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Peer victimization and weight/shape concerns in adolescents: Examining the moderating role of appearance-based rejection sensitivity

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Abstract

Peer victimization has been related to weight/shape concerns in adolescents. However, a dearth of research has examined potential moderators of this association. The present study examined the concurrent and prospective associations between two types of peer victimization, appearance-based and non-appearance-based, and weight/shape concerns among adolescents, and whether these associations were moderated by appearance-based rejection sensitivity. Participants were 897 adolescents, aged 11-19 years (*M* = 14 years 8 months, *SD* = 1 year 4 months), who completed a range of self-report measures as part of the EveryBODY study, one year apart. Both forms of victimization were associated with concurrent, but not prospective weight/shape concerns. Additionally, the concurrent association between appearance-related victimization and weight/shape concerns was dependent on appearance-based rejection-sensitivity, with stronger associations at lower levels of appearance-based rejection-sensitivity. These findings support previous research linking peer victimization with concurrent weight/shape concerns in adolescents. However, the impact of peer victimization on increased weight/shape concerns was not observed.

Keywords: Peer victimization; Weight teasing; Weight/shape concerns; Rejection sensitivity; Adolescence

Introduction

Adolescence is a developmental period marked by increased peer pressure and influence. Specifically, negative peer experiences, such as peer victimization, can place adolescents at risk for mental health problems (Perren et al., 2013). Peer victimization refers to recurrent and deliberate acts of interpersonal aggression with an imbalance of power, such as insults, physical harm, and social rejection (Olweus, 1991). Peer victimization is a pervasive problem during adolescence, with around 15% of adolescents reporting peer victimization (Jadambaa et al., 2020). Peer victimization is linked with numerous internalizing difficulties, such as anxiety (Perren et al., 2013), depression (Brunstein Klomek et al., 2019), and weight/shape concerns (Day et al., 2021). Further, appearance-related victimization, such as weight-related teasing, has been associated with eating pathology in adolescents (Fairweather-Schmidt & Wade, 2015) and many adults with an eating disorder report having experienced peer victimization during adolescence (Mitchison et al., 2018).

While previous research has shown that both weight-related teasing and peer victimization are associated with weight/shape concerns (Day et al., 2021), most studies to date have either examined peer victimization more broadly or weight-related teasing specifically. Thus, it remains unknown whether the experience of peer victimization in itself or the content of such victimization (i.e., one's appearance) contributes to weight/shape concerns. Existing research on this distinction is mixed. For example, Gleason et al. (2000) found that both weight-related teasing, and competence-related teasing, during childhood were associated with young adults' body image concerns among women. However, among men, only weight-related teasing was associated with body image concerns. In another study by Lunde et al. (2007) examining pre-adolescents, only peer victimization, not appearance-teasing, predicted body esteem among girls. Neither were associated with subsequent body esteem in boys.

Previous research has also pointed to variability in negative health outcomes of peer victimization, indicating that the relationship between peer victimization and weight/shape concerns

may be moderated by other factors (e.g., hormone levels (Forney et al., 2019); coping style (Pinkasavage et al., 2015)). Identifying such moderating factors will help develop screening protocols and interventions that target victimized adolescents and inform targeted health promotion campaigns to reduce weight/shape concerns.

A potential moderating variable is appearance-based rejection sensitivity, which refers to concerns regarding rejection from others based on one's appearance (Park, 2007). Specifically, individuals with high appearance-based rejection sensitivity experience more negative emotions following an appearance threat (e.g., reminders of negative aspects of one's looks), compared to those with lower appearance-based rejection sensitivity (Park, 2007). For adolescents, these appearance threats usually occur within the context of peer interactions (Webb et al., 2017). Appearance-based rejection sensitivity has been linked with both peer victimization and weight/shape concerns (Lavell et al., 2014; Schmidt & Martin, 2019; Webb et al., 2015), with young people with high levels of appearance-based rejection sensitivity being more prone to experience peer victimization, and weight/shape concerns. Previous research has posited that peer victimization increases adolescent's appearance-based rejection sensitivity, which in turn increases their weight/shape concerns (Lavell et al., 2014). Based on this theoretical framework, it would further be expected that adolescents with high levels of appearance-based rejection sensitivity would experience larger increases their weight/shape concerns in the event of peer victimization compared to their peers with lower levels of appearance-based rejection sensitivity, as their fear of rejection is reinforced (Park, 2007).

The current study aimed to investigate the concurrent and one-year longitudinal associations between two types of peer victimization, appearance-related and non-appearance-related peer victimization, and weight/shape concerns among adolescents and whether these associations are moderated by appearance-based rejection sensitivity. It was hypothesized that both appearance-related peer victimization and non-appearance-related peer victimization would be uniquely associated with increased weight/shape concerns. Further, it was hypothesized that appearance-

based rejection sensitivity would moderate the association between appearance-related peer victimization and weight/shape concerns, such that among adolescents with higher levels of appearance-based rejection sensitivity, appearance-related peer victimization would be more strongly associated with weight/shape concerns. No such moderation was expected in the case of non-appearance-related peer victimization.

Methods

Participants

This study used data from wave 1 and 2 of the EveryBODY study, a large cohort study of adolescents in Australia (for full methodology see Trompeter et al. (2018)). As part of the study design, only a subsample of students from four of the 13 schools in the study completed the appearance-based rejection sensitivity measure at wave 1 (n = 910). Of these students, 13 were excluded due to non-serious responses, leaving a total of 897 students with valid appearance-based rejection sensitivity data at wave 1. The cross-sectional sample included 516 boys (57.5%), 378 girls (42.21%), and 3 students who classified their gender as "other" (0.3%). Participants were aged between 11 and 19 years (M = 14 years and 8 months, SD = 1 year and 4 months). Most students were born in Australia (75.7%).

Of these, 476 students participated again at wave 2 (53.01% retention rate). Of these students, 4 were excluded due to non-serious responses, leaving a total of 472 students for the prospective sample. Students who participated at both waves reported lower BMI (t (825)= 2.73, p = .006), reported less appearance-based victimization (t (891)= 2.09, p = .037), and were younger (t (884)= 10.06, p < .001) compared those who only completed wave 1. No differences were reported in terms of weight/shape concerns (t (891)= -0.50, p = .617), appearance-based rejection sensitivity (t (891)= 0.27, p = .788), non-appearance-based victimization (t (891)= 0.91, p = .361), and gender ($\chi^2(2) = 1.24$, p = .539). The prospective sample included 265 boys (56.1%), 206 girls (43.6%), and 1 student who classified their gender as "other" (0.2%). However, due to issues convergence in analyses, this participant had to be excluded from analyses. Participants were aged between 11 and

17 years (*M* = 14 years and 3 months, *SD* = 1 year and 3 months) at wave 1. Most students were born in Australia (69.3%).

Measures

Peer victimization. To measure peer victimization, both appearance- and non-appearance-related, participants were first presented with a definition of bullying (Olweus, 1996). Participants rated the frequency of having experienced 19 bullying behaviors on a 6-point scale (0 = *Not at all* to 6 = *Many times a week*; in this context, a "term" refers to the previous school term, roughly 10 weeks). Behaviors represented multiple forms of peer victimization: cyber victimization (e.g., *Spreading rumors about you via email or on social media*), relational victimization (e.g., *Excluding you from a group*), and physical victimization (e.g., *Pushing you*). These items were adapted from existing bullying measures on traditional peer victimization (Barchia & Bussey, 2011), cyber victimization (Gámez-Guadix et al., 2014), and the National Covert Bullying Survey (Cross et al., 2009). For each behavior, students indicated whether they perceived this victimization to relate to their weight/shape ("appearance-related victimization") or not ("non-appearance-related victimization"). Responses for which "weight/shape" was selected were extracted to create a scale for appearance-related victimization, responses for which "other" was selected were extracted to create a scale for non-appearance-related victimization. Behaviors that were not endorsed (i.e., no victimization) were scored as "0" on both scales. In total, 19 items could have been endorsed for either scale with potential scores ranging from 0 to 114. In the current study internal consistency was high for both appearance-based victimization (Cronbach's $\alpha = .95$; McDonald's $\omega = .92$) and non-appearance-based victimization (Cronbach's $\alpha = .95$; McDonald's $\omega = .94$). The full questionnaire is available in supplementary material 1.

Appearance-based rejection sensitivity. Participants completed the Appearance-Based Rejection Sensitivity Scale short form (Park, 2013) to assess their appearance-based rejection sensitivity. The scale included 10 scenarios (e.g., "*You look in the mirror and notice that your stomach is getting bigger*"). For each scenario participants rated how concerned or anxious they

would feel about being rejected due to their appearance (e.g., "*How concerned or anxious would feel that others would think you were less attractive because of the way you look"*) on a 6-point scale (1 = *not unconcerned or anxious* to 6 = *very concerned*). Participants then rated their expectancy of rejection (e.g., "*Do you think other people would find you unattractive because your stomach is bigger*") on a 6-point scale (1 = *No* to 6 = *Yes*). For each scenario, scores on the anxious concern scale and the expectation scale were multiplied. The average anxious expectation of rejection score of all 10 scenarios provided the total score, whereby higher scores indicate higher appearance-based rejection sensitivity. In the current study internal consistency was high for both boys (Cronbach's α = .96, McDonald's ω = .96) and girls (Cronbach's α = .96, McDonald's ω = .96).

Weight/shape concerns. Participants' weight/shape concerns were assessed using the combined weight and shape concerns subscale of the Eating Disorders Examination Questionnaire (Fairburn, Cooper, & O'Conner, 2008). Participants rated the frequency/severity of their weight and shape concerns in the past 28 days across 12 items (e.g., *How dissatisfied have you been with your shape*) on a 7-point scale (0 = *No days/Not at all* to 6 = *Everyday/Markedly*). In the current study internal consistency was high for both boys (Cronbach's α = .94; McDonald's ω = .94) and girls (Cronbach's α = .97, McDonald's ω = .97) at both timepoints.

Demographic variables. Analyses were adjusted for demographic variables likely to be associated with weight/shape concerns, namely, age (measured in months), gender, and body mass index (BMI) percentile (Duncan et al., 2017; Hay et al., 2015).

Power analysis

Post-hoc power analysis using a Monte-Carlo simulation in Mplus version 8 (Muthén & Muthén, 2018) showed that adequate power (>80%) was achieved for cross-sectional analyses. This was supported by a power analysis in G*power for a simple linear regression, treating interaction terms as a small simple effect (ß = .10), which showed that a sample size of 395 would be needed to achieve 80% power. While power calculations for prospective effects that include interaction terms

are necessarily tentative, given the lack of existing research on such calculation, the sample size for the prospective analyses are in line with previous studies (e.g., Lavell et al., 2018). All code is available on our OSF website (https://osf.io/bp7n6/?view_only=ecacb31d0aec4921acb8e3e135c2551b).

Data Analysis Plan

Before analyses, school-level effects were tested using mixed model analyses with school as a random factor. The random factor was not significant and therefore was not included in subsequent analyses. There were small amounts of missing data at the scale level (0–7.4%), which were imputed through multiple imputation using the EM (expectation-maximization) procedure in SPSS.

To examine the relationship between victimization and weight/shape concerns, three separate hierarchical regression analyses were conducted in SPSS: first for appearance-related victimization, second for non-appearance-related victimization and finally for both types of victimization. For each regression model, the control variables (age, gender, BMI percentile) were entered first, followed by weight/shape concerns at wave 1, before entering main effects (victimization and appearance-based rejection sensitivity), and finally entering the interaction term (victimization x appearance-based rejection sensitivity). Prior to analysis appearance-based rejection sensitivity scores were centered (Shieh, 2011), and interaction terms were computed using the centered variables. Due to the large range of values for the victimization variables were winsorized to three standard deviations. Assumptions of independence and linearity were met. However, the assumptions of homoscedasticity and normality were violated. Bias-corrected bootstrapping (n = 2000) was used to deal with violated assumptions (Field & Wilcox, 2017). No issues with multicollinearity were reported. To control for multiple comparisons, the Benjamini-Hochberg procedure was used with a paper-wide false discovery rate of .05, resulting in a critical alpha of 0.027.

Results

Correlations

Table 1 shows correlations between the study variables. Both types of victimization showed significant, albeit small, correlations with weight/shape concerns cross-sectionally. However, only non-appearance-related victimization was significantly correlated with subsequent weight/shape concerns. Notably, appearance-based rejection sensitivity had a strong correlation with weight/shape concerns both concurrently and prospectively, and there was only a small degree of overlap between the two types of victimization.

Cross-sectional analyses

Appearance-related victimization

Results from the regression analyses are shown in Table 2. For the first regression, the overall main effect model (step 2) was significant, $F(6, 890) = 147.49$, $p < .001$. The R^2 for the main effects model was 49.9% with an adjusted R^2 of 49.5%, indicating a large size effect (Cohen, 1988). Only appearance-based rejection sensitivity was significantly positively associated with weight/shape concerns. In step 3, the interaction term emerged as significant. Simples slopes showed that the association between appearance-related victimization and weight/shape concerns was attenuated by appearance-based rejection sensitivity, whereby the association was strongest at low levels of appearance-based rejection sensitivity (B = .03, $p < .001$) and weakest at high levels of appearance-based rejection sensitivity (B = .01, $p = .028$). Associations remained unchanged when removing the control variables.

Non-appearance-related victimization

For the second regression model, the overall main effect model (step 2) was significant, $F(6, 890) = 150.05$, $p < .001$. The R^2 for the main effects model was 50.3% with an adjusted R^2 of 50.0%, indicating a large size effect (Cohen, 1988). Both non-appearance-related victimization and appearance-based rejection sensitivity were significantly positively associated with weight/shape

concerns. However, the interaction term did not emerge as significant. Associations remained unchanged when removing the control variables.

Overall victimization

For the third regression model, the overall main effect model (step 2) was significant, $F(7, 889) = 130.22$, $p < .001$. The R^2 for the main effects model was 50.6% with an adjusted R^2 of 50.2%, indicating a large size effect (Cohen, 1988). Only non-appearance-related victimization and appearance-based rejection sensitivity were significantly positively associated with weight/shape concerns. As previously reported, appearance-based rejection sensitivity attenuated the association between appearance-related victimization and weight/shape concerns. Associations remained unchanged when removing the control variables.

Prospective analyses

Appearance-related victimization

Results from the regression analyses are shown in Table 3. For the first regression, the overall main effect model (step 3) was significant, $F(6, 464) = 87.79$, $p < .001$. The R^2 for the main effects model was 53.2% with an adjusted R^2 of 52.6%, indicating a large size effect (Cohen, 1988). However, the largest variance in weight/shape concerns at T2 were accounted for by demographic variable (17.4%) and weight/shape concerns at T1 (35.2%). Neither appearance-related victimization or appearance-based rejection sensitivity predicated increases in weight/shape concerns. In step 3, the interaction term did not emerge as significant. Associations remained unchanged when removing the control variables.

Non-appearance-related victimization

For the second regression model, the overall main effect model (step 3) was significant, $F(6, 464) = 88.82$, $p < .001$. The R^2 for the main effects model was 53.5% with an adjusted R^2 of 52.9%, indicating a large size effect (Cohen, 1988). As noted above, the largest variance in weight/shape concerns at T2 were accounted for by demographic variable (17.4%) and weight/shape concerns at T1 (35.2%). Neither non-appearance-related victimization nor appearance-based rejection

sensitivity significantly predicted changes in weight/shape concerns. Additionally, the interaction term did not emerge as significant. Associations remained unchanged when removing the control variables.

Overall victimization

For the third regression model, the overall main effect model (step 3) was significant, $F(7, 463) = 75.98$, $p < .001$. The R^2 for the main effects model was 53.5% with an adjusted R^2 of 52.8%, indicating a large size effect (Cohen, 1988). However, the largest variance in weight/shape concerns at T2 were accounted for by demographic variable (17.4%) and weight/shape concerns at T1 (35.2%). Associations remained unchanged when removing the control variables.

Discussion

The current study aimed to examine the moderating role of appearance-based rejection sensitivity in the relationship between peer victimization and increased weight/shape concerns among adolescents in a one-year follow-up. Both appearance-related and non-appearance-related victimization were considered. It was hypothesized that appearance-based rejection sensitivity would moderate the association between appearance-related peer victimization and weight/shape concerns, such that among adolescents with higher levels of appearance-based rejection sensitivity, appearance-related peer victimization would be more strongly associated with weight/shape concerns, whereas no such moderation was expected in the case of non-appearance-related peer victimization.

Results did not support this hypothesis. Findings from the cross-sectional analysis showed that the association between appearance-related peer victimization and weight/shape concerns was stronger at lower levels of appearance-based rejection sensitivity. These findings are in contrast to previous research and theory suggesting that appearance-based rejection sensitivity might make adolescents more vulnerable to weight/shape concerns in the event of peer victimization (Lavell et al., 2014; Park, 2007). However, findings were not replicated in the prospective analyses.

In the prospective analysis, neither forms of peer victimization nor appearance-based rejection sensitivity predicted increases in weight/shape concerns after one year. This is in contrast to previous studies, which have reported significant associations between victimization, both general peer victimization and weight-teasing, and subsequent weight/shape concerns (Day et al., 2021).

The current study distinguished between two types of peer victimization, namely, appearance-related victimization and non-appearance-related victimization. Findings showed that neither type of peer victimization were associated with increases weight/shape concerns when controlling for appearance-based rejection sensitivity, but were associated with concurrent weight/shape concerns. This was the first study to distinguish between the type of peer victimization when examining weight/shape concerns and highlights that future research may benefit from examining the context of victimization experiences to better understand adolescents' weight/shape concerns.

While the current study had several strengths, some limitations should be noted. While gender was controlled for in the current study, it is possible that results may vary by gender. Indeed, Gleason et al. (2000) found while both weight-teasing and competence-teasing were associated with subsequent body image concerns in girls, only weight-teasing predicated body image concerns in boys. Thus, future research should examine the role of gender further. Notably, the current study used self-report measures to assess all constructs in the current study. Given the subjective nature of distinguishing between weight/shape victimization and 'other' victimization, adolescents with pre-existing weight/shape concerns and/or appearance-based rejection sensitivity may be more prone to both perceive victimization as "weight/shape" based, and more likely to recall such encounters. Future research may consider more objective measures of peer victimization, such as peer nominations. Finally, the current study only examined peer victimization over one school term. While this is reflective of current peer victimization experiences, it is unclear how many

adolescents had previously experienced peer victimization and how this may have contributed to their current weight/shape concerns.

In conclusion, the current study contributed to a range of studies supporting the notion that peer victimization is associated with concurrent weight/shape concerns in adolescents. However, we did not find support for any prospective relationships. These results suggest that health promotion, prevention, and early intervention programs for peer victimization should focus on mitigating negative outcomes associated with peer victimization, such as concurrent weight/shape concerns.

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Tables

Table 1: Pearson correlations of study variables

	M (SD)	1	2	3	4	5	6	7
1. Weight/shape concern Wave 1	1.52 (1.80)	-						
2. Weight/shape concerns Wave 2	1.62 (1.80)	.71*	-					
3. Appearance-related victimization	2.80 (9.50)	.17*	.10	-				
4. Non-appearance-related victimization	8.45 (14.76)	.28*	.27*	.16*	-			
5. Appearance-based rejection sensitivity	8.32 (9.19)	.63*	.51*	.18*	.33*	-		
6. Age (in months)	176.64 (16.07)	.03	.10	.05	.00	.02	-	
7. BMI percentile	54.22 (30.12)	.26*	.22*	.09*	-.01	.13*	-.07*	-

Note. Benjamini-Hochberg corrected critical value = 0.027. Significant associations are indicated (*). Un-winsorized results are reported.

Table 2. *Hierarchical regression analyses of (1) appearance-related victimization, (2) non-appearance-related victimization, and (3) a combined model in the cross-sectional analyses.*

		Variable	ΔR^2	B	*p*-value	95% CI
(1)	Step 1		.238		**<.001**	
		Age		.01	.917	[-.01, .01]
		Gender				
		Girls		1.50	**<.001**	[1.29, 1.72]
		Other		.55	.309	[-.69, 1.70]
		BMI percentile		.02	**<.001**	[.01, .02]
	Step 2		.260		**<.001**	
		Appearance-related victimization		.02	.124	[-.01, .04]
		Appearance-based rejection sensitivity		.10	**<.001**	[.09, .12]
	Step 3		.008		<.**001**	
		Interaction (appearance-related victimization)		-0.01	**.004**	[-.01, .00]
(2)	Step 1		.238		**<.001**	
		Age		.01	.919	[-.01, .01]
		Gender				
		Girls		1.50	**<.001**	[1.28, 1.73]
		Other		.57	.327	[-.68, 1.70]
		BMI percentile		.02	**<.001**	[.01, .02]
	Step 2		.266		**<.001**	
		Non-appearance-related victimization		.02	**.001**	[.01, .02]
		Appearance-based rejection sensitivity		.10	**<.001**	[.09, .11]
	Step 3		.000		.527	
		Interaction (Non-appearance-related victimization)		.00	.639	[-.00, .00]
(3)	Step 1		.238		**<.001**	
		Age		.00	.921	[-.01, .01]
		Gender				
		Girls		1.50	**<.001**	[1.29, 1.71]
		Other		.58	.329	[-.68, 1.70]
		BMI percentile		.02	**<.001**	[.01, .02]
	Step 2		.270		**<.001**	
		Appearance-related victimization		.01	.209	[-.01, .03]
		Non-appearance-related victimization		.01	**.002**	[.01, .02]
		Appearance-based rejection sensitivity		.10	**<.001**	[.08, .11]

Step 3	.007		**.002**	
Interaction (appearance-related victimization)		-.00	**.011**	[-.00, -.00]
Interaction (Non-appearance-related victimization)		-.00	.379	[-.00, .00]

Note. Bootstrapped unstandardized values are reported. Reference category for gender was 'male'.

Benjamini-Hochberg corrected critical value = 0.027. Significant associations are bolded

Table 3. *Hierarchical regression analyses of (1) appearance-related victimization, (2) non-appearance-related victimization, and (3) a combined model in the prospective analyses.*

		Variable	ΔR^2	B	*p*-value	95% CI
(1)	Step 1		.174		**<.001**	
		Age		.01	.110	[-.00, .02]
		Gender		1.28	**<.001**	[.96, 1.59]
		BMI percentile		.01	**<.001**	[.01, .02]
	Step 2		.352		**<.001**	
		Weight/shape concerns T1		.66	**<.001**	[.58, .75]
	Step 3		.006		.052	
		Appearance-related victimization		.01	.594	[-.02, .03]
		Appearance-based rejection sensitivity		.02	.055	[-.00, .04]
	Step 4		.000		.487	
		Interaction (appearance-related victimization)		.00	.492	[-.00, .00]
(2)	Step 1		.174		**<.001**	
		Age		.01	.126	[-.00, .02]
		Gender		1.28	**<.001**	[.96, 1.60]
		BMI percentile		.01	**<.001**	[.01, .02]
	Step 2		.352		**<.001**	
		Weight/shape concerns T1		.66	**<.001**	[.58, .75]
	Step 3		.009		**.012**	
		Non-appearance-related victimization		.01	.187	[-.00, .02]
		Appearance-based rejection sensitivity		.02	.102	[-.00, .04]
	Step 4		.004		.041	
		Interaction (non-appearance-related victimization)		.00	.111	[-.00, .00]
(3)	Step 1		.174		**<.001**	
		Age		.01	.124	[-.00, .02]
		Gender		1.28	**<.001**	[.97, 1.58]
		BMI percentile		.01	**<.001**	[.01, .02]
	Step 2		.352		**<.001**	
		Weight/shape concerns T1		.66	**<.001**	[.58, .75]
	Step 3		.009		.032	
		Appearance-related victimization		.00	.904	[-.02, .03]

	Non-appearance-related victimization		.01	.221	[-.01, .02]
	Appearance-based rejection sensitivity		.02	.105	[-.00, .04]
Step 4		.005		.067	
	Interaction (appearance-related victimization)		.00	.286	[-.00, .00]
	Interaction (non-appearance-related victimization)		-.01	.091	[-.00, .00]

Note. Bootstrapped unstandardized values are reported. Reference category for gender was 'male'. Benjamini-Hochberg corrected critical value = 0.027. Significant associations are bolded.