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Body Image Self-Discrepancy and Depressive Symptoms Among Early Adolescents

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A B S T R A C T

Purpose: This study examined whether body image self-discrepancy was a correlate of depressive symptoms among 556 early adolescents (45% girls; $M_{age} = 11.65$, $SD = .94$ years).

Methods: Participants completed self-report measures of their self-perceived actual and ideal body shapes and depressive symptoms. Sex-stratified polynomial regressions were used to examine the associations between depressive symptoms and (1) agreement (i.e., similar actual and ideal body shapes); (2) discrepancy (i.e., different actual and ideal body shapes); (3) direction of discrepancy (i.e., actual > ideal or actual < ideal); and (4) degree of discrepancy (i.e., how different actual and ideal body self-perceptions are).

Results: For both sexes, depressive symptoms were more frequent when the direction of the discrepancy was such that participants perceived their actual body was larger than their ideal body. Furthermore, depressive symptoms were more frequent when the degree of the discrepancy between actual and ideal body shape perceptions was larger.

Conclusions: Based on these findings, body image self-discrepancy may be a risk factor for depressive symptoms among early adolescents.

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IMPLICATIONS AND CONTRIBUTION

Body image self-discrepancy is associated with poor mental health among older adolescents. Studies examining this discrepancy present methodological issues and rarely focus on younger adolescents and males. Therefore, this study used polynomial regressions to identify that the direction and degree of this discrepancy are important predictors for adolescents' mental health.

Depression is predicted to be the second leading cause of disease burden worldwide by 2030 [1]. Among adolescents, depressive symptoms have been shown to persist over time [2] and can develop into a major depressive disorder in

adulthood [3]. Furthermore, depressed adolescents are at increased risk of developing and maintaining obesity [4]. However, obesity itself has also been implicated in the risk of developing depression [4]. In addition to overweight/obese individuals, females are also particularly vulnerable to experience depressive symptoms whereby females are twice as likely to experience depressive symptoms compared with males [5]. Several factors have been associated with depressive symptoms among these vulnerable groups, with body image dissatisfaction receiving notable attention [6].

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A discrepancy between self-perceived actual body (e.g., how one *believes* their body looks) and ideal body (e.g., how one *wants* their body to look) has been used as a cognitive measure of body image dissatisfaction [7]. However, body image dissatisfaction comprises of cognitive and affective elements, while this discrepancy remains strictly cognitive [7]. This discrepancy has been assessed using sex- and age/developmental-specific contour drawings of body shapes whereby participants select a figure that they feel best represents their actual and ideal body shapes [8]. These ratings have been traditionally used to calculate a difference score between self-perceived actual and ideal body shapes to represent a body image self-discrepancy (BISD) and infer greater body image dissatisfaction. Higher discrepancy scores have been linked with clinically significant levels of depression in women [9], in addition to disordered eating [10] and lower self-esteem [7] among adolescent and college-aged women. A discrepancy between self-perceived actual and ideal body shapes has also been associated with greater depression, lower self-esteem, and reduced satisfaction with life for men [11]. To date, the association between BISD and depressive symptoms is underexplored in early adolescents (ages 9–13 years), a time when girls' and boys' bodies undergo significant physical alterations [12] and physical self-perceptions are forming [13]. As well, there is an over-reliance on studying BISD among females in midadolescence and young adulthood, who typically want smaller silhouettes compared with their actual bodies [14]. In contrast, boys start to desire a larger and more muscular shape in adolescence and adulthood [15], and as such, a perceived discrepancy between their actual and ideal body shape is also likely to be detrimental to mental health [16]. More research is needed to help understand the nature of BISD among early adolescents, and in particular boys.

The methodological approach used to analyze BISD also warrants attention, whereby BISD are commonly measured as a calculation of difference scores between one's self-perceived actual and ideal body shape scores (i.e., actual body shape score minus ideal body shape score [17]). However, the use of difference scores suffers from methodological problems, such as reliance on a single-item assessment that falsely merges two distinct constructs (i.e., ideal and actual body shapes [17]). Single-item measures are susceptible to measurement error, and difference scores are less reliable than using actual and ideal body shape scores as individual predictors [17]. Polynomial regression analysis with response surface methods can be used to test whether self-perceived actual and ideal body shapes are independently associated with a specific outcome rather than merging two distinct constructs into a single score. Contrary to simple linear regressions, several calculations are used to transform beta weights from the polynomial regression model to response surface values. Interpretation of these response surface values enables the examination of how outcomes are associated with the degree of agreement (i.e., no discrepancy) between actual and ideal body perceptions, which is a novel approach in the BISD literature. Furthermore, the examination of the specific direction of the discrepancy (i.e., when actual is greater than ideal or vice versa), and the degree of the discrepancy (i.e., a greater discrepancy in scores between actual and ideal body perceptions [17]) can also be examined. The flexibility in the polynomial regression approach is particularly appropriate to study BISD among boys and girls who may report sex-specific actual and ideal perceptions based on sociocultural norms (e.g., the drive for muscularity vs. thinness, respectively [14,15]).

Examining a specific direction of the BISD may better inform sex-specific experiences of poor body image.

The purpose of the present study was to test the relationship between BISD and depressive symptoms in early adolescent boys and girls. To this effect, the following research questions were examined: (1) How does the degree of agreement (i.e., no discrepancy) between self-perceived actual and ideal body shapes relate to depressive symptoms? (2) How does the direction of the discrepancy between self-perceived actual and ideal body shapes relate to depressive symptoms? (3) How does the degree of discrepancy between self-perceived actual and ideal body shapes relate to depressive symptoms? Based on self-discrepancy theory [18] and empirical evidence [19], it was expected that an agreement (i.e., no discrepancy) between self-perceived actual and ideal body shapes would not be related to depressive symptoms. It was also hypothesized that for girls, a greater discrepancy between actual and ideal body shapes would be positively associated with depressive symptoms when they selected an actual body shape that was larger than their ideal body shape, indicating a drive for thinness that has been supported in the literature [10]. No specific direction was hypothesized for boys as it was expected that healthy weight boys would want to have a larger body shape (indicating a drive for muscularity) [15] while overweight boys would strive for a smaller body shape [20]. In this way, there may be different directions for the BISD for girls and boys that warrant exploring the data separately by sex. Nonetheless, the strength and direction of the relationship between BISD and depressive symptoms are not expected to be different for girls and boys. Finally, it was further anticipated that depressive symptoms would be more frequent if the degree of the discrepancy between actual and ideal body was larger, regardless of the direction, for boys and for girls. Moreover, heavier adolescents and adolescents who are in later stages of puberty report heightened BISD [21,22] and higher depressive symptoms [4]. As such, the present study used sexual maturity and fat mass index as covariates in the analyses.

Method

The Institutional Ethics Review Boards at the Centre Hospitalier Universitaire Sainte-Justine and Laval University approved the study protocol. All participants (and their parents) provided formal written consent to participate in the study.

Participants

Participants were 564 youth who took part in the second data collection of the Quebec Adipose and Lifestyle Investigation in Youth Cohort (QUALITY; [23]), which is a large study examining the psychosocial, biological, genetic, and environmental determinants of excess weight [23]. Though data have been collected from the parents, only adolescent data were used in the present study. Of these participants, eight were excluded from the analyses due to missing data (<2%). The analytical sample included 556 (306 boys; 250 girls) early adolescents aged 9–13 years ($M = 11.65$, $SD = .94$). Participants were initially recruited in primary school and were eligible if they were Caucasian of Western European ancestry, were between the ages of 8 and 10 years at the time of recruitment, and had at least one obese biological parent (i.e., a minimum body mass index of 30 kg/m^2 or a waist circumference $>102 \text{ cm}$ for fathers and $>88 \text{ cm}$ for mothers).

Procedure

Data collection for the QUALITY study involves families attending a full-day clinic visit at one of two hospitals in Quebec (Unité de recherche clinique du Centre Hospitalier Universitaire Sainte-Justine in Montreal and Institut universitaire de cardiologie et de pneumologie de Québec in Quebec City). Participants completed self-report measures independently in a dedicated research space. Two waves of data have been collected, approximately 3 years apart. The current analyses are restricted to the second wave of data collection since a measure of BISD was not included in the first wave. A complete description of the procedures for QUALITY and measures used is published elsewhere [23].

Measures

Depressive symptoms. Participants responded to the 12-item Centre for Epidemiological Studies-Depression Scale (CES-D-12) from the National Longitudinal Study of Children and Youth [24], which assessed the frequency to which depressive symptoms are experienced within the past week (e.g., “I felt lonely”), using a four-point scale ranging from 0 (*none of the time*) to 3 (*most or all of the time*). Based on preliminary reliability analyses, the three reverse-coded positively worded items (i.e., “I enjoyed life”) reduced the internal consistency of the scale. In addition, items of different valence (positive/negative) on a same scale can foster a different type of response and share variance distinct from the concepts that the factors measure [25]. For the main analysis, the positively worded items were removed to improve the reliability of this measure. The resulting Cronbach’s alpha (α) coefficient was .70. The responses from the nine remaining items were subsequently summed for a total score, with higher scores representing greater frequency of depressive symptoms [24]. There is evidence of score reliability and validity of the CES-D-12 from the National Longitudinal Study of Children and Youth [24].

Body image self-discrepancy. BISD was assessed using a sex-specific figure rating scale for adolescents with seven contour drawings of adolescent boys and girls’ bodies [8] ranging from underweight (1) to overweight (7). Participants selected the figure that they felt best represented their actual body (i.e., how they *believed* their body looks) and the figure that they felt represented their ideal body (i.e., how they *wanted* their body to look). Scores on this rating scale have shown evidence for test–retest reliability and convergent validity [26].

Anthropometrics and sexual maturation. Trained research nurses collected anthropometric data using a stadiometer for height and an electronic scale for weight while participants were dressed in light indoor clothing and no shoes (see Lambert et al. [23]). Fat mass index was measured with dual-energy X-ray absorptiometry. Trained nurses scored sexual maturity stage according to Marshall and Tanner [27,28].

Data analysis

Means and standard deviations were calculated for the main study variables, and Pearson correlation coefficients were computed. Polynomial regression analysis [17] with response surface methods [29] were used to test the main study hypotheses in two steps. In the first step, five independent variables

were created and examined as correlates of depressive symptoms in a linear regression model. These five variables were mean-centered actual body shape scores (A), mean-centered ideal body shape scores (I), the square of the centered actual body scores ($A \times A$), the square of the centered ideal body scores ($I \times I$), and the cross-product of the centered actual and ideal body scores ($A \times I$). Separate regression models were fitted for boys and girls to assess sex-specific models. Fat mass index (i.e., measure of body composition) and sexual maturation (i.e., Tanner) were included in the regression models as covariates.

In the second step, the regression coefficients were subsequently transformed into four surface values (a_1 to a_4) using four equations [29]. These equations used beta weights representing the five independent predictors in the polynomial regression model (e.g., A, I, $A \times A$, $A \times I$, $I \times I$; [29]). Values a_1 and a_2 are used to interpret the linear and nonlinear associations between similar self-perceived actual and ideal body shapes and depressive symptoms (i.e., research question 1), respectively. Specifically, a_1 ($\beta_A + \beta_I$; Equation 1) reflects the linear relationship between similar self-perceived actual and ideal body shapes and depressive symptoms, and a_2 ($\beta_{A \times A} + \beta_{A \times I} + \beta_{I \times I}$; Equation 2) reflects the nonlinear relationship between similar self-perceived actual and ideal body shapes and depressive symptoms. The a_3 ($\beta_A - \beta_I$; Equation 3) value represents how the direction of the discrepancy between self-perceived actual and ideal body shape is related to depressive symptoms (i.e., research question 2), and a_4 ($\beta_{A \times A} - \beta_{A \times I} + \beta_{I \times I}$; Equation 4) represents how the degree of the discrepancy between self-perceived actual and ideal body shapes relates to depressive symptoms (i.e., research question 3).

Results

Preliminary analyses

The means, standard deviations, and Pearson product-moment correlation coefficients among the study variables for boys ($n = 306$) and girls ($n = 250$) are presented in Table 1. Based on guidelines for interpreting effect sizes [30], medium-sized positive correlations between actual and ideal body shape self-perceptions were found for boys and for girls. A small positive correlation was found between actual body shape self-perception and depressive symptoms for girls, but not for boys. Ideal body shape self-perceptions were not significantly associated with depressive symptoms for either sex.

Main analyses

The results of the polynomial regression analyses are presented in Table 2. The discrepancies accounted for 9% and 13% of the variance in depressive symptoms for boys and for girls, respectively. No significant linear or nonlinear relationships were found between agreement (e.g., similarity) in actual and ideal body shapes and depressive symptoms for either sex (a_1 and a_2). Depressive symptoms were significantly more frequent when the direction of the discrepancy was such that actual body shape was larger than ideal body shape for boys and for girls ($a_{3girls} = 1.41, p < .05, a_{3boys} = 1.03, p < .05$). Finally, depressive symptoms were significantly more frequent as the degree of the discrepancy between ideal and actual body shapes increased for boys and for girls ($a_{4girls} = 1.69, p < .001$,

Table 1
Score ranges, means (M), standards deviations (SD), and bivariate correlations for all study variables

Variables	Score ranges	Boys (n = 306)		Girls (n = 250)		DEXA FMI	Tanner stage	Actual BSP	Ideal BSP	Depressive symptoms
		M (SD)		M (SD)						
1. DEXA FMI	1.01–19.47	6.01 (3.89)		6.88 (3.75)		—	.28**	.72**	.14*	.13*
2. Tanner stage	1–5	1.86 (.98)		2.47 (1.00)		.07	—	.26**	.16*	-.02
3. Actual BSP	1–7	3.70 (1.15)		3.63 (1.02)		.75**	.16**	—	.43**	.22**
4. Ideal BSP	1–5	3.20 (.83)		2.92 (.76)		.15**	.10	.49**	—	.00
5. Depressive symptoms	0–16	3.59 (3.09)		3.60 (3.39)		.06	-.07	.02	-.07	—

Girls above diagonal in correlation table.

*p < .05; **p < .01.

BSP = body shape self-perception; DEXA = dual-energy X-ray absorptiometry; FMI = fat mass index; SD = standard deviation.

$a_{4boys} = 2.23, p < .001$, respectively). Sex-stratified polynomial regression models were conducted using the three positively worded depression items (i.e., “I enjoyed life”). No significant results were found for boys. One significant surface value ($a_4 = .96, p < .001$) was found for girls indicating that as the degree of the discrepancy increased, scores on the positively worded depression items were higher.

Discussion

In the present study, the association between BISD and depressive symptoms was examined among early adolescent girls and boys. Within the framework of BISD research, questions related to agreement, discrepancy, degree of discrepancy, and direction of discrepancy were examined to address methodological limitations of previous studies and to gain a better understanding of the association between BISD and depressive symptoms.

Table 2
Associations between self-perceived actual and ideal body shape, controlling for fat mass index (DEXA FMI) and puberty stage (Tanner)

	Boys (n = 306)				Girls (n = 250)			
	b (se)	β	R ²	ΔR ²	b (se)	β	R ²	ΔR ²
			.09***	.08			.13***	.11
Step 1								
DEXA FMI	-.05 (.08)	-.07			-.14 (.09)	-.15		
Tanner stage	-.23 (.18)	-.07			-.18 (.22)	-.05		
Step 2								
Actual BSP	.45 (.29)	.17			1.06 (.35)	.32**		
Ideal BSP	-.58 (.26)	-.16*			-.34 (.35)	-.08		
Actual × actual BSP	.46 (.12)	.25***			.74 (.19)	.28***		
Actual × ideal BSP	-1.05 (.23)	-.33***			-.76 (.31)	-.20*		
Ideal × ideal BSP	.72 (.24)	.20**			.20 (.29)	.05		
Surface values								
a ₁	-.14				.72			
a ₂	.13				.18			
a ₃	1.03*				1.41*			
a ₄	2.23***				1.69***			

$a_1 = (\beta_A + \beta_I)$, where β_A is beta coefficient for actual body shape self-perception and β_I is beta coefficient for ideal body shape self-perception. $a_2 = (\beta_{A \times A} + \beta_{A \times I} + \beta_{I \times I})$, where $\beta_{A \times A}$ is actual body shape self-perception squared, $\beta_{A \times I}$ is the cross-product of actual body shape self-perception and ideal body shape self-perception, and $\beta_{I \times I}$ is the beta coefficient for ideal body shape self-perception squared. $a_3 = (\beta_A - \beta_I)$; $a_4 = (\beta_{A \times A} - \beta_{A \times I} + \beta_{I \times I})$.

*p < .05; **p < .01; ***p < .001.

β = unstandardized regression coefficient, BSP = body shape self-perception; DEXA = dual-energy X-ray absorptiometry; se = standard error.

In line with the first hypothesis, no significant linear or nonlinear relationships were found between similar actual and ideal body shapes (i.e., agreement) and depressive symptoms. Future research should examine whether meeting one’s self-perceived ideal physique is related to positive outcomes. For boys, these findings could be a result of our scale measuring body size only. Seeing that some boys desire to be more muscular [15,16,20], it may be that the perceptions of achieving well-developed muscles, rather than a specific body size, may be more predictive of positive outcomes. In contrast, an agreement between the actual body and the ought body (i.e., how we believe we *should* look; [18]) may be more predictive of positive outcomes for girls. This would be consistent with the literature demonstrating the strong sociocultural pressure for girls to look a certain way [31]. To better test whether an agreement between body self-perceptions is related to well-being, researchers are encouraged to use measures that make a well-defined distinction between muscular bodies and overweight bodies as well as incorporate measures of the *ought* body.

As hypothesized, adolescent girls and boys who reported significantly larger actual body shapes compared with their ideal bodies experienced the highest level of depressive symptoms. For girls, this finding supports the common notion of a drive for thinness, and a discrepancy between actual and ideal body shapes in this specific direction is predictive of negative mental health outcomes [19]. In corroboration with the body image literature, these findings further highlight the need for intervention and prevention efforts to be cognizant of thin internalization [32] and a BISD in this specific direction [19].

The findings are more complex for boys given the challenges of assessing body size for muscularity compared with weight. It was hypothesized that no specific direction of the discrepancy would be predictive of depressive symptoms for boys as healthy weight boys were expected to want to be larger and more muscular, while overweight boys would strive for a smaller body shape [15,20]. In the present study, boys who selected a larger actual body compared with their ideal body experienced the most frequent depressive symptoms. In addition, our findings are consistent with prior work [15,20] in that larger adolescent boys were dissatisfied with their weight status and wanted to be smaller like their female counterparts. Though we controlled for the confounding effects of weight, other potential confounding factors deserve further discussion. For instance, the participants’ young age may be a contributing factor given other studies have suggested that boys are not concerned with their muscularity until after puberty [15]. Furthermore, dieting and a desire to lose weight may be particularly salient in these households where at least one parent is obese. When considering these specific

sample characteristics, the association between boys' desire to be smaller and depressive symptoms is not as surprising. Overall, the findings from the present study support the idea that desiring a smaller body shape holds negative mental health consequences for early adolescent girls and boys alike. As such, additional research is needed to identify potential mechanisms that are contributing to this finding.

The degree of the discrepancy was also important when examining depressive symptoms among early adolescent boys and girls. Specifically, depressive symptoms were more frequent when the degree of the discrepancy between actual and ideal body scores increased. This may be because a larger discrepancy suggests that these adolescents have the perception of failure to achieve his/her body goals, which can lead to symptoms of depression such as feelings of worthlessness, sadness, and hopelessness [18]. Although the mechanisms underlying this association still need to be investigated, this finding supports the prevalent problem of a BISS among youth (see Bearman et al. [33] for a review). Furthermore, these results complement a study by Castonguay et al. [19] that highlighted the degree of the discrepancy between actual and ideal weight status was predictive of women's negative self-conscious emotions (i.e., shame and guilt). However, to our knowledge, this is the first study to establish that the degree of the discrepancy also holds negative implications for young boys' mental health and well-being.

Clinical implications

Our findings may inform prevention and intervention efforts for BISS among early adolescents. For example, our findings support that cognitive elements of body image (i.e., BISS) are associated with negative psychological outcomes among youth. One study found cognitive dissonance training significantly reduced thin-ideal internalization and body image dissatisfaction, and this improvement was maintained at a 6-month follow-up [32]. Similarly, numerous studies have demonstrated that mindfulness-based cognitive therapy is an effective intervention that reduces the likelihood of a relapsing major depressive episode and residual depressive symptoms (see Barnhofer et al. [34] for a review). As such, the present study and extant research [32,34] suggest that early adolescents with a BISS and/or depressive symptoms may benefit from cognitive-based training. Moreover, participants had at least one obese parent, which has been associated with an increased risk for children to become overweight or obese themselves [35]. Therefore, the present study targeted a particularly vulnerable sample as overweight or obese adolescents experience higher than average levels of BISS and depressive symptoms [4,36]. Interventions aimed at decreasing a BISS and depressive symptoms may want to consider targeting the unique needs of this specific sample of youth.

Limitations and future directions

The data from the present study were taken from the QUALITY study, where the main objective was to examine the genetic, biological, environmental, and psychosocial determinants of excess weight. As such, only Caucasian families were recruited to limit ethnic/genetic variation [23]. Thus, generalizability of the results is limited. Furthermore, depressive symptoms were assessed with a self-report measure, and positively worded items (e.g., "I enjoyed life") were removed. While the results remain

vulnerable to biases relating to self-report, the reliability of the outcome measure was significantly improved when the positively worded items were eliminated. Other researchers have also questioned the validity of the positively worded CES-D items [37]. Moreover, as the data are cross-sectional, directions of relationship between BISS and depressive symptoms should be interpreted with caution. It is possible that higher depressive symptoms exacerbated the BISS. Longitudinal data are needed to better understand the directionality of this relationship. This study was also limited in that the FRS [8] does not assess muscularity. Given the heightened importance of muscularity among males, future research should continue using polynomial regression analyses with response surface methods and include measures of muscularity [38] to see whether this has an impact on the direction of the discrepancy. Last, future work is needed to determine how the degree of agreement, degree of discrepancy, and direction of discrepancy in relation to body shapes relate to other outcomes associated with body dissatisfaction such as disordered eating and low self-esteem [7,10].

Conclusions

To conclude, the present study used appropriate statistical techniques to better understand how BISS is related to negative mental health outcomes among early adolescents. Based on these findings, BISS may be a risk factor for depressive symptoms among early adolescents. Prevention and intervention efforts aimed to circumvent the anticipated increase in depression by 2030 [1] may benefit by incorporating BISS into their approaches.

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