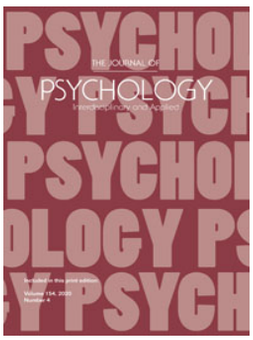

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Self-Compassion and Need Frustration Moderate the Effects of Upward Appearance Comparisons on Body Image Discrepancies

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ABSTRACT

Drawing from diverse theoretical frameworks, we examined predictors of discrepancy between current and ideal body image in a sample of 396 Greek adolescents. The participants completed assessments of the frequency of comparing oneself with someone of perceived better appearance, appearance evaluations, frustration of basic psychological needs, and appearance self-compassion. We found that upward appearance comparisons negatively predicted appearance evaluation, which in turn was a negative predictor of body image discrepancy. Moderated mediation analyses showed that appearance self-compassion buffered, whereas psychological need frustration augmented the negative effects of upward comparisons on appearance evaluation. Our findings contribute to the growing literature on body image discrepancies in adolescence by examining moderating factors that amplify or buffer such discrepancies, hence identifying viable intervention pathways.

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Body image; psychological theory; adolescent psychology; behavioral medicine; behavioral research

Introduction

The degree of preoccupation of adolescent boys and girls with their physical appearance and body image has been identified as a significant problem by researchers and health practitioners alike. In Australia, concerns with body image have been rated as one of the three top concerns of adolescent girls and boys in the Mission Australia Annual National Youth Survey (2018). In the latest survey report in 2017, using a sample of over 24,000 young people, "body image concerns" was rated as an important concern for 31.3% of the respondents, up from 20.4% in the 2012 report. There is a significant amount of empirical evidence in the literature linking body dissatisfaction with an array of maladaptive outcomes, such as poor psychological health (e.g., low self-esteem, depression), low physical activity, and disordered eating (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). Interestingly, perceptions of body weight and size, rather than actual body mass index (BMI), have been better predictors of such maladaptive outcomes (Jansen, van de Looij-Jansen, de Wilde, & Brug, 2008). Hence,

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understanding which factors predict adolescents' perceptions of their body weight and, particularly, how such perceptions differ from internalized "ideal standards" is an important consideration for researchers and clinicians. The present study aims to contribute to the growing literature on this topic by examining moderating factors that amplify or buffer such discrepancies.

Upward Appearance Comparisons

One factor that has been found to contribute to body image discrepancies and subsequent feelings of body dissatisfaction is upward appearance comparisons. Drawing from social comparison theory (SCT; Festinger, 1954), researchers have examined the effects of comparing one's appearance to that of others. Researchers have primarily studied the effects of upward (i.e., comparing oneself to someone perceived to be more attractive) and downward physical appearance comparisons. Findings from such studies have shown that upward comparisons are detrimental in that they relate to low appearance evaluation and disordered eating behaviors, whereas the opposite pattern of associations was found for downward comparisons (O'Brien et al., 2009). Hence, in this study, we are focusing on upward appearance comparisons only. With regard to gender differences, typically, it has been reported in the self-discrepancy theory (Higgins, 1987) literature that women tend to compare themselves with thinner, more desired alternatives. For males there is a great variation, with some wanting to be leaner, and others wanting to be larger and more muscular (Vartanian, 2012). Studies using signed (i.e., allowing positive and negative scores) and absolute (i.e., absolute scores) discrepancies, however, have reached similar conclusions in that higher levels of self-discrepancy between current and ideal body shape standards are related to higher body dissatisfaction and negative affect in both males and females (Vartanian, 2012). Hence, in our study we focused on signed discrepancies and controlled for any potential gender (as well as BMI and age) effects to focus on theory-based predictors of such discrepancies. We use the terms "predict" and "predictors" in a statistical/regression analysis sense and not to imply causality.

The Mediating Role of Appearance Evaluations

A large study of 2220 Cypriot adolescents showed that appearance evaluation was a significant negative predictor of actual–ideal body weight discrepancies, in both males and females (Argyrides & Sivitanides, 2017). Appearance evaluation refers to feelings of physical attractiveness and satisfaction with one's body image and looks. Given that O'Brien et al. (2009) reported that upward (but not downward) physical appearance comparisons predicted lower appearance evaluations in both young males and females, it is likely that appearance evaluation might mediate the effects of upward physical comparisons on body image discrepancies. In other words, feeling less satisfied with one's appearance might be one of the reasons why engaging in upward physical comparisons might result in large body image discrepancies. This indirect effect was tested in the present study.

The Moderating Role of Appearance Self-Compassion and Psychological Need Frustration

The role of self-compassion has also been studied in the body image literature. Self-compassion refers to being accepting and understanding toward personal failure and responding with self-kindness (Neff, 2003). Braun, Park, and Gorin (2016) conducted a review of 28 studies that examined the role of self-compassion in predicting poor body image and eating pathology. Of relevance to the present study, the review showed that self-compassion can directly predict body-related outcomes (e.g., high body appreciation and low body preoccupation; e.g., Wasylkiw, MacKinnon, & MacLellan, 2012). Further, self-compassion buffered the effects of risk factors on maladaptive outcomes. For example, Homan and Tylka (2015) showed that self-compassion moderated the negative relation between body-related comparisons and body appreciation. Specifically, at high levels of self-compassion, body comparisons and appearance contingent self-worth were unrelated to body appreciation. In contrast, at low levels of self-compassion, these relations were significant. Unfortunately, only the frequency but not the direction of these comparisons (upward or downward) was assessed in that study. Further, Braun et al. (2016) noted that such buffering effects of self-compassion have not always been consistent, and to complicate matters even further, other studies have tested self-compassion as a mediator as opposed to a moderator (e.g., Duarte, Ferreira, Trindade, & Pinto-Gouveia, 2015).

In the present study, we examined the role of self-compassion specific to negative appearance-related thoughts and events, as opposed to global self-compassion, as per Breines, Toole, Tu, and Chen's (2014) study. Using a diary study methodology, Breines et al. (2014) showed that on days when participants reported higher levels of appearance-related self-compassion, they also reported lower levels of disordered eating. Thøgersen-Ntoumani, Dodos, Chatzisarantis, and Ntoumanis (2017) also used a diary study methodology to test the main and interactive effects of daily upward appearance comparisons and appearance self-compassion on daily social physique anxiety, drive for thinness, and body dissatisfaction. Results showed that both state appearance-related upward comparisons and self-compassion independently predicted all three outcomes in a positive and negative fashion, respectively, however, no interactive effects were found. It is possible that the lack of significant interactions was due to the inclusion of negative outcomes only. Perhaps self-compassion serves better to protect risk factors from impacting on positive outcomes; for example, Homan and Tylka (2015) found protective effects of self-compassion on a positive outcome (i.e., body appreciation).

In the present study, we build upon and extend past research by examining whether appearance self-compassion decreases the effects of appearance-related upward comparisons on a positive body image outcome (i.e., appearance evaluations). It is possible that the undermining effect of upward appearance comparisons on appearance evaluations might be buffered when levels of self-compassion are high rather than low, in other words, when one is accepting and shows kindness to oneself in relation to negative appearance-related thoughts. Extending the moderation analysis by Homan and Tylka (2015), we also tested whether appearance self-compassion moderates the indirect effect of upward appearance comparisons on body image discrepancies through appearance

evaluations. We expected that high appearance self-compassion would buffer this indirect effect.

We also examined psychological need frustration as another potential moderator in how upward appearance comparisons predict appearance evaluation and, indirectly, body image discrepancies. The term psychological need frustration stems from self-determination theory (SDT; Ryan & Deci, 2017) and refers to one's experience of having their basic needs for autonomy, competence, and relatedness undermined. Thøgersen-Ntoumani, Ntoumanis, and Nikitaras (2010) called for an integration of constructs from SDT and SCT to promote a more comprehensive understanding of determinants of and variability in body image concerns. The SCT factors are typically proximal predictors of body image-related outcomes, whereas the concept of psychological needs refers to deeper psychological mechanisms that underpin personal growth and development. Thøgersen et al. (2010) found support for a model in which unhealthy weight control behaviors of Greek adolescents were directly predicted by body image concerns and indirectly predicted by psychological need frustration as well as perceptions of parental need support. In a diary study, Verstuyf, Vansteenkiste, Soenens, Boone, and Mouratidis (2013) found that daily experiences of need frustration were associated with binge eating in female adolescents. In a more recent study, Thøgersen-Ntoumani et al. (2018) reported daily need frustration predicted feelings of body-related shame and guilt (but not pride). Further, an interaction between upward appearance comparisons and need frustration emerged, in that need frustration exacerbated the negative effects of such comparisons on thoughts of dietary restriction. Thøgersen-Ntoumani et al. (2018) also tested the same interaction in predicting body image-related emotions (shame, guilt, and pride) but found no significant effects.

The present study tested the interaction between psychological need frustration and upward appearance comparisons in predicting appearance evaluations, and indirectly, body image discrepancies. Appearance evaluations and appearance management behaviors are related to thoughts of dietary restriction (Chang, Jarry, & Kong, 2014), and hence, the interaction between psychological needs and upward comparisons is more likely to replicate the significant interaction found by Thøgersen-Ntoumani et al. (2018). The links between need frustration, appearance evaluation, and body image discrepancies have not been tested previously, but we expected that psychological need frustration would be associated with low appearance evaluation and would exacerbate the negative effects of upward appearance comparisons on appearance evaluation and, indirectly, on body image discrepancies. The theoretical rationale for this argument is that when individuals' needs for autonomy, competence, and relatedness are frustrated, they develop coping resources in the form of need substitutes and/or compensatory behaviors (Deci & Ryan, 2000). Need substitutes could be manifested through the endorsement of the "thin-ideal" as well as compensatory behaviors such as rigid and restrictive eating patterns (Deci & Ryan, 2000).

Study Hypotheses

In sum, one mediation and two moderated mediation hypotheses (which built upon and qualify the mediation hypothesis) were put forward in our study:

1. Appearance evaluation would mediate the relation between upward appearance comparisons and body image discrepancy.
2. Appearance self-compassion would buffer the negative relation between upward appearance comparisons and appearance evaluation; the relation should be significant at low, but not high levels of self-compassion. Further, the indirect effect of upward appearance comparisons on body image discrepancy (see hypothesis 1) should be significant at only low levels of appearance self-compassion.
3. Psychological need frustration would augment the negative relation between upward appearance comparisons and appearance evaluation; the relation should be significant at high but not low levels of need frustration. Further, the indirect effect of upward appearance comparisons on body image discrepancy (see hypothesis 1) should be significant at only high levels of need frustration.

Method

Participants and Procedure

Participants ($N = 396$; males = 185, females = 210, one participant did not report sex) were young adolescents (M age = 13.36; $SD = 1.31$; 17 participants did not report age), predominantly of Greek origin (96.5%; three participants did not report ethnicity). Their mean BMI was 19.98 ($SD = 3.01$; no BMI data were available for six participants), as determined by measurements of height and weight taken by trained research assistants. After initial data screening, 30 participants were excluded from the analyses due to missing data on one or more variables (PROCESS requires complete data; Hayes, 2018). Hence, the final sample included in the analyses included 366 participants (males = 168, females = 198). There were no statistically significant differences on any of the study variables between those excluded and the included sample.

The participants were recruited from a summer recreational activities camp outside Athens, Greece, following ethics approval from a local university. Written consent was obtained from the participants and their parents, and camp organizers. Participants were assured of the confidentiality and anonymity of their responses and were told that they can withdraw from the study at any point.

All questionnaires were translated using a parallel back-translation procedure (Vallerand et al., 1992). Specifically, each original scale was translated from English to Greek by a bilingual researcher. The translated version was then translated back into English by another bilingual researcher who did not consult the English version of the scale whilst undertaking the translation. Any discrepancies between the Greek and English version were discussed as to whether they were necessary to accurately reflect the intended meaning of a word or phrase in the Greek language. A third senior bilingual researcher then compared the translated version and the original English version and made some small final amendments. All three researchers had a PhD in psychology.

Instruments

Upward Appearance Comparisons

The 10-item Upward Appearance Comparison Scale (O'Brien et al., 2009) was used to measure tendencies for upward appearance-focused social comparisons (e.g. "I compare

my body to people who have a better body than me"), on scales ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). O'Brien et al. (2009) reported adequate test-retest reliability ($r = .79$; 2-weeks) and internal consistency ($\alpha = .94$) estimates.

Appearance Evaluations

Six (out of eight) items from the Multidimensional Body-Self Relations Questionnaire (Appearance Scale; Cash, 2000) were used to measure feelings of physical attractiveness and satisfaction with one's looks, on scales ranging from 1 (*Definitely Disagree*) to 4 (*Definitely Agree*), reversing items where appropriate. We did not use two items that were indicated to us as being potentially inappropriate by the camp organizers: "I am careful to buy clothes that will make me look my best" (as it might not apply to children whose parents chose the clothes), and "my body is sexually appealing." Argyrides and Kkeli (2013) reported a Cronbach's alpha coefficient of .82 and a test-retest reliability of .87 (over 1 month) for this subscale using a sample of 1312 high school students.

Body Image Discrepancy

We used the Figure Rating Scale (Stunkard, Sorenson, & Schulsinger, 1983) which comprises nine males and nine females numbered drawings of increasing body size. Participants were asked to choose a number that represented their ideal body size and another number that represented their current body size, with reference to either the male or female drawings. As per the study by Fitzgibbon, Blackman, and Avellone (2000), the difference between these two numbers was operationalized as the degree of participants' body image discrepancy. Williamson, Gleaves, Watkins, and Schlundt (1993) have shown that discrepancies between current and ideal weight correlated with ratings of body dissatisfaction.

Appearance-Related Self-Compassion

We used the 12-item Self-Compassion Short-Form (Raes, Pommier, Neff, & Van Gucht, 2011) to assess self-compassion, and as in the study by Breines et al. (2014), we modified the items so that they were specific to appearance-related self-compassion (e.g., "I try to be understanding and patient towards those aspects of my body I don't like"). Responses were collected on 5-point scales ranging from 1 (*Almost Never*) to 5 (*Almost Always*), reversing items where appropriate. In a diary study, Breines et al. (2014) showed that the average daily Cronbach's alpha was $\alpha = .79$, and on days when participants reported greater self-compassion, they also reported lower daily disordered eating.

Psychological Need Frustration

We used 12 items from Costa, Ntoumanis, and Bartholomew (2015) study to measure feelings of frustration in one's life related to the needs for autonomy, competence, and relatedness (e.g., "In my life I feel prevented from making choices"). Responses were provided on 7-point scales ranging from 1 (*Strongly Disagree*) and 7 (*Strongly Agree*). Costa et al. (2015) showed in a confirmatory factor analysis that the scale had good

Table 1. Bivariate Correlations, Descriptive Statistics, and Internal Consistencies ($n = 366$).

	1	2	3	4	5	6	7	8
1. Age								
2. Sex[a]	.40*							
3. BMI	.25*	.15*						
4. Body image discrepancy	.09	.16*	.53*					
5. Upward appearance comparisons	.34*	.24*	.14*	.14*				
6. Appearance evaluations	−.01	−.05	−.23*	−.31*	−.26*			
7. Appearance Self-compassion	−.13*	−.07	−.17*	−.22*	−.42*	.47*		
8. Need frustration	.18*	.05	.07	.04	.36*	−.31*	−.38*	
M	13.36	–	19.93	0.38	2.45	3.44	3.36	3.40
SD	1.31	–	2.97	1.09	0.70	0.78	0.68	1.12
Skewness	−.05	–	0.73	0.11	−0.08	−0.59	−0.45	0.13
Kurtosis	−0.31	–	1.25	1.32	−0.68	0.67	0.50	−0.33
ω					0.87	0.79	0.72	0.84

Note. [a]Point-biserial correlations.
ω = omega coefficient (McDonald, 1970).
*$p < .05$.

model fit. Thøgersen-Ntoumani et al. (2018) utilized an overall need frustration score with a Cronbach's alpha of .93.

Statistical Analyses

The statistical analyses were performed in IBM SPSS, version 24. After initial data screening and descriptive analyses, we used the SPSS macro PROCESS version 3.0 to estimate the mediation and moderated mediation models (Hayes, 2018). For all models, we used a heteroscedasticity consistent standard error and covariance matrix estimator (HC3; Hayes & Cai, 2007; MacKinnon & White, 1985). Indirect and moderated indirect effects were calculated using 5000 bootstrap samples for the percentile bootstrap confidence intervals (CI). If the 95% bootstrap CI did not include zero, the indirect effect was considered statistically significant. We also report the completely standardized effect size (ab_{cs}) for the indirect effect, which expresses the indirect effect in terms of the difference in standard deviation units in the outcome variable (Y) between two cases that differ by one standard deviation in the independent variable (X; Hayes, 2018).

The moderated mediation models were specified as first stage moderated mediation models (Edwards & Lambert, 2007; Hayes & Rockwood, 2017), in which the association between X and the mediator (M), and thereby also the indirect effect of X on Y, are dependent on the moderator (W). We used the index of moderated mediation (a_3b; Hayes, 2015) to quantify the relation between the moderator and the indirect effect. If the 95% bootstrap CI did not include zero, the indirect effect was considered statistically significant and dependent on the moderator. To aid interpretation, all independent variables were mean centered in the moderated mediation model (Hayes, 2018).

Results

Preliminary Analysis and Descriptive Statistics

Bivariate correlations, descriptive statistics, and internal reliability coefficients are displayed in Table 1. All variables displayed acceptable skewness and kurtosis values

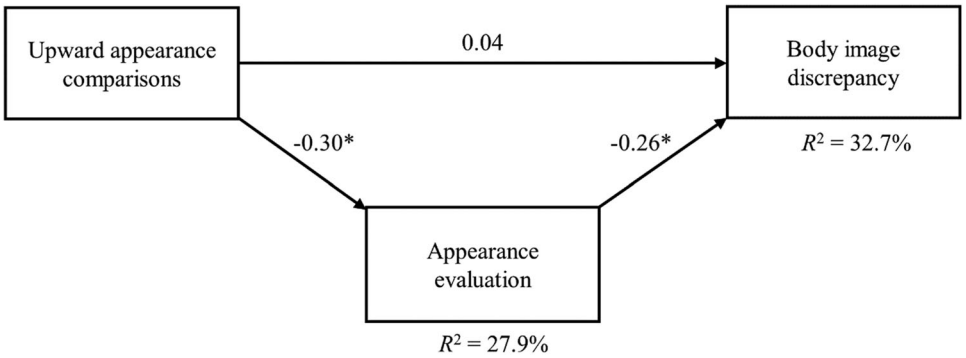

Figure 1. Mediation model. Covariates (age, BMI, and sex) are not shown in the Figure. $^*p < .05$.

(within ±1.5) and internal consistency estimates (ω) ranged from 0.72 to 0.87. The bivariate correlations showed that higher age was associated with more upward appearance comparisons, need frustration, and less self-compassion. Being female and having a higher BMI were associated with larger body image discrepancy and more upward appearance comparisons. Larger body image discrepancy was also associated with lower appearance evaluation and self-compassion. More upward appearance comparisons were associated with lower appearance evaluation, self-compassion, and more need frustration. Higher appearance evaluation was related to more self-compassion and less need frustration, and more self-compassion was associated with less need frustration.

Mediation Model

First, we estimated a mediation model (Model 1; Figure 1) with upward appearance comparisons as the independent variable, appearance evaluation as the mediator, and body image discrepancy as the outcome variable, while controlling for age, BMI, and sex (see Table 2). Upward appearance comparisons were negatively associated with appearance evaluation, which in turn was negatively associated with body image discrepancy. The direct association between upward appearance comparisons and body image discrepancy was weak and not statistically significant, however, establishing mediation does not require a significant direct effect of the predictor on the outcome (Hayes, 2018). The indirect effect of upward appearance comparisons on body image discrepancy through appearance evaluation was positive and statistically significant, $ab = .078$, $SE = .026$, 95% CI [.031, .132], which also was corroborated by the completely standardized effect size, $ab_{cs} = .050$, $SE = .017$, 95% CI [.020, .086].

Moderated Mediation Models

Building on the mediation model, we specified two moderated mediation models, the first with self-compassion as the moderator (Model 2; Figure 2) and the second with need frustration as the moderator (Model 3; Figure 3). We controlled for age, sex, and BMI in the moderated mediation models. Conditional direct and indirect effects at

Table 2. Parameter Estimates from the Mediation (Model 1) and Moderated Mediation Models (Models 2 and 3).

	Mediator Appearance evaluation					Dependent variable Body image discrepancy				
				95% CI					95% CI	
Model 1	*B*	*SE*	*p*	LL	UL	*B*	*SE*	*p*	LL	UL
Age	.09	.03	.009	.02	.15	−.07	.04	.109	−.15	.02
BMI	−.06	.01	.000	−.09	−.03	.18	.02	.000	.14	.22
Sex (1 = boy, 2 = girl)	−.02	.09	.845	−.19	.15	.22	.11	.051	−.00	.44
Upward appearance comparisons	−.30	.06	.000	−.43	−.18	.04	.07	.538	−.09	.18
Appearance evaluation						−.26	.07	.000	−.39	−.13
R^2	12.1%					29.7%				
				95% CI					95% CI	
Model 2	*B*	*SE*	*p*	LL	UL	*B*	*SE*	*p*	LL	UL
Age	.08	.03	.008	.02	.14	−.07	.04	.109	−.15	.02
BMI	−.04	.01	.001	−.07	−.02	.18	.02	.000	.14	.22
Sex (1 = boy, 2 = girl)	−.02	.08	.797	−.17	.13	.22	.11	.051	−.00	.44
Upward appearance comparisons	−.12	.38	.051	−.23	.00	.04	.07	.538	−.09	.18
Appearance self-compassion	.44	.07	.000	.31	.57					
Upward appearance comparisons x Appearance Self-compassion	.20	.07	.004	.07	.33					
Appearance evaluation						−.26	.07	.000	−.39	−.13
R^2	27.9%					32.7%				
				95% CI					95% CI	
Model 3	*B*	*SE*	*p*	LL	UL	*B*	*SE*	*p*	LL	UL
Age	.11	.03	.001	.05	.18	−.07	.04	.109	−.15	.02
BMI	−.05	.01	.000	−.08	−.03	.18	.02	.000	.14	.22
Sex (1 = boy, 2 = girl)	−.06	.08	.438	−.22	.10	.22	.11	.051	−.00	.44
Upward appearance comparisons	−.20	.06	.001	−.32	−.08	.04	.07	.538	−.09	.18
Need frustration	−.19	.04	.000	−.26	−.11					
Upward appearance comparisons x Need frustration	−.15	.05	.001	−.25	−.06					
Appearance evaluation						−.26	.07	.000	−.39	−.13
R^2	20.9%					32.7%				

Note. LL = lower limit, UL = upper limit.

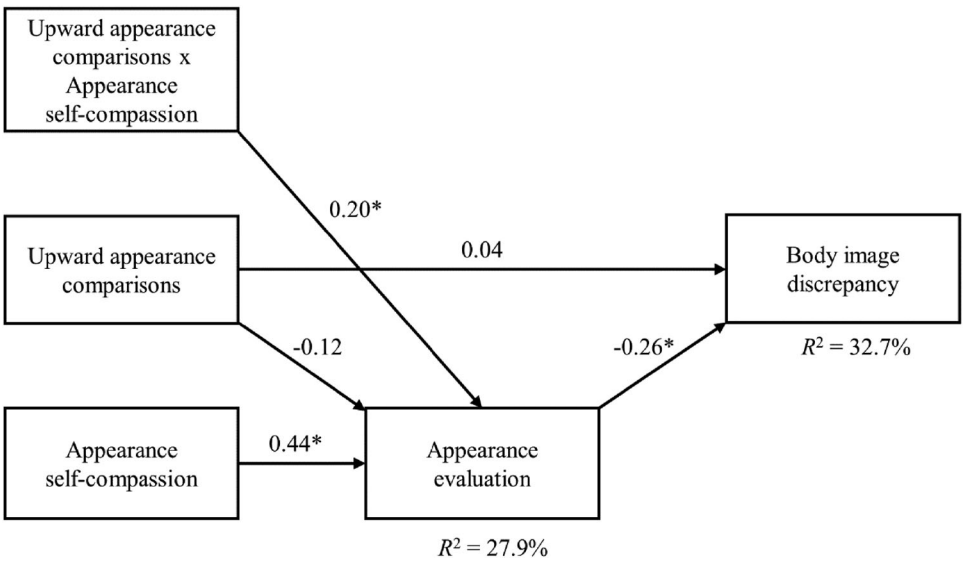

Figure 2. Moderated mediation model with appearance self-compassion as the moderator. Covariates (age, BMI, and sex) are not shown in the Figure. $^{*}p < .05$.

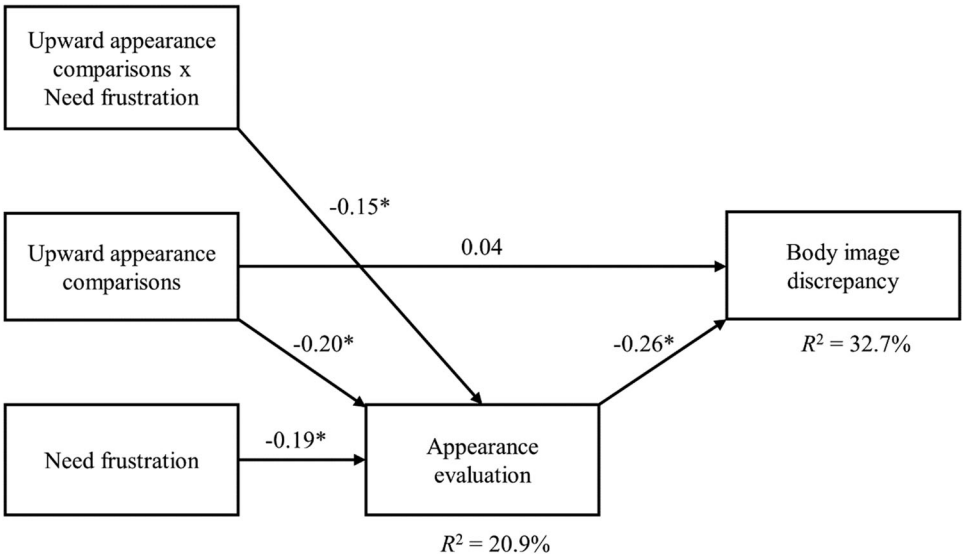

Figure 3. Moderated mediation model with need frustration as the moderator. Covariates (age, BMI, and sex) are not shown in the figure. $^*p < .05$.

different levels of the moderators (i.e., simple slopes) are presented in Table 3. All parameter estimates for Models 2 and 3 are presented in Table 2.

In Model 2, the interaction between upward appearance comparisons and self-compassion was a statistically significant predictor of appearance evaluation, indicating that the negative association between upward appearance comparisons and appearance evaluation was non-significant for those with higher self-compassion (i.e., self-compassion had a buffering effect). The index of moderated mediation also indicated that the indirect effect between upward appearance comparisons and body image discrepancy was statistically significant and dependent on self-compassion, $a_3b = -.052$, $SE = .021$, 95% CI [–.096, –.014]. The indirect effect was also non-significant for those reporting higher self-compassion (see Figure 4 and Table 3).

Model 3 showed that the interaction between upward appearance comparisons and need frustration was a statistically significant predictor of appearance evaluation, indicating that the negative association between upward appearance comparisons and appearance evaluation was augmented for those with more need frustration, but non-significant for those with low need frustration. The index of moderated mediation also indicated that the indirect effect between upward appearance comparisons and body image discrepancy was statistically significant and dependent on need frustration, $a_3b = .040$, $SE = .017$, 95% CI [.012, .076]. The indirect effect was significant for those reporting higher, but not lower, need frustration (Figure 4 and Table 3).

We performed a sensitivity analysis and compared the results when using raw body image discrepancy scores to the results when using absolute values of body image discrepancy (cf. Rousseau & Eggermont, 2018) as the outcome variable, with higher values reflecting higher discrepancy. The results from the sensitivity analyses mirrored the original results and support our conclusions regarding the indirect effects and the conditional direct and indirect effects.

Table 3. Conditional Direct (Upward Appearance Comparisons → Appearance Evaluation) and Indirect Effects (Upward Appearance Comparisons → Appearance Evaluation → Body Image Discrepancy) at Different Levels of the Moderators (Appearance Self-Compassion and Need Frustration).

	Model 2						Model 3				
				95% CI						95% CI	
Level of self-compassion Direct effect	*B*	*SE*	*p*	LL	UL	Level of need frustration Direct effect	*B*	*SE*	*p*	LL	UL
−1 *SD*	−.25	.08	.003	−.41	−.09	−1 *SD*	−.03	.08	.690	−.18	.12
mean	−.12	.06	.051	−.23	.00	mean	−.20	.06	.001	−.32	−.02
+1 *SD*	.02	.07	.752	−.11	.15	+1 *SD*	−.37	.09	.000	−.54	−.21
Indirect effect						Indirect effect					
−1 *SD*	.07	.03		.02	.12	−1 *SD*	.01	.02		−.03	.05
mean	.03	.02		.00	.07	mean	.05	.02		.02	.10
+1 *SD*	−.01	.02		−.04	.03	+1 *SD*	.10	.03		.04	.17

Note. LL = lower limit, UL = upper limit.

Discussion

The aim of this study was to examine predictors of body image discrepancy in adolescents, with emphasis on identifying variables from diverse theoretical frameworks that augment or buffer such discrepancies. Given the large volume of evidence indicating that body image concerns are high in adolescents, and that such concerns are associated with poor dietary choices and psychopathology (e.g., Neumark-Sztainer et al., 2006), our research findings can be used to identify avenues for potential interventions.

First, we examined whether a tendency to engage in upward appearance comparisons would predict body image discrepancies. The correlation was small; in the regression analysis, the path coefficient linking these two variables was not significant when controlling for appearance evaluations. Nevertheless, upward appearance comparisons negatively predicted body image discrepancy indirectly, via appearance evaluation. In other words, one reason why upward appearance comparisons magnify discrepancies between one's body image and ideal standards could be because such comparisons reduce the appreciation of one's appearance. This is the first study that tested such a mediation, although relations between upward appearance comparisons and appearance evaluation, as well as between such evaluations and body image discrepancies, have been tested previously (Argyrides & Sivitanides, 2017; O'Brien et al. 2009).

We further investigated this indirect effect by carrying out two moderated mediations. The aim of these additional analyses was to examine factors that buffer or augment the indirect, as well as the direct effects. We focused on two variables that are relatively new to the body image literature. First, we examined the role of self-compassion specific to appearance evaluations, that is, the extent to which one is kind to oneself when having negative thoughts about one's appearance. We expected that appearance self-compassion would be a positive predictor of appearance evaluation. More importantly, we anticipated that self-compassion would buffer the negative effect of upward appearance comparisons on appearance evaluation. The first moderated mediation analysis supported these predictions; a non-significant effect was evident at high levels of self-compassion, whereas at low levels of this moderator variable upward appearance comparisons remained a negative predictor of appearance evaluation. Further, in line with this finding, the indirect effect

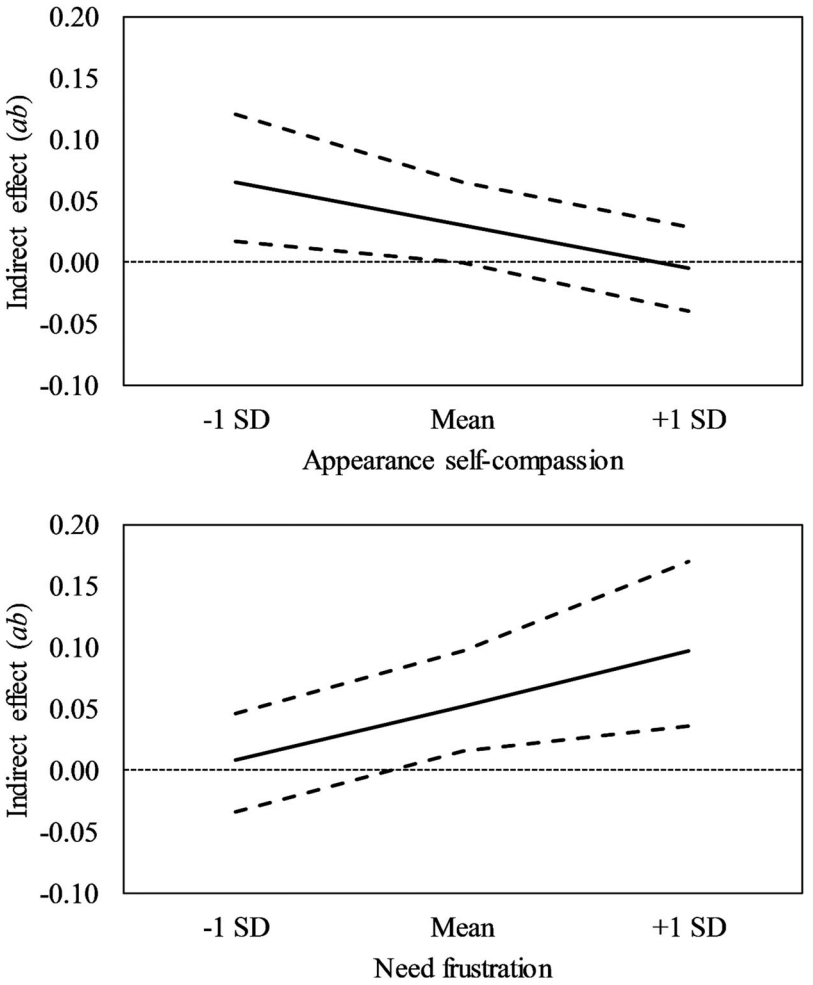

Figure 4. The figure shows the indirect effect of upward appearance comparisons on body image discrepancy through appearance evaluation (*Y*-axis) at different levels of the moderator (*X*-axis). Top figure shows the moderating effect of appearance self-compassion (Model 2). Bottom figure shows the moderating effect of need frustration (Model 3). Solid lines represent indirect effects and dashed lines represent the 95% CI around the indirect effects.

between upward appearance comparisons and body image discrepancy was significant at low, but not high, levels of appearance self-compassion.

These findings build upon and extend Homan and Tylka's (2015) work which showed that global (as opposed to appearance-specific) self-compassion moderated the negative relation between body-related comparisons and body appreciation (albeit not distinguishing between upward and downward comparisons). Further research is needed to examine how such a buffering effect takes place. It is likely that being self-compassionate when it comes to one's appearance might make individuals less likely to engage in upward appearance comparisons in the first place. It is also possible that when such comparisons are triggered (e.g., in a gym environment), self-compassion might act as a protective mechanism by helping individuals to engage in positive self-talk, cognitive restructuring, acceptance focused coping (Neff, Hsieh, & Dejitterat, 2005); or to be more balanced with

their negative emotions so that they are neither suppressed nor exaggerated (Neff, 2003). We recommend qualitative work (e.g., "think aloud" designs) complemented with diary methodologies to delineate how such buffering mechanisms might unfold over time and in different situations. The buffering effects of global self-compassion have been documented elsewhere. For example, Marshall et al. (2015) reported that self-compassion buffered the effects of low self-esteem on mental health of Australian adolescents. These data add to the body of literature showing that self-compassion protects against negative self-judgments (Leary, Tate, Adams, Batts Allen, & Hancock, 2007).

The second moderated mediation we tested was based on the SDT construct of psychological need frustration, in other words, the experience that one's fundamental needs for autonomy, competence, and relatedness are being undermined. There is a plethora of evidence in the SDT literature indicating that need frustration is linked to psychopathology and disturbed eating behaviors (Deci & Ryan, 2000). However, the role of need frustration in the body image literature has not received much empirical attention. In this study, we tested whether need frustration predicted low appearance evaluation and also whether it exacerbated the effects of upward appearance comparisons on such evaluations. The interaction between need frustration and upward appearance comparisons has been tested previously in one study (Thøgersen-Ntoumani et al., 2018) predicting body-related emotions, but no significant effects were found. We found support for both the main and the interactive effect involving need frustration. Further, the indirect effect of upward appearance evaluation on body image discrepancy via appearance evaluation was significant only when need frustration was high. Our findings could be explained with reference to Vansteenkiste and Ryan's (2013) study theorizing that need thwarting environments engender feelings of insecurity, which make individuals search for external indicators of worth. Invariably, such external goals and standards involve comparisons with others, including upward appearance comparisons, which are often likely to make individuals feel insecure, incompetent, and unwanted by others, as well as less accepting of their own appearance. Our findings are in line with previous experimental work in the SDT literature. For example, Mask and Blanchard (2011) found that exposing women high in autonomy need deprivation to a video depicting the "thin ideal," increased perceived pressure to be thin as well as body dissatisfaction.

Reflections, Recommendations, and Conclusions

Our research offers some preliminary unique evidence of cross-sectional associations (main and interactive) between variables from different theoretical perspectives. Further, stronger evidence is needed to test such associations over time. As mentioned earlier, diary studies would be particularly suited to this line of research. Identifying the extent to which individuals engage in upward appearance comparisons as well as the context in which these are more likely to occur (e.g., when interacting with social media, at school) will be a good starting point to examine how such comparisons fluctuate within and across days and people. Building on this research, experimental designs could be introduced to facilitate appearance self-compassion via using modern technology, such as social media or mobile phone applications. As an example, Rodgers et al. (2018) used a mobile-based application intervention to promote positive body image via enhancing

self-compassion (e.g., messages pertaining to mindfulness, self-kindness, and positive emotions). Experimental designs could also aim to help significant others (e.g., parents, teachers) to prevent or reduce need frustration experienced by adolescents (e.g., by being emphatic, acknowledging perspectives and negative affect, offering competence-supportive feedback; see Ntoumanis, Quested, Reeve, & Cheon, 2018), and hence, prevent or reduce upward appearance comparisons. Another limitation of our study was the use of explicit self-report measures only. Future studies could also utilize implicit measures (e.g., implicit beliefs about ideal body image; Heider, Spruyt, & de Houwer, 2015).

In conclusion, our study adds to the growing literature on the deleterious consequences of upward physical appearance comparisons by examining factors that exacerbate, buffer, and mediate the effects of such comparisons on actual–ideal body image discrepancies in adolescents. Our work brings together diverse literatures on psychological needs, self-compassion, social comparisons, and self-discrepancies, as a means to identify potential opportunities for intervention work to reduce a growing problem in adolescents, that is their concern and insecurity about how their body image compares to societal ideal standards. Identifying and testing opportunities that foster appearance self-compassion and reduce feelings of psychological need frustration has the potential to promote feelings of body competence and positive body image (Wood-Barcalow, Tylka, &Augustus-Horvath, 2010).

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