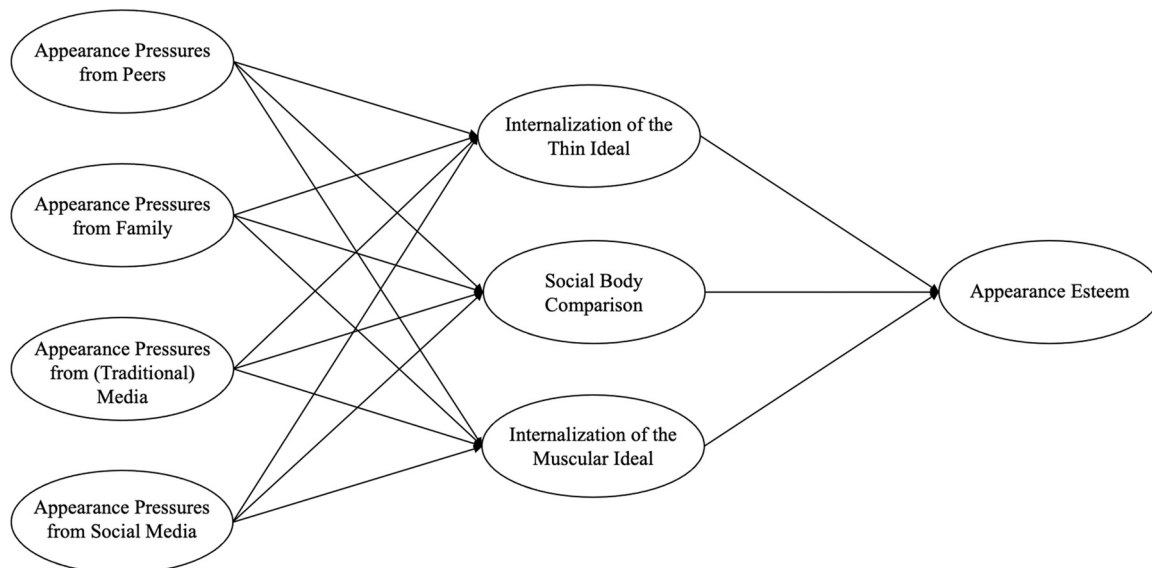

Fig. 1. Hypothetical Model Depicting Adapted Tripartite Influence Model.

Table 1
Descriptive Statistics and Correlations for Study Variables (N = 543).

	1	2	3	4	5	6	7	8	M	SD
1 Appearance Pressure: Peers	—								1.92	1.06
2 Appearance Pressure: Family	.51	—							2.40	1.22
3 Appearance Pressure: Traditional Media	.47	.48	—						2.72	1.40
4 Appearance Pressure: Social Media	.47	.46	.90	—					2.75	1.44
5 Thin Ideal Internalization	.44	.44	.62	.63	—				2.96	1.15
6 Muscular Ideal Internalization	.35	.26	.36	.38	.57	—			2.50	1.13
7 Body Comparison	.38	.40	.60	.60	.64	.37	—		3.72	1.85
8 Appearance Esteem	-0.37	-0.40	-0.50	-0.50	-0.52	-0.23	-0.59	—	3.12	0.93

Note. All correlations $p < .001$.

covariances to be equal resulted in a significant decrement in model fit, and thus they were allowed to freely vary, $\Delta\chi^2(14) = 103.01$, $p < .001$.

Finally, modification indices suggested the addition of two cross-loadings. A cross-loading of the thin-ideal internalization item about looking "lean" onto the muscularity factor resulted in a significant improvement in model fit, $\Delta\chi^2(1) = 70.60$, $p < .001$. A cross-loading of a BEECOM "toned or muscular" item on the muscularity latent factor also resulted in significant improvement in fit, $\Delta\chi^2(1) = 67.07$, $p < .001$. The final measurement model showed acceptable fit to the data, $\chi^2(769) = 2118.90$, $p < .001$, TLI = 0.92, CFI = 0.93, RMSEA = 0.06, SRMR = 0.04. Standardized factor loadings for primary loadings ranged from .33 to .96, with all but two loadings above .50. Factor loadings for the secondary cross-loadings on the muscularity factor were .38 (thin ideal internalization item) and .26 (BEECOM item).

3.2. Structural Model

The structural model was then estimated, using the measurement model derived from the prior step, and imposing the tripartite model structure on the latent factors. Specifically, appearance esteem was regressed on the internalization factors and the body comparison factors, which were in turn regressed on the latent factors for family, peer, media, and social media pressures. The model showed acceptable fit to the data, $\chi^2(776) = 2348.28$, $p < .001$, TLI = 0.92, CFI = 0.93, RMSEA = 0.06, SRMR = 0.06. Given theoretical relevance, BMI and race/ethnicity (Latina as reference group; dummy codes for White, Black, Asian, multiracial/other race/ethnicity) were added as predictors of all paths, which significantly improved model fit and thus were retained in the model, $\Delta\chi^2(200) = 354.62$, $p < .001$. Modification indices indicated residual covariances between thin ideal internalization and each of the other two mediating factors (i.e., muscular ideal internalization and body comparison). Given the theoretical likelihood that these constructs may be associated with one another after accounting for associations with BMI, race/ethnicity, and family, peer, media, and social media influences, these covariances were freely estimated in sequential models. The addition of the freely estimated covariance between thin ideal internalization and muscular ideal internalization significantly improved model fit, $\Delta\chi^2(1) = 75.96$, $p < .001$, as did the covariance between thin ideal internalization and body comparison, $\Delta\chi^2(1) = 51.88$, $p < .001$. Additional modification indices were not consistent with theory, and thus no further models were explored. The final model showed acceptable fit to the data, $\chi^2(974) = 2617.78$, $p < .001$, TLI = 0.92, CFI = 0.92, RMSEA = 0.06, SRMR = 0.05.

3.3. Direct and Indirect Effects

The significant direct effects for the final structural model are presented in Fig. 2 and all model parameters are presented in Table 2. Higher family pressure was significantly associated with higher thin ideal internalization. Higher peer pressure was significantly associated with higher muscular ideal internalization and thin ideal internalization. Higher media pressure was significantly associated with higher thin ideal internalization. Higher social media pressure was significantly associated with higher body comparison, thin ideal internalization, and muscular ideal internalization. Higher body comparison and thin ideal internalization were significantly associated with lower appearance esteem, whereas muscular ideal internalization was not significantly associated with appearance esteem. Family, peer, media, and social media each had significant total effects on appearance esteem collectively through the three mediating variables (ps = .009 to .04). In terms of indirect effects, higher appearance pressure from all sources was significantly associated with lower appearance esteem through thin ideal internalization: family pressure ($b = -0.10$, $se = 0.05$, $p = .02$), peer pressure ($b = -0.08$, $se = 0.04$, $p = .03$), media pressure ($b = -0.17$, $se = 0.08$, $p = .04$), social media pressure ($b = -0.20$, $se = 0.09$, $p = .02$). Higher social media pressure was also indirectly associated with lower appearance esteem through body comparison ($b = -0.16$, $se = 0.08$, $p = .04$).

4. Discussion

The current study incorporated social media appearance pressures and muscular ideal internalization into the tripartite influence model, to reflect the contemporary environment navigated by adolescent girls today. We found that, controlling for the appearance pressure sources outlined in the tripartite influence model (family, peers, and traditional media; Thompson et al., 1999), higher social media pressure was associated with lower appearance esteem. This effect primarily operated through thin ideal internalization and body comparison—mechanisms outlined in the tripartite influence model. Notably, higher appearance pressure from each source was associated with lower appearance esteem via thin ideal internalization. Social media was the only source of pressure associated with lower appearance esteem through both thin ideal internalization *and* body comparison. Higher appearance pressures from peers and social media were significantly associated with higher muscular ideal internalization, yet muscular ideal internalization was not associated with appearance esteem in the context of the full model. These findings highlight the salience of both thinness and muscularity for girls' appearance ideals and the importance of including social media appearance pressures when considering the etiology of adolescent girls' body dissatisfaction.

4.1. Appearance Pressure from Social Media

Social media is nearly ubiquitous among adolescents. Adolescent girls are especially likely to use highly-visual social media (Anderson & Jiang, 2018) and to engage in appearance-related social media cognitions and behaviors that can exacerbate body dissatisfaction (Choukas-Bradley et al., 2020). In the current study, we found support for social media as a fourth source of appearance pressure in the adapted tripartite influence model. Prior studies have found support
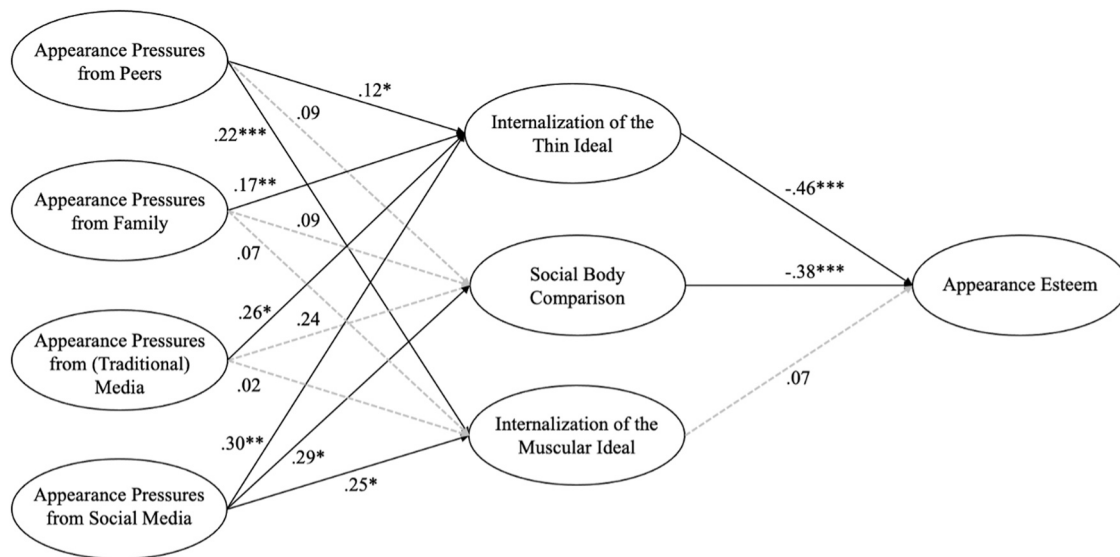
Fig. 2. * *p* < .05. * *p* < .01. *** *p* < .001. Structural Equation Model Depicting Adapted Tripartite Influence Model. (Note: Residual covariances not shown.)

Table 2
Direct Paths from the Adapted Tripartite Model.

	b	*β* (SE)	*p*
Sources of Appearance Pressure → Mediators			
DV: Body Comparison			
Peers	0.11	0.09 (0.07)	.104
Family	0.11	0.09 (0.07)	.138
Traditional Media	0.31	0.24 (0.16)	.056
Social Media	0.37	0.29 (0.16)	.020
DV: Thin Ideal Internalization			
Peers	0.18	0.12 (0.07)	.012
Family	0.25	0.17 (0.09)	.005
Traditional Media	0.38	0.26 (0.17)	.020
Social Media	0.44	0.30 (0.16)	.007
DV: Muscular Ideal Internalization			
Peers	0.25	0.22 (0.07)	< 0.001
Family	0.08	0.07 (0.08)	.294
Traditional Media	0.02	0.02 (0.13)	.885
Social Media	0.29	0.25 (0.13)	.023
Mediators → Appearance Esteem			
Body Comparison	-0.43	-0.38 (0.09)	< 0.001
Thin Ideal Internalization	-0.46	-0.46 (0.09)	< 0.001
Muscular Ideal Internalization	0.09	0.07 (0.07)	.225

Note. DV = dependent variable.

for the role of social media in adolescents' appearance ideals, appearance comparisons, and body dissatisfaction (see Jarman, Marques, et al., 2021; Rodgers et al., 2020). The current study builds on these findings by considering the *unique* influence of social media in the context of other sources of appearance pressure. Controlling for appearance pressure from family, peers, and traditional media, we found that social media was uniquely associated with appearance esteem through the proposed mediators. Notably, social media was the only source of appearance pressure included in the model to be associated with *all* mediators: body comparison, thin ideal internalization, and muscular ideal internalization. Although more work is necessary to understand the relative influence of social media, these results support contemporary body image theories that highlight social media as a primary source of adolescent girls' body dissatisfaction (Choukas-Bradley et al., 2021).

Further research is needed to understand *how* using social media affects body image. In the current study, social media appearance pressures were indirectly associated with appearance esteem through thin ideal internalization and body comparison. Appearance ideals are likely promoted on social media through "thinspiration," "fitspiration," and other highly-edited or influencer-created visual content (Carrotte et al., 2017; Ghaznavi & Taylor, 2015). Research suggests that engaging with photos on social media may promote internalization of unrealistically thin body ideals, resulting in worsened body image (Jarman, Marques, et al., 2021). Furthermore, the current results are aligned with prior work demonstrating that social appearance comparisons mediate the association between social media use and body dissatisfaction (e.g., Chang et al., 2019; Jarman, Marques, et al., 2021; Scully et al., 2020). Unlike celebrities and models in traditional media, images on social media may appear as realistic targets of comparison, encouraging adolescents to engage in appearance comparisons with highly-idealized photos that can negatively impact their body image (see Choukas-Bradley et al., 2021).

4.2. Muscular Ideal Internalization

To account for modern sociocultural appearance ideals, we also tested internalization of the muscular ideal as a mechanism linking sources of appearance pressure to appearance esteem in our adapted tripartite model. Our findings support the growing societal importance of both a thin and muscular body over a solely thin body (Bozsik et al., 2018). In the present study, only appearance pressures from peers and social media, but not family or traditional media, were significantly associated with higher muscular ideal internalization. Notably, these findings suggest that muscularity ideals may be transmitted primarily through peer-based sources, including directly by peers and via social media. Indeed, research suggests that muscularity ideals seem to be *emerging* among women (Bozsik et al., 2018) and therefore may be more likely to be held and transmitted among peer groups, not yet having been adopted by traditional media or parental sources of pressure. However, the prevalence of "fitspiration" and related content on social media (Tiggemann & Zaccardo, 2018) may also help explain the role of social media in communicating the muscular ideal. Rather than being exposed to muscularity-related content solely from peers, many adolescents may also view such content from celebrities and influencers on social media (Bell et al., 2021), thereby increasing the collective internalization of the muscular ideal across the peer group.

In the present study, controlling for other variables in the structural equation model, muscular ideal internalization was not significantly associated with adolescent girls' appearance esteem. In prior work, internalization of the muscular ideal has not been

directly associated with adolescent girls' and boys' body dissatisfaction, but rather their likelihood to engage in muscle-building behaviors (Rodgers et al., 2020). Thus, internalization of the muscular ideal is perhaps more relevant to behavioral outcomes than cognitive experiences. Future research ought to test whether this expanded tripartite influence model can predict thinness-oriented and muscularity-oriented disordered eating behaviors.

4.3. Appearance Pressure from Family, Peers, and Traditional Media

In addition to adapting the tripartite influence model, the current study contributes to our understanding of how the sources of appearance pressure originally proposed by the model contribute to adolescent girls' body dissatisfaction. For example, findings suggest that family, peers, and traditional media are indirectly associated with appearance esteem through thin ideal internalization, highlighting the enduring salience of thinness for adolescent girls' beauty ideals, even in a context where muscularity is increasingly valued. Additionally, pressure from traditional media (e.g., print media, television) was significantly positively associated with thin ideal internalization, even when controlling for the influence of social media. These results are consistent with past research, which shows that media exposure is associated with internalization of the thin ideal among adolescent girls (Keery et al., 2004; Shroff & Thompson, 2006). The present findings highlight that traditional media and social media each exert unique influence on adolescent girls' thin ideal internalization.

4.4. Limitations and Future Directions

The current study provides novel information about the relationships between sources of appearance pressure and adolescent girls' internalization of beauty ideals using a large school-based sample. However, it is important to acknowledge this study's limitations. A primary limitation of our findings is the use of cross-sectional data. The tripartite influence model is an inherently mediational model (Thompson et al., 1999), and with cross-sectional analyses we can only examine whether forms of internalization account for a unique proportion of variance in the relationship among the appearance pressures and appearance esteem. Without the use of longitudinal data, we cannot assess the temporal ordering of the model and thus inferences about the causal structure of the model cannot be made. The associations outlined in the tripartite influence model may unfold across adolescent development, making longitudinal data necessary to capture these relationships. Longitudinal studies with adolescent girls using the tripartite influence model as a framework have found that internalization of the appearance ideal transmitted by the media predicts body dissatisfaction eight months later (Rodgers et al., 2015), yet other research has found that long-term exposure to thin ideal media is not associated with body dissatisfaction, except among girls who exhibit heightened initial body image concerns (Stice, Spangler, & Agras, 2001). One prior study of Australian adolescents found that appearance pressure from mothers and female friends predicted girls' disordered eating behaviors 16 months later, whereas appearance pressures from the media and fathers did not (McCabe & Ricciardelli, 2004). This prior work suggests that sources of appearance pressure may have different longitudinal effects. Indeed, initial work with Australian adolescents suggests that, over time, social media use predicts lower body satisfaction via social comparison, but not thin ideal or muscular ideal internalization (Jarman, McLean, et al., 2021). Importantly, researchers have yet to examine longitudinally how social media appearance pressures differ from other sources of appearance pressures (e.g., mass media, parents). Thus, our study represents a preliminary step towards an eventual long-term longitudinal

examination of this adapted tripartite influence model that simultaneously considers four unique sources of appearance pressure.

Additionally, the measures used in the current study, as well as those traditionally administered in body image surveys, are designed to capture a dominant Eurocentric beauty ideal (e.g., thinness). Consequently, this study does not capture appearance ideals that may be culturally relevant to historically marginalized racial and ethnic populations. Our sample was racially and ethnically diverse with Latina girls making up almost 50% of the sample. Latina women and adolescent girls living in the United States describe awareness of, and frustration with, primarily White appearance ideals proliferated in media (Schooler & Daniels, 2014; Viladrich, Yeh, Bruning, & Weiss, 2009). Some work also suggests that Black and Latina girls desire a curvier appearance than their White peers (Romo, Mireles-Rios, & Hurtado, 2016; Schooler & Daniels, 2014), suggesting that girls of color may have their own unique appearance ideals. Therefore, while internalization of thin and muscular appearance ideals are likely relevant to the body dissatisfaction of girls of color, future research should incorporate diverse, culturally-inclusive measures of appearance ideals, and explore these processes within racial/ethnic groups.

4.5. Clinical Implications

Mental health providers, teachers, and parents should be aware of the influence of social media as a source of appearance pressure beyond that of peers, family, and traditional media. Social media literacy programs can help adolescents become informed consumers of appearance-related content on social media and may help prevent body dissatisfaction and eating disorders (McLean, Wertheim, Masters, & Paxton, 2017). Additionally, although muscular ideal internalization was not associated with body dissatisfaction in the current study, the rising popularity of the muscular ideal among adolescent girls could have negative consequences that are not yet well-understood. For example, though studied primarily among men and boys, muscle-enhancing diets and behaviors are associated with a range of adverse health consequences, including increased risk for eating disorders and depression and adverse physiological changes, such as poor lipid and glucose levels and increased blood pressure (see Cafri et al., 2005 for review). Clinicians working with adolescent girls should assess for muscularity-oriented disordered eating behaviors, which are relatively common among both adolescent boys *and* girls (Eisenberg, Wall, & Neumark-Sztainer, 2012).

5. Conclusion

The current study provides preliminary empirical support for an adapted version of the tripartite influence model (Thompson et al., 1999) that includes social media as a source of appearance pressure in the etiology of adolescent girls' body dissatisfaction. Findings suggest that social media is a robust source of appearance pressure, even after accounting for the influence of family, peers, and traditional media. Moreover, results highlight that both muscular and thin body ideals are communicated to adolescent girls, in part via social media, though the thin ideal appears more relevant to girls' body dissatisfaction. Future research should continue to consider sociocultural trends in appearance ideals and technological advancements that allow for novel sources of appearance pressure, with attention to the unfolding of these processes across adolescent girls' development.

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CRediT authorship contribution statement

Savannah R. Roberts: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Anne J. Maheux:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Rowan A. Hunt:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Brianna A. Ladd:** Conceptualization, Writing – original draft, Writing – review & editing, Visualization, Project administration. **Sophia Choukas-Bradley:** Conceptualization, Writing – review & editing, Supervision, Project administration, Resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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