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Preadolescents' Reliance on and Internalization of Media Appearance Ideals: Triggers and Consequences

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Abstract

The present three-wave panel study ($N = 973$, $M_{age} = 11.14$) sought to advance the current literature on media internalization in preadolescence by examining triggers and consequences related to preadolescents' media internalization and use of media for appearance information. We sought to examine whether (a) media internalization and use of media for appearance information could be explained by pubertal timing and peer appearance criticism, and (b) such media internalization and use of media for information could foster dysfunctional body image investment. Structural equation analyses showed that early maturation relative to peers and peer appearance criticism predicted preadolescents' use of media for appearance information and media internalization, 6 months later. Such media use, in turn, predicted preadolescents' development of dysfunctional appearance beliefs, 6 months later. These results highlight the importance for future studies to examine whether preadolescents' reliance on appearance media stems from their need to cope with current body concerns.

Keywords: pubertal timing, peer appearance criticism, media internalization, body image investment

Preadolescents' Reliance on and Internalization of Media Appearance Ideals: Triggers and Consequences

The magnitude of weight and body image concerns among preadolescent children is concerning (e.g., Dion et al., 2016; Dunn, Lewis, & Patrick, 2010). Circa one in two preadolescents suffers from body dissatisfaction and desires either a thinner or a more muscular body shape (Clark & Tiggemann, 2007; Dunn et al., 2010). This high prevalence of body image concerns is worrying as body dissatisfaction in preadolescence has been shown to track into later life (Micali et al., 2015), and to prospectively predict health problems such as unhealthy eating behaviors (Tremblay & Lariviere, 2009) during adolescence. Hence, considerable research has been directed toward understanding the causes of preadolescents' distorted body image (Clark & Tiggemann, 2006; Michael et al., 2014).

Much of this research has focused on whether exposure to idealized media images (e.g., the thin-ideal for girls and the lean /muscular ideal for boys) affects how preadolescents see themselves and evaluate their physical appearance (e.g., Anschutz, Spruijt-Metz, Van Strien, & Engels, 2011; Clark & Tiggemann, 2006). These studies have consistently documented an inverse relationship between preadolescents' media exposure and body satisfaction, and underscored a critical role of media internalization in this relationship (e.g., Anschutz et al., 2011; Evans, Tovée, Boothroyd, & Drewett, 2013).

Given the detrimental impact of idealized media images on preadolescents' body image, the present study sought to identify developmental factors that contribute to preadolescents' reliance on and endorsement of media promoted appearance ideals. Drawing on the idea that preadolescents may rely on media content as a way of coping with body image related threats, the first objective was to examine whether early pubertal timing and peer appearance criticism predicted media internalization and use of media for appearance

information (Cash, 2002; Wertheim & Paxton, 2011). Second, given the importance of body image investment, beyond body image dissatisfaction, in understanding body image disturbances (Cash, Melnyk, & Hrabosky, 2004), the second objective was to investigate how body image investment may vary as a function of preadolescents' media internalization and use of media for appearance information. To test both objectives, we proposed a longitudinal mediation model that examined the impact of developmental body image stressors, including peer appearance criticism and pubertal timing, on preadolescents' body image investment through the use of media as a source of information and media internalization (see Figure 1).

Understanding Preadolescents' Use and Internalization of Media Models

In support of sociocultural models (e.g., Keery, van den Berg, & Thompson, 2004), research has demonstrated that the media can transmit current societal appearance ideals, which emphasize the desirability of an unattainable slender body for women and an unattainable muscular body for men. Despite the unattainable nature of media promoted appearance ideals, individuals cognitively "buy into" media defined ideals of attractiveness and engage in behaviors designed to produce an approximation of these ideals (Thompson & Stice, 2001, p. 181). This process, referred to as media internalization, has been found to induce body dissatisfaction as most individuals fall short in complying with the internalized ideals, and perceive discrepancies between their actual and desired physical appearance (e.g., Bessenoff, 2006). Recently, the association between media internalization and body dissatisfaction has been empirically investigated and supported in preadolescent samples (Anschutz et al., 2011; Rodgers, McLean, & Paxton, 2015). For instance, Evans et al. (2013) showed that preadolescent girls' (7 to 11 years) media internalization increased their body dissatisfaction and disordered eating attitudes. In another study, Smolak and Stein (2006)

demonstrated that boys' (11 to 13 years) drive for muscularity was contingent on the internalization of muscular media ideals.

Despite this evidence that links media internalization with adverse body image outcomes, research has hardly addressed the question *why* preadolescents use media as a source for appearance information and comparison in the first place. With respect to preadolescents' motives for using media, studies have suggested that preadolescent media users selectively attend to and compare with media models with the aim of self-improvement (Eyal & Te'eni-Harari, 2013; Rodgers et al., 2015). Hence, it could be that body image stressors, such as peer appearance criticism and pubertal changes, might spur preadolescents to look for ways of improving their appearance such as those proposed by media and to compare themselves to media images with the aim of appearance fixing (i.e., appearance-related self-improvement; Rodgers et al., 2015).

Fluctuations in pubertal timing have been repeatedly studied in the literature and their association with body image has been well documented (Leone et al., 2015). For girls, pubertal changes, such as an increase in body fat, move them further away from the ideal female body (e.g., Tremblay & Lariviere, 2009). Consistently, research has found greater body image concerns in girls who physically mature faster than other girls (Klump, Perkins, Burt, McGue, & Iacono, 2007; McCabe, Ricciardelli, & Holt, 2010). For boys, opposite results have been obtained, with late-developing boys showing higher levels of body image concerns (de Guzman & Nishina, 2014). This may be because pubertal growth in boys is marked by a gradual increase in height and muscle mass, masculinity features that move boys closer to the male body ideal. Thus, pubertal changes in boys and girls may result in different body image experience, due to their moving youth further or closer away to media ideals.

A second factor that is equally important to the formation of preadolescents' body image is peer appearance-related feedback (Webb et al., 2015). More specifically research has shown that the experience of being teased about one's physical appearance can cultivate negative attitudes and feelings toward one's body (Lawler & Nixon, 2011; Paxton, Eisenberg, & Neumark-Sztainer, 2006). Additionally, research has indicated that deviations in pubertal development are often accompanied by higher rates of peer appearance criticism (e.g., Lindberg, Grabe, & Hyde, 2007). Early developing girls are at a higher risk for appearance criticism (Llewellyn, Rudolph, & Roisman, 2012), whereas early developing boys are at a lower risk for peer appearance criticism (e.g., Ricciardelli, 2012). Based on these findings, and taking into account the notions of uses and gratifications theory (Katz, Blumler, & Gurevitch, 1974), we suggest that pubertal timing and peer appearance criticism may predict preadolescents' use of media as an information and comparison source concerning physical appearance. More specifically, we suggest that preadolescents' media use stems from their need to cope with emerging body image concerns, that are elicited by pubertal timing and peer appearance criticism. This assumption is strengthened by body image coping models, which argue that individuals develop and employ cognitive and behavioral strategies to cope with distressing thoughts, feelings, and situations concerning their bodily appearance (Cash, 2002, p. 192). The first objective of this study was therefore to test a model in which pubertal timing and peer appearance criticism would predict preadolescents' comparison with media appearance ideals and their perception of media as a source for appearance information.

Media Internalization and Preadolescents' Body Image Investment

Drawing on body image coping literature, we suggested that preadolescents' reliance on and internalization of media appearance ideals is possibly fostered by a desire to correct features of their physical appearance that they perceive as deviating from the 'norm' (i.e.,

appearance fixing coping; Cash, Santos, & Williams, 2005). The use of appearance fixing strategies to cope with body image threats has been linked to dysfunctional body image investment (Cash et al., 2005; Choma, Shove, Busseri, Sadava, & Hosker, 2009). Body image investment concerns the cognitive-behavioral importance of one's appearance, and encompasses a self-evaluative and a motivational facet. The self-evaluative salience of one's appearance refers to the degree to which appearance is a central aspect of one's self-worth and self-concept, and the motivational salience refers to one's attention to and investment in appearance self-management to improve one's attractiveness (Cash, Phillips, Santos, & Hrabosky 2004).

Prior studies have shown that body image investment, and especially self-evaluative body image investment, is more predictive of individuals' poor psychological functioning (e.g., eating disturbance, social anxiety) than body dissatisfaction (Carraça et al., 2011; Cash et al., 2004). Hence, the second objective of this study was to investigate how body image investment may vary as a function of preadolescents' media internalization and use of media for appearance information. In doing so, we extended the aforementioned model by introducing dysfunctional appearance beliefs and body surveillance as possible outcomes of preadolescents' perceived informational value and internalization of media appearance ideals. Body surveillance, which is defined as the continuous monitoring of one's physical appearance, was used as a proxy for motivational body image investment as it pertains to one's attention to and investment in appearance self-management. According to objectification theory (Fredrickson & Roberts, 1997), and confirmed by media effects research (Dakanalis et al., 2012; Vandebosch & Eggermont, 2012), repeated exposure to idealized media images encourages viewers to internalize appearance ideals as personal standards, and adopt an observers' perspective on the self. Such an observer's perspective on

the self manifests as body surveillance (McKinley & Hyde, 1996), whereby individuals monitor their compliance with internalized genders-specific appearance ideals, and has been linked to negative body image evaluations (e.g., McKenney & Bigler, 2016).

Although body surveillance has been shown to be more normative among girls (Vandenbosch & Eggermont, 2012) and women (Aubrey, 2006), there is increasing evidence that boys (Vandenbosch & Eggermont, 2013) and men (Dakanalis et al., 2012) too internalize masculine appearance ideals promoted by the media, and engage in objectifying practices to ensure compliance with the internalized ideals. We therefore hypothesized that both preadolescent boys and girls who rely on and compare with idealized media models for self-improvement or appearance fixing purposes invest more time in monitoring their body to ensure compliance with internalized appearance standards. Given that body surveillance has been referred to as a maladaptive coping strategy for managing body image distress (Fitzsimmons-Craft, Harney, Brownstone, Higgins, & Bardone-Cone, 2012), we deemed it important to understand how preadolescents' media reliance and internalization relates to this form of motivational body image investment.

The second facet of body image investment, the self-evaluative salience, was measured by the degree to which preadolescents consider their physical appearance as instrumental to self-definition and life satisfaction (i.e., dysfunctional appearance beliefs Spangler, 2002). We hypothesized that preadolescents' media reliance and internalization would positively relate to the endorsement of dysfunctional appearance beliefs, as prior studies have demonstrated that using media as a source of information on how to attain an appealing appearance positively relates to adolescents' dysfunctional attitudes about physical appearance (e.g., Spangler, 2002). Analogous to body surveillance, endorsing dysfunctional

appearance beliefs has also been implicated in unhealthy body image behaviors, such as eating disturbances (Bohon, Stice, & Buton, 2009).

In sum, we suggest that preadolescents' experienced pubertal changes and related peer appearance criticism may cause psychological distress associated with certain body features. In order to cope with this body-image related stress, preadolescents may rely on media models to alter or correct physical features perceived as flawed (e.g., Choma et al., 2009). Eventually, the informational use and internalization of idealized media images might contribute to the importance preadolescents place on appearance in their personal life, and manifest itself in preadolescents' constant monitoring of their appearance.

Method

Sample and Participant Selection

We used a three-wave panel design with a 6-month time lag between wave 1 (October 2014), wave 2 (April 2015) and wave 3 (October 2015) conducted among a sample of Belgian 9- to 14-year-olds. Ethical approval for the study was granted by the Ethical Committee of the host university. Participants were recruited through a two-stage sampling method within the national school system. In the first step, using a database of the Belgian Department of Education, geographically dispersed schools from different educational levels were randomly selected and requested to participate. By the end of this stage, 24 elementary schools and 13 secondary school agreed upon participation. Next, an active informed consent procedure was followed in which principals, teachers, parents and pupils were informed about the study and written informed consent from the legal guardians of all enrolled pupils was obtained, along with pupils' assent. During the second stage, research assistants visited the selected schools and administered the survey by asking all enrolled students to complete a

paper-and-pencil questionnaire.² In order to reduce social desirability, respondents were guaranteed that all answers would be treated confidentially. No incentive was provided as is customary in Belgium.

In all, 1,971 pupils completed the survey at baseline. The mean age of this sample was 11.30 years ($SD = 1.06$), 52.6% were boys and the majority was born in Belgium (93%). In the second wave, 1,612 pupils of those who had participated in the first wave participated again (response rate of 82%), 973 respondents were tracked over three waves (49.37% of total). The high rate of attrition (39.65%) between the second and third wave was due to the fact that the children in the original Grade 6 sample went to several different secondary schools in seventh grade. As a consequence, 60% of the attrition between wave 2 and wave 3 was due to an inability to contact primary school children who had transferred to a different secondary school. Using Pillai's trace, a MANCOVA analysis revealed that there were no significant difference with respect to relevant Wave 1 variables between the preadolescents who participated only in the first wave and those who participated in all three waves, $V = .007$, $F(5, 870) = 1.27$, $p > .05$, $\eta p^2 = .01$.

Measures

For the purpose of this study, all scales were translated into Dutch by the main researcher and proofread by two members of the research team who were proficient in English and Dutch. Before administering, the translated questionnaire was pilot tested on a group of Flemish Grade 5 pupils that was not affiliated with schools in the present panel study. Drawing on the result of the pilot test, wording was simplified and some items were deleted due to low comprehensibility.

² All of the questionnaires, as used in the study, are available upon request.

Pubertal Timing. For the construction of pubertal timing, self-reports of pubertal development were measured using an adapted version of the Pubertal Development Scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988). Participants were asked to report their development of secondary sexual characteristics on four indices of pubertal growth: growth, body hair, skin changes (pimples), changes to voice (boys) and breast development (girls). Answers were scored on a four-point Likert-type scale ranging from 1 (not yet started) to 4 (seems complete), except for the item on skin changes, where no was coded as 1 and yes was coded as 4. Next, the total PDS scores were standardized within each age cohort and gender to create a measure of pubertal timing (e.g., Skoog, Sorbring, & Bohlin, 2015), with higher scores indicating earlier maturation relative to age-mates.

Peer Appearance Criticism. A seven-item scale developed by Jones, Vigfusdottir, and Lee (2004) measured how often participants reported being teased by female and male peers about their physical appearance. Four items were used to assess the experience of general bodily criticism. A sample item reads: "Boys laugh at me or make fun of me because of my body." The other three items tapped into the experience of peer criticism related to gender specific body concerns. Depending on the participant's gender, sample items read "Boys say that I would look better if I were thinner" and "Girls say I should build up my muscles." The scale evidenced internal consistency reliability across all waves (Girls: $\alpha_{w1} = .90$; $\alpha_{w2} = .92$; $\alpha_{w3} = .93$; Boys: $\alpha_{w1} = .89$; $\alpha_{w2} = .89$; $\alpha_{w3} = .85$).

Media Internalization and Use of Media for Appearance Information. To assess participants' tendency to compare their physical self with media appearance ideals as well as their perception of media as a valuable information source for appearance norms, we used items from both the 'Internalization-General Scale' and the 'Information Scale', two subscales derived from the Sociocultural Attitudes Toward Appearance Scale-3 (SATAQ-3;

Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). This new combined scale included eleven items pertaining to participants' use of media as a comparison referent for and information source about appearance standards. Answers were scored on a five-point Likert-type scale ranging from 1 (I totally disagree) to 5 (I totally agree). Sample items read: "I compare my body to the bodies of TV and movie stars" and "TV programs are an important source of information about fashion and being attractive." Internal consistency was demonstrated in each wave ($\alpha_{w1} = .92$; $\alpha_{w2} = .94$; $\alpha_{w3} = .94$).

Body Surveillance. To measure participants' body surveillance, we used the Body Surveillance subscale of the Objectified Body Consciousness Youth Scale (OBC-Youth; Lindberg, Hyde, & McKinley, 2006). The Body Surveillance subscale assesses the extent to which participants monitor their external appearance. Participants evaluated four statements on a 5-point Likert scale, ranging from 1 (Almost never) to 5 (Almost always). A sample item reads: "I often worry about whether the clothes I am wearing make me look good." Internal consistency was demonstrated in each wave ($\alpha_{w1} = .81$; $\alpha_{w2} = .87$; $\alpha_{w3} = .88$).

Dysfunctional Appearance Beliefs. The cognitive component of body image investment, dysfunctional appearance beliefs, was measured by means of the Beliefs About Appearance Scale (BAAS; Spangler & Stice, 2001). The original scale comprised 20 items that attempt to measure individuals' belief that their physical appearance has important consequences for various life domains. However, a pilot study designed to assess the applicability of the scale in a preadolescent sample showed that several items were not clear to interpret. Based on this preliminary study, the original scale was shortened by twelve items and wording was simplified. Participants evaluated the eight remaining items on a 5-point Likert scale, ranging from 1 (Almost never) to 5 (Almost always). A sample item reads: "People would be more interested in me if I looked better." The selected items showed a

good internal consistency ($\alpha_{w1}=.88$; $\alpha_{w2}=.91$; $\alpha_{w3}=.92$), supporting the construct validity of this shortened BAAS scale for preadolescents.

Demographics. Age, gender, and body mass index (BMI) were included as control variables. Self-reported measures of height and weight were used to estimate BMI, which was calculated as weight (kilograms) per square height (meter). BMI scores were standardized within each age cohort and gender to create age- and gender-specific BMI z-scores.

Analysis

Structural equation modelling (SEM) using the maximum likelihood method was used to test our hypothesized model. Pubertal timing was entered as a manifest variable, while peer appearance criticism, media internalization and information, dysfunctional appearance beliefs, and body surveillance were entered as latent constructs with their respective indicator variables. A confirmatory factor analytic measurement model was estimated prior to estimating the structural model in order to test the fit of the factor structures and to determine the factor loadings for each indicator. Then, we estimated the full structural model in which all variables at Time 2 (media information and internalization) and Time 3 (body surveillance and dysfunctional appearance beliefs) were predicted by their preceding values at Time 1 and Time 2, and by the value of the respective independent variables at Time 1 (peer appearance criticism and pubertal timing). We controlled for participants' gender, age and body mass index, which were modeled as manifest variables in the model, by letting them predict the dependent and mediator variables at wave 2 and wave 3 and covary with the variables at wave 1. We also estimated covariances between latent variables measured at the same time point and allowed covariances between the measurement errors of the same indicators. When evaluating our models for goodness of fit, we relied on the following indices: the chi-squared

to degrees of freedom ratio (χ^2/df), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Criteria for acceptable model fit were: a χ^2/df ratio < 3.0, an RMSEA value < .06 (with values < .03 representing excellent fit), and a CFI value < .90, but preferably above .95 (Hooper, Coughlan, & Mullen, 2008).

To generate results for the mediation analysis as well as confidence intervals (CI) for the indirect effects percentile, bootstrapping of 2000 samples with 95% CI and AMOS user-defined estimands were used (Amos Development Corporation, 2010) (e.g., Rashid et al., 2013). Since the bootstrapping method does not allow the sample to include missing values, multiple imputation (SPSS version 22) was performed to impute missing values. Five datasets were created, and imputed values were restricted to the range of observed scores of the available data. For sensitivity analysis, we compared the models (measurement model and structural model) estimated with the imputed data to those estimated with the un-imputed data. Results were compared and no relevant differences in model fit, factor loadings, and structural paths were found.

Lastly, to test whether the hypothesized relationships differed for boys and girls, we conducted multiple group comparison tests. Both the chi-square difference test (significant difference if $\Delta\chi^2 p < .05$) and changes in the CFI index (non-invariant if $\Delta CFI < .01$) were used to evaluate whether an unconstrained model (i.e., a model in which all structural paths are allowed to vary among boys and girls) significantly differed from a constrained model (i.e., a model where the relationships were fixed to be equal among boys and girls).

Results

Descriptive Statistics and Zero-Order Correlations

Descriptive statistics and zero-order correlations between all relevant variables for boys and girls are presented in Table 1 and 2, respectively. Preadolescents in our sample generally did not equate their self-worth and life satisfaction with physical appearance: nearly

three-quarters of the sample were at or near the scale-midpoint for dysfunctional appearance beliefs. Forty percent of girls and 25% of boys reported that they occasionally monitor their body, and approximately 10% of the sample reported that they regularly rely on and compare themselves with media appearance ideals. And finally, 10% of the sample reported to have experienced some form of peer appearance criticism. There were significant positive correlations between media internalization and dysfunctional appearance beliefs and body surveillance. Using VassarStats (Lowry, 2017), we conducted Fisher's z comparisons to verify whether the strengths of the correlations between the body image stressors and media internalization varied by gender. Fisher r -to- z transformation tests revealed that the correlation between peer appearance criticism and media internalization ($z = -2.74, p < .01$), and the correlation between pubertal timing and media internalization ($z = -4.29, p < .01$) was stronger among girls than boys.

Using Pillai's Trace, a MANCOVA (controlling for age and BMI), with peer appearance criticism, pubertal development, media information and internalization, dysfunctional appearance beliefs, and body surveillance (all wave 1) as dependent variables, showed significant differences between boys and girls, $V = .07, F(5, 961) = 15.39, p < .001, \eta p^2 = .07$. Separate independent ANCOVA-tests revealed that girls scored significantly higher on pubertal development (boys $M = 1.94, SD = .66$; girls $M = 2.15, SD = .71$), $F(1, 965) = 35.84, p < .001, \eta p^2 = .04$, and body surveillance (boys $M = 2.10, SD = .81$; girls $M = 2.41, SD = .95$), $F(1, 965) = 35.49, p < .001, \eta p^2 = .04$. No significant differences were found regarding peer appearance criticism, dysfunctional appearance beliefs and the use of media as an information and comparison source.

Testing the Measurement Model

Results of the measurement model indicated that all of the indicator variables loaded significantly onto the respective latent construct ($p < .001$), with most of the standardized factor loadings ranging from .66 to .86. As expected, pubertal timing and peer appearance criticism were positively correlated with media internalization and information, which, in turn, was positively associated with dysfunctional appearance beliefs and body surveillance. However, the measurement model showed a mediocre fit to the data: chi-square value of 3425.08 with 604 degrees of freedom, $\chi^2/df = 5.67$, $p < .001$, CFI = .87, RMSEA = .07. Inspection of the modification indices suggested that model fit would improve by allowing correlated errors between peer appearance criticism-items that represent general criticism about the body, and between items of the peer appearance criticism scale that represent criticism about the gender-specific concerns of thinness for girls or muscular build for boys. After these modifications, the measurement model showed an acceptable fit: chi-square value of 2015.265 with 594 degrees of freedom, $\chi^2/df = 3.39$, $p < .001$, CFI = .94, RMSEA = .05. All indicator variables continued to load significantly onto the respective latent construct ($p < .001$), and the standardized factor loadings were very similar to those in the original measurement model (range: .50 - .88), suggesting that the indicator variables adequately measured the latent constructs.

Testing the Hypothesized Model

The observed model (Figure 2) showed an acceptable fit: chi-square value of 5950.45 with 2157 degrees of freedom, $\chi^2/df = 2.76$, $p < .001$, CFI = .94, RMSEA = .03. Consistent with our expectation, the model showed that pubertal timing ($\beta = .12$, $B = .13$, $SE = .03$, $p < .001$) and peer appearance criticism ($\beta = .08$, $B = .12$, $SE = .05$, $p < .01$) (both wave 1 variables) positively related to preadolescents' perception and use of media as an information and comparison source regarding physical appearance at wave 2. Furthermore, results also

revealed that pubertal timing positively related to peer appearance criticism (both wave 1 variables), in that early developers did more frequently experience peer criticism in regard to their physical appearance ($\beta = .18$, $B = .13$, $SE = .03$, $p < .001$).

Next, comparisons with media appearance ideals and perceptions of media as a valuable information source for appearance norms (wave 2) were found to positively predict the presence of dysfunctional appearance beliefs in preadolescents (wave 3) ($\beta = .13$, $B = .11$, $SE = .03$, $p < .001$). In contrast to our prediction, no similar result was found for the behavioral component of body image investment, with the model showing that body surveillance (wave 3) was not related to preadolescents' media use (wave 2) ($\beta = .02$, $B = .02$, $SE = .03$, $p > .05$). Neither peer appearance criticism nor pubertal timing (both wave 1 variables) were directly related to dysfunctional appearance beliefs or body surveillance. As a final analysis, we assessed the integrative model, as presented in figure 2, and examined the indirect effect of pubertal timing and peer appearance criticism (both wave 1 variables) on preadolescents' development of dysfunctional appearance ideals and tendency toward body surveillance (both wave 3 variables), through the internalization of media ideals and the perception of media as an important information source (wave 2). Results partially confirmed the hypothesized structure of our integrated model, in that both pubertal timing and peer appearance criticism (both wave 1 variables) significantly related to preadolescents' dysfunctional appearance beliefs and body surveillance (both wave 3 variables). More specifically, mediation tests revealed that pubertal timing (wave 1) was positively related to dysfunctional appearance beliefs (wave 3), through the internalization and perception of media as an information source (wave 2) (.015, 95% CI [.008, .028], $p < .01$). Likewise, the experience of being teased about one's appearance (wave 1) was significantly associated with higher levels of dysfunctional appearance beliefs (wave 2), through the use of media as an information and comparison source regarding appearance (wave 1) (.014, 95% CI [.006,

.034], $p < .01$). However, contrary to our prediction, neither the influence of pubertal timing, nor the impact of peer appearance criticism appeared to be indirectly related to body surveillance.

Moderation by Gender

To test whether the hypothesized integrative model differed by preadolescents' gender, we conducted a multi-group analyses with gender as the grouping variable. In testing for metric invariance, we constrained all factor loadings of each construct to be equal across gender (e.g., Teo, 2015). Both the chi-square difference test ($\Delta\chi^2(51) = 64.33, p > .05$) and the significant change in CFI (CFI unconstrained model = .948; CFI constrained model = .946; $\Delta\text{CFI} < .01$) indicated that factor loadings were invariant across gender, satisfying metric invariance. Next, structural invariance was measured by constraining all structural weights to be the same across gender, and comparing this constrained model with the measurement model. While the chi-square difference tests suggested a statistically significant difference between the two models ($\Delta\chi^2(24) = 43.75, p < .05$), the change in CFI (CFI metric invariance model = .946; CFI constrained model = .946; $\Delta\text{CFI} < .01$) indicated that the nested models were not meaningfully different. However, the chi-square difference test between nested models is sample size dependent (Cheung & Rensvold, 2002) and sensitive for models with several constrained parameters (Vandenberg & Lance, 2000). In turn, the difference in CFI value is considered a robust fit statistic when testing multigroup models (Cheung & Rensvold, 2002). So, based on the results of the CFI difference test, we concluded that the unstandardized relations among the latent variables were equal across gender, confirming structural invariance. Having established metric and structural invariance, we concludes that the observed relationships between our variables of interest were not moderated by gender.

Discussion

The present study attempted to broaden our understanding of the triggers and consequences of preadolescents' use of media as an information and comparison source regarding physical appearance. SEM analyses showed that both pubertal timing and peer appearance criticism were positively related to preadolescents' media internalization and use of media for appearance information. Such media use was, in turn, positively related to preadolescents' dysfunctional appearance beliefs. Regarding the indirect paths, the results partially supported our hypothesized integrated model (see Figure 1) and showed that the relationships between pubertal timing and the accompanying appearance criticism from peers, and dysfunctional appearance beliefs were fully mediated by preadolescents' use of media as an information and comparison source regarding physical appearance. However, no similar relation was noted for body surveillance, the motivational component of body image investment. Preadolescents' media internalization and use of media for appearance information was not significantly related to body surveillance. Several conclusions can be drawn from these results.

First, this study provides novel insights into the developmental body image stressors that predict preadolescents' use of and reliance on media appearance ideals *over time*. Our analyses showed that both early puberty (relative to peers) and the experience of peer appearance criticism were positively related to preadolescents' internalization of media appearance ideals and the use of media as an information source six months later. This finding is in line with previous cross-sectional research reporting a positive association between peer appearance criticism and the internalization of media appearance ideals among preadolescent boys and girls (e.g., Jones et al., 2004; Lawler & Nixon, 2011; Rodgers, Paxton, & McLean, 2014; Yamamiya et al., 2016). Differential levels of body image distress (e.g., Leone et al., 2015; McCabe et al., 2010) can, according to uses and gratifications theory

(Katz et al., 1974) foster preadolescents' use of media as a body image coping strategy (Cash et al., 2005). In this context, scholars have previously highlighted the role of early puberty (Lindberg et al., 2007) and aversive peer appearance feedback (Tiggemann & Slater, 2014) as psychological stressors that produce body image distress among youth. It would be worthwhile for future research to consider whether and how early maturation relative to peers and peer appearance criticism might spur preadolescents to look for ways of altering their physical appearance such as those proposed by media (e.g., Evans et al., 2013), and compare themselves to media images with the aim of self-improvement (Rodgers et al., 2015, p. 707). Accordingly, future studies could benefit from including assessments of body image distress and body image coping, to verify whether early maturing preadolescents' reliance on appearance media stems from their need to cope with current body concerns.

Second, it appeared that the impact of preadolescents' early pubertal timing on their media internalization and perception of media as an appropriate sources on appearance norms was further aggravated by appearance criticism from peers. More specifically, our study emphasized the interrelated nature of social and individual factors in shaping preadolescents' media use, in that pubertal status predicted peer appearance criticism, which, subsequently, increased preadolescents' comparison with and reliance on media ideals. This study therefore suggests that it may be warranted to consider how individual and social predictors of media use are related, because it may further inform us as to why preadolescents rely on and compare themselves with media appearance ideals. In this light, the contextual amplification hypothesis (Ge, Brody, Conger, Simons, & McBride Murray, 2002), which posits that the social context can attenuate or intensify the impact of individual factors on youth's psycho-behavioral resilience, provides an interesting framework from which to study the integrated impact of both social and individual factors in youth's media use and preferences.

Accordingly, future research may explore whether social factors, such as secure peer and parental attachment (e.g., Hardit & Hannum, 2012), can also have an attenuating impact on the relationship between bodily related stressors (e.g., puberty) and one's reliance on media appearance ideals.

Third, the internalization and perceived informational value of media appearance ideals was found to positively correlate with the self-evaluative component of body image investment (i.e., dysfunctional appearance beliefs). More specifically, our findings indicate that the use of media as an information and comparison source directly affected the belief that physical attractiveness is an important determinant of one's worth and self-evaluation. This finding is in line with previous research, suggesting that the media play an important role in the construction of youth's appearance schemas (Anschutz et al., 2012), i.e. learned beliefs, assumptions, and generalizations about one's appearance and its implications (Hargreaves & Tiggemann, 2003, p. 368). Since most studies that examined media internalization have focused on body dissatisfaction (e.g., Evans et al., 2013; Lawler & Nixon, 2011), these findings shed new light on the way media affect the investment component of body image. As previous literature has indicated that dysfunctional body image investment is more predictive of poor socio-behavioral functioning (e.g., restrained eating) than negative body image evaluations (e.g., Carraça et al., 2011; Cash et al., 2004), future media literacy programs should benefit from applying a body image cognitive-behavioral approach (Cash, 2011). Such an approach is aimed at cognitive restructuring dysfunctional body image beliefs that underlie aversive behavioral body investment rituals (e.g., body surveillance), and uses exposure to and discussion of appearance stereotype currently promoted in the media (e.g., Jarry & Ip, 2005).

Additionally, content analytic research has evidenced the presence of beauty-is-good messages in media content specifically targeted at preadolescents (Northup & Liebler, 2010). Since such content is marked by an emphasis on the social and psychological benefits associated with appearing physically attractive (e.g., positive social attention), this might further explain why preadolescents' reliance on and internalization of media models prompt them to overvalue their physical appearance in terms of perceived implications of appearance for friendships, achievements and self-worth. Accordingly, organizations focused on youth wellbeing could look for ways to support the development of media productions that may counteract the beauty-is-good stereotype (e.g., American Psychological Association, 2010).

Fourth, the relationship between pubertal timing and the accompanying appearance criticism from peers, and dysfunctional appearance beliefs was fully mediated by preadolescents' use of media as an information and comparison source regarding physical appearance. The lack of a direct link between these body image stressors (pubertal timing and peer appearance criticism) and dysfunctional appearance beliefs stresses the crucial, though negative, role of media in preadolescents' body image beliefs. This finding possibly supports the idea that media can operate as a super peer, providing early maturing preadolescents with appearance information that is not available within their micro-context (e.g., family and peers) (Brown, Halpern, & L'Engle, 2005). The possibility of media as a super peer for early maturers would be supported by social comparison theory (Festinger, 1954), which suggests that individuals prefer to compare with similar others, or comparison targets who are similar for the attribute of concern, because they provide the most accurate information for self-evaluation. However, with respect to pubertal timing, it has been argued that preadolescents who experience puberty relatively early feel different from and more mature than their *on-time* peers; and therefore seek out and socialize with older peers who resemble them

physically (Skoog & Stattin, 2014). It stands to reason, then, that early maturing preadolescents would prefer older, more mature comparison targets for appearance-related self-evaluations (Festinger, 1954). Hence media content might serve as a relevant source for appearance-related self-evaluation, as the media provide abundant opportunities for appearance-related comparisons with older, more mature, role models (e.g., Eyal & Te'eni-Harari, 2013; Tatangelo & Ricciardelli, 2015). Future studies should consider the (moderating) influence of alternative sources of appearance information as previous research, using a social compensation framework (Davis & Kraus, 1989), has indicated that individuals tend to use media as a way to satisfy certain needs that are unmet in everyday life (e.g., Selfhout, Branje, Delsing, ter Bogt, & Meeus, 2009).

Findings were also obtained that do not directly fit prior literature. First, this study found that boys' early maturation was related to higher levels of appearance related criticism from peers; a remarkable finding, since most prior studies have suggested that early developing boys are at a lower risk for negative peer appearance criticism (e.g., Frisén & Holmqvist, 2010; Ricciardelli, 2012). One way to explain this unexpected finding is to pay more attention to preadolescents' motives for criticizing one another. Future research could consider whether receiving negative comments about one's physical appearance is not so much a consequence of deviating from the sociocultural ideal body, but rather a result of standing out in the peer group by looking more physically mature.

Second, early maturing boys appeared to be more sensitive to media appearance ideals, in that early maturation positively related to boys' perceived informational value and internalization of media appearance ideals. Future studies might consider the intervening role of experienced body image distress in the relationship between boys (and girls) precocious puberty and their reliance on and internalization of media appearance ideals. In this context,

the maturational disparity hypothesis (Ge & Natsuaki, 2009) argues that early developing youth lack the cognitive resources to cope with psychosocial challenges presented by puberty, and therefore experience higher levels of body image distress.

Third, preadolescents' internalization and perceived informational value of media ideals was not significantly associated with body surveillance, the motivational body investment component. Dysfunctional appearance beliefs, on the other hand, turned out to increase in a linear manner as a function of preadolescents' reliance on and internalization of media appearance ideals. This finding suggests that media-influenced cognitive effects are more primary than media-induced behavioral effects, and leads us to suspect that behavioral media effects are dependent on an antecedent cognition (e.g., Potter, 2012). In this regard, it might be worthwhile to address the role of media-induced cognitive body image investment as a mediator in the relationship between media exposure and behavioral body investment.

Although this study has several strengths, some limitations should be noted. First, this study focuses on developmental (risk) factors that contribute to preadolescents' use of media as a source of information and internalization of media appearance ideals. Although peer appearance criticism and pubertal timing were selected on theoretical and empirical grounds, we acknowledge that controlling for other protective predictors, such as social self-esteem (e.g., Wichstrøm & von Soest, 2016) and peer attachment (e.g., Hardit & Hannum, 2012) would have provided a more nuanced insight into preadolescents' media reliance and internalization. Second, only self-report assessments were used, leaving the possibility that some respondents might have overestimated or underestimated the progress of their own puberty. Additionally, self-report data increase the risk for common method variance (i.e., variance that is attributable to the measurement method rather than the constructs that are measured; Podsakoff, MacKenzie, Lee, & Posakoff, 2003) which may have inflated

associations among variables. Future studies could replicate our results using other methods, such as peer reports or physical measures of puberty. Third, we did not collect detailed demographic characteristics of our sample, therefore generalizing the results of the present study to an entire preadolescent population should be done with caution. We can also not preclude the cultural context from affecting our results. Nevertheless, Belgian teens' pubertal developmental has been shown to be similar to those in other Western European countries (Roelants, Hauspie, & Hoppenbrouwers, 2009). Moreover, studies in the U.S., other Westernized countries, and Belgium have reported similar trends in the role of media and peers in body image concerns (e.g., Clark & Tiggemann, 2006; Gondoli, Corning, Salafia, Bucchianeri, & Fitzsimmons, 2010, Vandenbosch & Eggermont, 2012). Finally, a large amount of missing data had to be imputed, which may have impacted the findings, but sensitivity analysis showed that this had no impact on the observed structural model.

Conclusion

In conclusion, the present study has made three important contributions to the current literature on preadolescents' media internalization. First, we showed that preadolescents' media internalization and use of media for appearance information can be triggered by age-related developmental aspects, such as early puberty and peer appearance criticism. Second, we showed that preadolescents' media internalization and use of media as an information source regarding physical appearance was positively related to dysfunctional appearance beliefs. Third, we found that preadolescents' media internalization and use of media for appearance information fully mediated the impact of early puberty and peer appearance criticism on dysfunctional appearance beliefs, suggesting that the presence of alternative sources of appearance information (e.g., parents and peers) could possibly mitigate the negative impact of these developmental factors on preadolescents' body image.

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Tables

Table 1

Descriptive Statistics

				Girls		Boys	
				M	SD	M	SD
Pubertal development	W1	1	4	2.15	0.72	1.94	0.84
Peer appearance criticism	W1	1	5	1.25	0.51	1.28	0.52
Media internalization/information	W1	1	5	1.91	0.79	1.87	0.67
	W2	1	5	1.90	0.80	1.82	0.73
Body surveillance	W1	1	5	2.41	0.95	2.10	0.81
	W2	1	5	2.36	0.99	1.99	0.87
	W3	1	5	2.46	1.02	1.94	0.84
Dysfunctional appearance beliefs	W1	1	5	2.13	0.84	2.07	0.78
	W2	1	5	2.03	0.88	1.94	0.81
	W3	1	5	2.04	0.89	1.90	0.80

Table 2

Zero-Order Inter-Order Correlations for Boys and Girls

		Boys	Puberty	Criticism	Internalization		Body surveillance			Appearance beliefs		
					W1	W2	W1	W2	W3	W1	W2	W3
Girls	Puberty	W1	1	.10*	.02	.10*	.16**	.10*	.08	.17**	.18**	.05
	Criticism	W1	.23**	1	.10*	.10*	.33**	.26**	.08	.32**	.27**	.10*
	Internalization	W1	.32**	.25**	1	.42**	.32**	.30**	.27**	.37**	.35**	.26**
		W2	.36**	.27**	.52**	1	.31**	.43**	.34**	.27**	.46**	.37**
	Body surveillance	W1	.37**	.38**	.56**	.44**	1	.57**	.45**	.62**	.53**	.40**
		W2	.32**	.37**	.43**	.56**	.59**	1	.51**	.39**	.65**	.40**
		W3	.32**	.30**	.40**	.47**	.55**	.63**	1	.36**	.45**	.68**
	Appearance beliefs	W1	.31**	.41**	.53**	.37**	.72**	.50**	.46**	1	.57**	.50**
		W2	.25**	.41**	.45**	.54**	.55**	.75**	.54**	.60**	1	.54**
		W3	.30**	.38**	.38**	.45**	.48**	.57**	.67**	.52**	.63**	1

Note. *Puberty* pubertal timing, *Criticism* peer appearance criticism, *Internalization* media internalization and use of media for appearance

information, *Appearance beliefs* dysfunctional appearance beliefs. ** $p < .001$; * $p < .05$

Figure 1. Hypothesized model for the relationships between pubertal timing, peer appearance criticism, media internalization and use of media for appearance information, dysfunctional appearance beliefs and body surveillance.

Figure 2. Observed model for the relationships between pubertal timing, peer appearance criticism, media internalization and use of media for appearance information, dysfunctional appearance beliefs and body surveillance. *Note.* Values reflect standardized coefficients; dashed lines represent non-significant relationships; * $p < .01$, ** $p < .001$. For clarity, cross-sectional correlations, autoregressive relationships, and error terms are not shown. Gender, BMI z-scores and age were entered as covariates but also removed from the figure for clarity. Likewise, non-significant direct relationships between the body image stressors (pubertal timing and peer appearance criticism) and the outcome variables (body surveillance and dysfunctional appearance beliefs) are not shown.