

Body Weight Dissatisfaction, Social Appearance Anxiety, and Restrained Eating in Chinese Mother-Son and Mother-Daughter Dyads

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Abstract

Objective

Body weight dissatisfaction (BWD) is associated with restrained eating, but most previous research has focused on individual-level processes. This cross-sectional study examined within-person and cross-dyad associations between BWD and restrained eating, as well as indirect associations through social appearance anxiety (SAA), in Chinese mother–adolescent dyads.

Method

Participants were 351 Chinese mother–adolescent dyads, including 180 mother–son dyads and 171 mother–daughter dyads. Mothers and adolescents completed self-report measures of BWD, SAA, and restrained eating. Actor–Partner Interdependence Models and Actor–Partner Interdependence Mediation Models were estimated separately for mother–son and mother–daughter dyads, adjusting for mothers’ and adolescents’ age and body mass index, as well as family subjective social status.

Results

In both dyad types, higher BWD was associated with greater restrained eating within mothers ($\beta = .44$) and adolescents (sons: $\beta = .58$; daughters: $\beta = .66$). Maternal BWD was also positively associated with adolescents’ restrained eating (sons: $\beta = .40$; daughters: $\beta = .31$), whereas adolescents’ BWD was not significantly associated with mothers’ restrained eating (sons: $\beta = .05$, $p = .477$; daughters: $\beta = .10$, $p = .243$). Significant actor indirect associations through individuals’ own SAA were observed for mothers and adolescents in both dyad types. In mother–daughter dyads, maternal BWD showed a positive total indirect association with daughters’ restrained eating through SAA ($B = .095$, 95% CI [.036, .208]); the corresponding total indirect association was not supported in mother–son dyads ($B = -.026$, 95% CI [–.098, .037]). A specific daughter-to-mother indirect association through maternal SAA was statistically supported ($B = .073$, 95% CI [.009, .182]), although the total daughter-to-mother indirect association was not supported.

Conclusions

BWD and SAA were associated with restrained eating both within individuals and across mother–adolescent dyads. Findings highlight individual and dyadic associations that may be relevant to future research and intervention development.

Plain English Summary

Many mothers and teenagers feel unhappy with their body weight, and these concerns may be related to limiting food intake to control weight. In this study, we surveyed 351 Chinese mothers and their teenage sons or daughters. We examined body-weight concerns, worries about being judged for appearance, and restrained eating. Mothers and adolescents who were less satisfied with their body weight tended to report more

restrained eating. Mothers' body-weight concerns were also linked with greater restrained eating in both sons and daughters. In mother–daughter pairs, mothers' body-weight concerns were additionally linked with daughters' restrained eating through daughters' worries about their appearance. This indirect pattern was not found in mother–son pairs. These findings may inform future family-based research and prevention efforts by highlighting the links between mothers' body-weight concerns, adolescents' appearance-related worries, and restrained eating.

Introduction

Body weight has become an increasingly salient topic in contemporary China. In 2024, the National Health Commission and multiple other departments launched the “Weight Management Year” initiative, which aims to establish supportive environments for weight management, improve public awareness and skills related to healthy weight control, and promote healthier lifestyles over approximately three years [1]. This policy context reflects growing recognition that weight management is not merely an individual issue but a broader public health priority involving families, schools, communities, and healthcare systems.

However, increased public attention to body weight does not necessarily ensure scientifically informed weight-management practices. For many individuals, particularly adolescents, restricting food intake may appear to be a direct and accessible strategy for weight loss or weight maintenance [2]. Restrained eating refers to the intentional restriction of food intake, typically with the aim of weight loss or weight maintenance [2]. Adolescence is a particularly vulnerable developmental period for the emergence of restrained eating, as pubertal development is associated with changes in body composition, heightened body awareness, and increased risk for eating-related concerns [2–5]. In addition, adolescents are increasingly exposed to appearance-focused social media and sociocultural pressures emphasizing thinness or weight control, which may further increase the likelihood of adopting restrained eating behaviors [6–9]. Given that restrained eating is associated with eating disorder symptoms [10–12] and broader psychosocial impairment, including anxiety and depression [13, 14]. Thus, it is crucial to identify psychological and interpersonal factors associated with restrained eating in adolescence. Understanding these factors can potentially inform prevention and intervention strategies, providing valuable insights into ways to improve adolescents' eating behaviors.

The Association between Body Weight Dissatisfaction and Restrained Eating

Body weight dissatisfaction (BWD) refers to negative thoughts and feelings about one's body weight and body size [15, 16]. It is commonly reflected in a perceived discrepancy between one's current and desired body weight [16]. Conceptually, BWD can be understood as a weight-focused form of body dissatisfaction. Whereas body dissatisfaction broadly refers to negative evaluations of one's physical appearance, BWD is more specifically concerned with perceived body weight, fatness, adiposity, and weight-related body size [17]. Although BWD may involve concerns about either weight loss or weight gain, concerns about fatness and weight gain may be particularly salient in the contemporary Chinese sociocultural context [1]. Therefore, the present study focuses specifically on fatness-related BWD, that is, negative cognitions and dissatisfaction related to perceived body weight, adiposity, and fat-related body size.

Body dissatisfaction, including its weight-focused dimension, is prevalent among adolescents [18–20] and has been associated with a range of adverse psychological and behavioral outcomes, including eating disorder symptoms, harmful weight-control practices, depressive symptoms, and lower self-esteem [21–24]. Within this broader construct, BWD may represent a particularly behaviorally relevant dimension. Whereas body dissatisfaction may involve multiple aspects of physical appearance, such as facial features, height, skin tone, or overall attractiveness, body weight is often perceived or framed as comparatively modifiable through personal behaviors, particularly dietary control and physical activity [25, 26]. As a result, dissatisfaction with body weight may be especially likely to activate weight-control goals and motivated attempts to change the body through eating-related behavior.

Individuals who experience BWD may attempt to reduce the perceived discrepancy between their current and ideal weight by restricting or monitoring their food intake as a weight-control strategy. Consistent with this view, cross-sectional studies have shown that elevated BWD or weight dissatisfaction is associated with dieting, restrictive weight-control practices, eating disorder symptoms, and other forms of disordered eating [27–29]. Although longitudinal research examining narrowly defined BWD as a predictor of restrained eating remains limited, prospective evidence concerning broader weight- and shape-related body dissatisfaction indicates that negative evaluations of weight and shape predict subsequent increases in dieting and restrictive eating [30]. Accordingly, BWD may represent an important cognitive risk marker for restrained eating.

Social Appearance Anxiety as a Mediator between Body Dissatisfaction and Disordered Eating Behaviors

Social appearance anxiety (SAA) refers to the persistent fear or apprehension of being negatively evaluated by others because of one's overall physical appearance in social situations [31]. Body dissatisfaction may heighten individuals' sensitivity to appearance-based social evaluation. Studies involving clinical and university samples have shown that SAA is associated with body dissatisfaction, drive for thinness, and concerns about body weight, shape, and eating [32, 33]. Evidence also indicates that body dissatisfaction is positively associated with social physique anxiety, a related but conceptually distinct construct concerning evaluations of one's physique [34]. Together, these findings suggest that negative evaluations of one's body may extend into interpersonal contexts, leading individuals to worry that others will also judge their appearance unfavorably.

SAA may, in turn, contribute to restrained eating. Although direct evidence specifically linking SAA to restrained eating remains limited, research on related social-evaluation concerns provides indirect support for this pathway. Fear of negative evaluation has been positively associated with restrained eating among female college students [35], while appearance anxiety has been linked to eating-disorder symptoms among Chinese university students [36]. Fear of negative evaluation has been associated with a greater likelihood of eating disorders characterized by weight and shape concerns among adolescents [37]. In addition, SAA was uniquely associated with several eating-related concerns and symptoms, whereas general fear of negative evaluation was uniquely associated with drive for thinness and dietary restraint [33]. These findings suggest that individuals with elevated SAA may attempt to control their food intake, weight, or body shape to reduce

concerns about negative appearance-based evaluation. Therefore, SAA may serve as a psychological mechanism through which body weight dissatisfaction contributes to restrained eating.

Parental Influence on Children's Body Dissatisfaction and Dietary Behaviors

According to family systems theory, the family constitutes an interdependent system in which the experiences and behaviors of one family member may be related to those of other members and family subsystems [38, 39]. This framework suggests that parents' and adolescents' body-image and eating-related attitudes and behaviors should not be considered in isolation. Importantly, these associations may operate in both directions rather than reflecting exclusively unidirectional parental influence. Empirical evidence suggests that parental weight- or appearance-related comments, teasing, or critical evaluations are associated with adolescents' body image and maladaptive eating behaviors [40], although the predominantly cross-sectional evidence does not establish direct causal effects.

Although both mothers and fathers may contribute to children's body dissatisfaction and eating-related socialization, there is a strong rationale for paying particular attention to mothers. Mothers' own dietary patterns are associated with aspects of the children's dietary intake, partly through the home food environment [41]. This may be particularly relevant in contemporary Chinese families, where mothers frequently undertake a greater share of daily household tasks and childcare responsibility [42]. Moreover, Cerea et al. (2024) found that maternal body dissatisfaction, dysfunctional eating behaviors, and perfectionism were collectively associated with body dissatisfaction and drive for thinness among young adult sons, whereas paternal perfectionism was associated with sons' bulimic symptoms [43]. These findings suggest that maternal characteristics may be relevant to sons' body image and eating behaviors while also underscoring the potentially distinct contributions of mothers and fathers.

Patterns of parental association may also differ between sons and daughters. According to the transactional model, child development is a product of continuous, bidirectional interactions between the individual and their social context [44]. In mother-daughter dyads, mothers may serve as salient models of body-related attitudes and behaviors. Evidence from a mother-focused body-image intervention showed improvements in mothers' body appreciation and positive body-image role-modeling skills, supporting the relevance of maternal modeling to daughters' body-image environments [45]. For sons, body-image concerns may involve muscularity, strength, and athleticism in addition to body weight and thinness [46]. These potentially different body ideals suggest that associations observed in mother-son dyads should not be assumed to operate identically in mother-daughter dyads. Accordingly, examining mother-son and mother-daughter dyads separately may clarify whether the associations among BWD, SAA, and restrained eating vary according to adolescent sex.

The Actor-Partner Interdependence Model

Although body dissatisfaction/BWD and restrained eating have been extensively studied, prior research has largely focused on individual-level processes. Far less attention has been paid to the dyadic nature of parent-

child relationships, in which mothers' and adolescents' body image and eating-related variables may show interdependent associations. Furthermore, the psychological mechanisms underlying these bidirectional effects remain underexplored, representing a significant research gap in understanding how restrained eating develops and persists within families.

The Actor-Partner Interdependence Model (APIM) [47] provides a rigorous analytical framework for examining such dyadic processes. Originally developed to analyze interdependence in dyads such as marital partners, parent-child, friendships, and teacher-student pairs, APIM simultaneously estimates two types of effects: actor effect, which represents the influence of an individual's predictor variable on their own outcome, and the partner effect, which captures the influence of an individual's predictor variable on the other person's outcome. Applied to mother-adolescent dyads, this framework allows for the examination of how BWD predicts one's own restrained eating and that of the dyad member.

The Present Study

The present study applied the APIM to investigate mother-adolescent interdependencies in BWD and restrained eating. By incorporating SAA as a mediator, the study further examined whether SAA explained associations between BWD and restrained eating within individuals and across dyad members. We hypothesized that mothers' and children's BWD would be positively associated with their own restrained eating. We also examined whether BWD in one dyad member was associated with restrained eating in the other dyad member. Finally, we tested whether mothers' and adolescents' SAA were involved in statistically supported indirect associations within and across dyad members. Given potential sex differences, analyses were conducted separately for mother-son and mother-daughter dyads.

Methods

Participants and Procedures

The study protocol was approved by the Research Ethics Office of Hengyang Normal University (No. 2026lllw004). Participants were recruited from a secondary school in Chenzhou, Hunan Province, China. The research team contacted the school administration, and class teachers distributed recruitment letters to students, inviting them and their mothers to participate voluntarily. Students completed their questionnaires at school under the supervision of the research team, while mothers completed theirs at home and returned them through their children. Parent-child dyads were matched based on the child's class and name. A total of 766 individual questionnaires were returned. After excluding 64 invalid questionnaires (due to unmatched pairs or incomplete responses), we retained 351 valid parent-child dyads, resulting in a response rate of 91.6%. The final sample included 180 mother-son dyads and 171 mother-daughter dyads. In the mother-son dyads, mothers had a mean age of 41.83 years ($SD = 5.69$) and a mean BMI of 21.75 kg/m² ($SD = 2.48$), whereas boys had a mean age of 12.73 years ($SD = 0.72$) and a mean BMI of 18.72 kg/m² ($SD = 3.38$). In the mother-daughter dyads, mothers had a mean age of 40.78 years ($SD = 4.77$) and a mean BMI of 21.86 kg/m² ($SD = 3.35$), whereas girls had a mean age of 12.63 years ($SD = 0.68$) and a mean BMI of 18.45 kg/m² ($SD = 2.98$).

Measures

Demographic Information

Participants self-reported their age (years), sex, height (meters), and weight (kilograms). These self-reported height and weight values were used to calculate body mass index (BMI) for both mothers and children. Additionally, for mothers, socioeconomic status was assessed using the Subjective Social Status (SSS) scale. This measure uses a 10-rung ladder format, in which participants select the rung that best represents their position in the social hierarchy relative to others in society [48]. Scores range from 1, indicating the lowest perceived social status, to 10, indicating the highest perceived social status, with higher scores reflecting higher perceived socioeconomic status.

Body weight dissatisfaction

Body weight dissatisfaction was assessed using the Negative Physical Self Scale-Fat Subscale (NPSS-F) [49]. The NPSS-F is an 11-item self-report measure designed to assess negative cognitions and dissatisfaction related to perceived fatness, for example, "Weighing myself makes me feel depressed". Items are rated on a 5-point scale ranging from 1 (not at all) to 5 (always). Scores are summed up to obtain a total score, with higher scores indicating greater BWD. The scale has demonstrated good reliability and validity in previous studies among Chinese adolescents [50] and college students [51]. In this study, McDonald's ω was .90 for boys and .87 for mothers in the mother-son dyad sample, and .91 for girls and .89 for mothers in the mother-daughter dyad sample.

Restrained Eating

Restrained eating was assessed using the 10-item Restrained Eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ) [52]. The subscale assesses the tendency to restrict food intake to control body weight, for example, "Do you deliberately eat foods that are slimming?" Items are rated on a 5-point scale from 1 (never) to 5 (very often). Scores are summed up to obtain a total score, with higher scores indicating stronger cognitive control over food intake. The subscale has shown good psychometric properties among Chinese adolescents [53] and college students [54]. In the present study, McDonald's ω was .89 for boys and .90 for mothers in the mother-son dyad sample, and .91 for girls and .93 for mothers in the mother-daughter dyad sample.

Social Appearance Anxiety

Social appearance anxiety (SAA) was assessed by the 16-item Social Appearance Anxiety Scale (SAAS) [31]. The SAAS is a self-report measure designed to assess anxiety related to being negatively evaluated by others because of one's appearance, for example, "I worry that others are judging my appearance." Items are rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). After reverse-scoring the first item, all item responses were summed to obtain a total score, with higher scores indicating greater SAA. The SAAS has been used among Chinese adolescent and young adult populations and has demonstrated good internal consistency [55, 56]. In this study, McDonald's ω was .92 for boys and .94 for mothers in the mother-son dyad sample, and .95 for both girls and mothers in the mother-daughter dyad sample.

Data Analysis

SPSS 29.0 [57] was used for data entry and descriptive statistical analysis. Descriptive statistics were calculated for continuous variables, including means and standard deviations. Paired-samples t-tests were used to examine differences between mothers and children on BWD, SAA, and restrained eating. Pearson correlation coefficients were calculated to examine the relationships between the study variables. The Actor-Partner Interdependence Model (APIM) was then applied to examine dyadic relationships between mothers and children and to analyze both actor and partner effects. Specifically, mothers' and children's BWD were treated as independent variables, while their respective restrained eating scores served as dependent variables. Building upon the APIM, the Actor-Partner Interdependence Mediation Model (APIMeM) was used to examine whether mothers' and children's SAA mediated the actor and partner associations between BWD and restrained eating. This model allowed for the simultaneous estimation of actor and partner indirect effects through mothers' and children's SAA. In addition, to control for potential confounding effects, SSS, mothers' age, children's age, mothers' BMI, and children's BMI were included as covariates in the model [58, 59]. Specifically, mothers' age and BMI were included as covariates for mothers' SAA and restrained eating, whereas children's age and BMI were included as covariates for children's SAA and restrained eating. SSS was treated as a family-level covariate and was included as a predictor of both mothers' and children's SAA and restrained eating. The same covariate adjustment strategy was applied in both the APIM and APIMeM. APIM and APIMeM analyses were conducted using the lavaan package [60] in R 4.5.1 [61]. Models were estimated using raw scores, and standardized estimates are reported. Missing data was handled using full information maximum likelihood. No item-level missing data were present for the three focal measures, and all six focal scale scores were complete. Residual missingness was limited to covariates: maternal age was missing for seven dyads (2.0%), maternal BMI for one dyad (0.3%), and adolescent BMI for one dyad (0.3%). For overidentified APIM and APIMeM models, global fit was evaluated using the scaled chi-square statistic, robust comparative fit index (CFI), robust Tucker-Lewis index (TLI), robust root mean square error of approximation (RMSEA) with its 90% confidence interval, and standardized root mean square residual (SRMR). For any just-identified model, global fit indices were not interpreted because such models reproduce the observed covariance matrix exactly. Bootstrap resampling (5000 iterations) was applied to estimate the confidence intervals for the indirect effects, with nonzero intervals indicating significant mediation [62]. Analyses were conducted separately for mother-son and mother-daughter dyads.

Results

Differences in Study Variables Between Mothers and Adolescents

Table 1 presents descriptive statistics and dyadic comparisons between mothers and their children. For mother-son dyads, mothers reported significantly higher restrained eating than sons (Cohen's $d = 0.31$). No significant differences were found between mothers and sons in BWD (Cohen's $d = 0.14$) or SAA (Cohen's $d = 0.00$). For mother-daughter dyads, mothers reported significantly higher restrained eating than daughters (Cohen's $d = 0.21$). No significant differences were found between mothers and daughters in BWD (Cohen's $d = 0.03$) or SAA (Cohen's $d = -0.14$).

Table 1
Descriptive statistics and paired-samples t-test

Variable	Group	N	M ± SD	t	df	p	Cohen's d
BWD	Mothers of sons	180	18.69 ± 7.41	1.92	179	.057	0.14
	Sons	180	17.41 ± 7.82				
	Mothers of Daughters	171	18.25 ± 7.31	0.40	170	.693	0.03
	Daughters	171	17.99 ± 7.75				
SAA	Mothers of sons	180	33.04 ± 12.53	0.03	179	.980	0.00
	Sons	180	33.02 ± 12.35				
	Mothers of Daughters	171	34.32 ± 12.88	-1.78	170	.077	-0.14
	Daughters	171	36.26 ± 12.59				
Restrained eating	Mothers of sons	180	21.12 ± 7.39	4.16	179	< .001	0.31
	Sons	180	18.70 ± 6.68				
	Mothers of Daughters	171	22.19 ± 8.47	2.70	170	.008	0.21
	Daughters	171	20.49 ± 7.82				

Abbreviations: M, mean; SD, standard deviation.

Insert Table 1 Here

Correlations Among Study Variables

Table 2 presents the bivariate correlations among the study variables separately for mother-son and mother-daughter dyads. Within both groups, BWD, restrained eating, and SAA were generally positively correlated within individuals. Cross-dyad associations were observed. In mother-son dyads, mothers' BWD was positively associated with sons' restrained eating. Mothers' and sons' corresponding scores were positively correlated with BWD, restrained eating, and SAA. In mother-daughter dyads, mothers' BWD was positively associated with daughters' SAA and restrained eating. Daughters' body weight dissatisfaction was also positively associated with mothers' SAA. Mothers' and daughters' corresponding scores were positively correlated with BWD, SAA, and restrained eating.

Table 2
Correlation analysis among variables

1. Child's Age	1	2	3	4	5	6	7	8	9	10	11
	1	.09	– .22**	.09	– .003	.05	.13	.05	– .07	– .01	.02
2. Mothers' Age	.07	1	– .15*	.14	.23**	.12	.14	.05	.13	– .02	.05
3. SSS	– .09	– .01	1	.07	– .01	.03	– .03	.06	– .02	.09	– .02
4. Child's BMI	.11	.09	– .02	1	.39***	.46***	.35***	.23**	.27***	.25***	.16*
5. Mothers' BMI	.02	.32***	– .002	.29***	1	.20**	.20**	.20**	.41***	.20**	.22**
6. Child's BWD	.14	.09	– .05	.63***	.17*	1	.75***	.72***	.39***	.27***	.30***
7. Child's R E	.11	.07	.02	.53***	.29***	.72***	1	.70***	.54***	.49***	.47***
8. Child's SAA	.06	.17*	– .06	.45***	.11	.70***	.60***	1	.39***	.31***	.38***
9. Mother's BWD	.02	.10	– .001	.36***	.56***	.31***	.58***	.26***	1	.48***	.44***
10. Mothers' RE	– .07	– .06	.01	.26***	.32***	.19*	.39***	.17*	.50***	1	.57***
11. Mothers' SAA	– .04	.08	– .17*	.19**	.21**	.21**	.30***	.28***	.53***	.42***	1
Note: Correlations for sons ($N = 180$) are presented below the diagonal, and correlations for daughters ($N = 171$) are presented above the diagonal. The diagonal (1) indicates perfect autocorrelation. SSS = Subjective Social Status; BMI = Body Mass Index. * $p < .05$, ** $p < .01$, *** $p < .001$.											

Insert Table 2 Here

APIM Analyses

Figure 1 presents the results of APIM analyses for mother-son (a) and mother-daughter (b) dyads. Both APIMs were overidentified and demonstrated good global fit. For mother-son dyads, the robust fit indices were $\chi^2(4) = 5.16$, $p = .271$, CFI = .998, TLI = .980, RMSEA = .037, 90% CI [.000, .123], and SRMR = .015. For mother-daughter dyads, the robust fit indices were $\chi^2(4) = 3.33$, $p = .504$, CFI = 1.000, TLI = 1.000, RMSEA = .000, 90% CI [.000, .112], and SRMR = .014. All estimated actor and partner effects were obtained after

controlling for covariates. Specifically, mothers' age and BMI were included as covariates for mothers' restrained eating, children's age and BMI were included as covariates for children's restrained eating, and subjective social status was included as a family-level covariate predicting both mothers' and children's restrained eating.

In mother-son dyads, significant actor effects were found for both mothers and sons. Mothers' BWD was positively associated with their own restrained eating ($\beta = .44, p < .001$), and sons' BWD was positively associated with their own restrained eating ($\beta = .58, p < .001$). A significant mother-to-son partner effect was also observed, with mothers' BWD positively associated with sons' restrained eating ($\beta = .40, p < .001$). In contrast, the son-to-mother partner effect was not significant ($\beta = .05, p = .477$).

In mother-daughter dyads, significant actor effects were observed for both mothers and daughters. Mothers' BWD was positively associated with their own restrained eating ($\beta = .44, p = .005$), and daughters' BWD was positively associated with their own restrained eating ($\beta = .66, p < .001$). The mother-to-daughter partner effect was significant, with mothers' BWD positively associated with daughters' restrained eating ($\beta = .31, p < .001$). However, the daughter-to-mother partner effect was not significant ($\beta = .10, p = .243$).

Insert Fig. 1 Here

APIMeM Analyses

Figure 2 presents the APIMeM results for mother-son and mother-daughter dyads. Both models were overidentified and demonstrated good global fit. For mother-son dyads, the robust fit indices were $\chi^2(8) = 11.54, p = .173$, CFI = .994, TLI = .961, RMSEA = .051, 90% CI [.000, .113], and SRMR = .020. For mother-daughter dyads, the robust fit indices were $\chi^2(8) = 9.32, p = .316$, CFI = .999, TLI = .992, RMSEA = .023, 90% CI [.000, .096], and SRMR = .015. All estimated paths were obtained after controlling for covariates. Specifically, mothers' age and BMI were included as covariates for mothers' SAA and restrained eating, children's age and BMI were included as covariates for children's SAA and restrained eating, and SSS was included as a family-level covariate predicting both mothers' and children's SAA and restrained eating.

For mother-son dyads, significant actor pathways were observed. Mothers' BWD was positively associated with their own SAA ($\beta = .60, p < .001$), which in turn was positively associated with their own restrained eating ($\beta = .25, p = .005$). Similarly, sons' BWD was positively associated with their own SAA ($\beta = .71, p < .001$), which was positively associated with their own restrained eating, $\beta = .18, p = .006$. The direct associations between BWD and restrained eating remained significant for both mothers ($\beta = .29, p = .004$) and sons ($\beta = .46, p < .001$). Regarding partner pathways, mothers' body weight dissatisfaction was directly associated with sons' restrained eating ($\beta = .42, p < .001$), whereas the reverse partner pathway from sons' BWD to mothers' restrained eating was not significant ($\beta = .03, p = .757$).

For mother-daughter dyads, significant actor pathways were also found. Mothers' BWD was associated with their own SAA ($\beta = .38, p = .014$), which in turn was associated with their own restrained eating ($\beta = .44, p < .001$). Daughters' BWD was associated with their own SAA ($\beta = .72, p < .001$), which was associated with their own restrained eating ($\beta = .22, p = .006$). The direct associations between BWD and restrained eating remained significant for both mothers ($\beta = .27, p = .027$) and daughters ($\beta = .47, p < .001$). Regarding partner pathways, mothers' BWD was associated with daughters' SAA ($\beta = .15, p = .009$) and restrained eating ($\beta = .22,$

$p < .001$). Mothers' SAA was also associated with daughters' restrained eating ($\beta = .15, p = .013$). In contrast, daughters' BWD was not significantly associated with mothers' restrained eating ($\beta = .01, p = .878$).

Insert Fig. 2 Here

Indirect Associations in APIMeM

Table 3 presents the indirect effects for mother-son dyads. Significant actor indirect effects were found for both mothers and sons. Mothers' BWD was indirectly associated with their own restrained eating through mothers' SAA, $B = 0.147$, 95% CI [0.051, 0.263]. Sons' BWD was also indirectly associated with their own restrained eating through sons' SAA, $B = 0.108$, 95% CI [0.030, 0.213]. In contrast, neither the total mother-to-son indirect effect, $B = -0.026$, 95% CI [-0.098, 0.037], nor the total son-to-mother indirect effect, $B = 0.018$, 95% CI [-0.123, 0.171], was significant.

Table 3
Indirect effects from the APIMeM in mother-son dyads

Effect	<i>B</i>	<i>SE</i>	<i>z</i>	95% CI for <i>B</i>	β
Mother actor indirect effect	0.147	0.054	2.722	[0.051, 0.263]	0.147
Son actor indirect effect	0.108	0.047	2.298	[0.030, 0.213]	0.126
Mother-to-son indirect effect via children's SAA	0.008	0.013	0.615	[-0.012, 0.042]	0.009
Mother-to-son indirect effect via mother's SAA	-0.033	0.032	-1.031	[-0.100, 0.026]	-0.037
Son-to-mother indirect effect via mother's SAA	0.008	0.019	0.421	[-0.029, 0.045]	0.008
Son-to-mother indirect effect via children's SAA	0.010	0.073	0.137	[-0.127, 0.166]	0.011
Total mother-to-son indirect effect	-0.026	0.034	-0.765	[-0.098, 0.037]	-0.028
Total son-to-mother indirect effect	0.018	0.074	0.243	[-0.123, 0.171]	0.019

Notes: APIMeM = Actor-Partner Interdependence Mediation Model. The mediation paths are significant when the confidence interval does not contain zero; β , standardized estimate; CI, confidence interval.

Insert Table 3 Here

Table 4 presents the indirect effects for mother-daughter dyads. Significant actor indirect effects were found for both mothers and daughters. Mothers' BWD was indirectly associated with their own restrained eating through mothers' SAA, $B = 0.190$, 95% CI [0.082, 0.365]. Daughters' BWD was also indirectly associated with their own restrained eating through daughters' SAA, $B = 0.159$, 95% CI [0.038, 0.294]. The total mother-to-daughter indirect effect was significant, $B = 0.095$, 95% CI [0.036, 0.208], whereas the total daughter-to-mother indirect effect was not significant, $B = 0.091$, 95% CI [-0.050, 0.235].

Table 4
Indirect effects from the APIMeM in mother-daughter dyads

Effect	<i>B</i>	<i>SE</i>	<i>z</i>	95% CI for <i>B</i>	β
Mother actor indirect effect	0.190	0.069	2.754	[0.082, 0.365]	0.164
Daughter actor indirect effect	0.159	0.065	2.446	[0.038, 0.294]	0.158
Mother-to-daughter indirect effect via child SAA	0.035	0.018	1.944	[0.007, 0.081]	0.033
Mother-to-daughter indirect effect via mother's SAA	0.060	0.041	1.463	[0.009, 0.170]	0.056
Daughter-to-mother indirect effect via mother's SAA	0.073	0.042	1.738	[0.009, 0.182]	0.067
Daughter-to-mother indirect effect via children's SAA	0.018	0.068	0.265	[-0.118, 0.151]	0.016
Total mother-to-daughter indirect effect	0.095	0.042	2.262	[0.036, 0.208]	0.089
Total daughter-to-mother indirect effect	0.091	0.071	1.282	[-0.050, 0.235]	0.083

Notes: APIMeM = Actor-Partner Interdependence Mediation Model. The mediation paths are significant when the confidence interval does not contain zero; β , standardized estimate; CI, confidence interval.

Insert Table 4 Here

Discussion

This study is among the first to use the Actor-Partner Interdependence Model (APIM) and its extended mediation framework (APIMeM) to examine dyadic associations among BWD, SAA, and restrained eating within mother-adolescent dyads. The findings showed robust actor effects in both mother-son and mother-daughter dyads: mothers' and adolescents' own BWD was associated with their own restrained eating, and these associations were partially explained by SAA. In addition, maternal BWD was associated with adolescents' restrained eating in both mother-son and mother-daughter dyads, whereas adolescents' BWD was not significantly associated with mothers' restrained eating. The separately estimated models showed different patterns of indirect associations across mother-son and mother-daughter dyads. In mother-son dyads, maternal BWD was directly associated with sons' restrained eating, but this association was not explained by either mothers' or sons' SAA. In mother-daughter dyads, maternal BWD was associated with daughters' restrained eating both directly and indirectly through SAA. These findings highlight the central role of maternal BWD in adolescents' restrained eating and suggest that the mechanisms underlying this association may differ between mother-son and mother-daughter dyads.

Actor–Partner Associations Between Body Weight Dissatisfaction and Restrained Eating

Consistent with previous research identifying BWD as a key correlate of disordered eating [20–23], robust actor effects were observed in both mothers and adolescents. Mothers and children with higher BWD reported higher restrained eating, suggesting that negative body evaluations may translate into greater attempts to control food intake across both generations. Within adolescents, these associations are relevant

to consider in the context of pubertal development. Puberty is accompanied by rapid changes in weight and body fat, which often conflict with socially prescribed body ideals [63], potentially rendering adolescents more vulnerable to BWD and leading them to attempt dietary restriction as a maladaptive coping strategy. These factors may make adolescents especially vulnerable to translating BWD into restrictive eating behaviors.

Another notable finding was that the direct partner effects were primarily mother-driven: maternal BWD was associated with both sons' and daughters' restrained eating, whereas adolescents' BWD was not significantly associated with mothers' restrained eating. This pattern was observed in both mother-son and mother-daughter dyads, suggesting that mothers may play a particularly important role in shaping adolescents' eating-related cognitions and behaviors. During childhood and adolescence, the family environment serves as a primary source of learning cultural values and ideals [64], and mothers typically act as the family's nutritional gatekeepers [65]. Thus, mothers' own BWD may be communicated to adolescents through modeling, comments about weight or eating, food-related rules, or broader family norms about appearance and self-control. At the same time, the absence of significant child-to-mother partner effects suggests that adolescents' BWD may be less likely to shape mothers' eating behaviors directly, at least in the present cross-sectional data. This pattern aligns with family systems theory [66], which posits that families are hierarchically structured, with parents occupying a dominant position, and their emotional and behavioral patterns may help shape children's emotions and behaviors. Furthermore, body image and eating-related schemas tend to be more stable and entrenched in adulthood [67], making adults less susceptible to influence from their children.

Social Appearance Anxiety and Indirect Associations

A central finding of this study was that statistically supported actor indirect associations through SAA were observed for both mothers and adolescents. Across mother-son and mother-daughter dyads, individuals with greater BWD reported higher SAA, which in turn was associated with greater restrained eating. These findings are broadly consistent with cognitive-behavioral accounts of eating pathology and research on fear of negative social evaluation. As a weight-related negative self-appraisal, BWD may co-occur with heightened SAA and greater restrictive eating. Restrictive eating, in turn, may be understood as a behavioral strategy aimed at maintaining weight control [34, 68]. According to Hobfoll's conservation of resources theory [69], resource loss is the principal ingredient in the stress process, and loss events lead to negative psychological outcomes, including anxiety and depressive mood. In this light, BWD can be conceptualized as an internalized stressor that continuously depletes individuals' psychological resources. As emotional resources become increasingly exhausted, SAA emerges as a prominent affective response, which in turn drives individuals to adopt dieting behaviors as a compensatory mechanism. However, it is crucial to note that the mediation was partial, implying that body weight dissatisfaction also retains a direct, rule-governed influence on eating behaviors that operate independently of emotional distress.

Beyond the actor indirect associations observed in both dyad types, partner indirect associations were examined separately in mother-son and mother-daughter dyads. In mother-son dyads, mothers' BWD was directly associated with sons' restrained eating, but the indirect effect through SAA was not significant. This suggests that the mother-to-son association may operate less through appearance-related anxiety and more through direct behavioral or family-environmental mechanisms, such as food availability, dietary rules, health-oriented messages, or modeling of eating control. One possible explanation is that boys may also interpret

maternal concerns through a more health-, fitness-, or performance-oriented lens rather than through appearance-based social evaluation. Research indicates that boys are often socialized to suppress expressions of vulnerability and anxiety [70], and male body ideals often emphasize strength, power, and muscularity rather than thinness alone [45]. Thus, maternal concerns about body weight or eating may be translated in mother-son dyads into more practical messages about health, fitness, or eating control, rather than being internalized as SAA.

In contrast, mother-daughter dyads showed evidence of a significant mother-to-daughter indirect effect through SAA. Mothers' BWD was associated with daughters' restrained eating both directly and indirectly, suggesting that daughters may be more likely to internalize maternal body concerns as appearance-related social pressure. This pattern converges with prior research indicating that mothers' weight- and appearance-related attitudes, comments, and behavioral modeling are associated with daughters' weight-related and body image concerns, as well as disordered eating [71–74]. It is also consistent with the Tripartite Influence Model, which conceptualizes parents as important sociocultural agents in shaping adolescent girls' body image and eating-related concerns [75, 76]. Daughters may therefore be likely to internalize maternal body concerns as appearance-related social pressure. Within the mother–daughter model, the total indirect association from maternal BWD to daughters' restrained eating was statistically supported, whereas the reverse total indirect association from daughters to mothers was not supported.

Implications

This study advances our understanding of restrained eating by adopting a dyadic perspective and highlighting the role of SAA. The findings suggest that interventions should not focus only on adolescents' individual BWD but should also consider maternal body image concerns and family-based communication about appearance and eating. Parent-focused programs could help mothers to shift their attention from appearance to health and functionality [77, 78], thereby reducing the transmission of body-related anxiety to adolescents and promoting healthier eating habits. Furthermore, for daughters, SAA may be an especially relevant intervention target, given that the mother-to-daughter association was partly explained by SAA. For example, health education initiatives may incorporate media literacy and psychological training to help adolescents critically evaluate unrealistic body ideals [79, 80], regulate emotions, and build resilience against peer and social media pressures. For sons, maternal BWD was associated with restrained eating, but this association was not explained by SAA. This finding suggests that future research and intervention development may need to examine other possible mechanisms in mother-son dyads, such as family food practices, dietary rules, health-oriented eating messages, or modeling of eating control. However, because these mechanisms were not directly assessed in the present study, this interpretation should be considered tentative. Lastly, from a clinical perspective, the findings highlight the value of family-centered interventions. Addressing mothers' BWD and appearance-related anxiety may not only enhance their own well-being but also foster a more supportive emotional climate for adolescents. Encouraging positive shared eating experiences and reducing weight-focused talk within families may help create a family environment less conducive to restrained eating and other disordered eating behaviors among adolescents [80].

Limitations and Future Directions

The current study has several limitations that should be considered when interpreting the results. First, the cross-sectional design of this study precludes causal inference. Although the APIM and APIMeM provide useful frameworks for examining dyadic associations, the directionality of the associations among BWD, SAA, and restrained eating cannot be established. Future research should adopt longitudinal or experimental designs to clarify temporal and potentially causal pathways within mother-adolescent dyads. Second, the sample was drawn from a single school in one geographic region of China, which may limit the generalizability of the findings. Future studies should recruit larger, more diverse samples across different regions and school types. Third, although adolescence is a developmental period characterized by substantial pubertal changes, pubertal status or pubertal timing was not assessed in this study. This is important because pubertal development may influence adolescents' body image and eating behaviors [3, 4]. Future research should include measures of pubertal status or timing to better account for developmental differences in body image and eating-related processes. Finally, this study focused exclusively on mother-child dyads and therefore did not capture the possible roles of fathers, grandparents, siblings, or other caregivers. This is particularly important in Chinese families, where multiple family members may be involved in adolescents' daily eating practices, appearance-related communication, and health-related decision-making. Future research should examine broader family systems to determine how different family members jointly shape adolescents' body image and eating behaviors.

Conclusion

This study highlights the value of a dyadic perspective for understanding restrained eating among adolescents and their mothers. Across mother-son and mother-daughter dyads, BWD was associated with higher restrained eating within individuals, and these actor associations included statistically supported indirect associations through SAA. Maternal BWD was also associated with adolescents' restrained eating, whereas adolescents' BWD was not significantly associated with mothers' restrained eating. The separately estimated models showed descriptive differences in the pattern of indirect associations across mother-son and mother-daughter dyads. In mother-son dyads, maternal BWD was directly associated with sons' restrained eating, but this association was not mediated by SAA. In mother-daughter dyads, maternal BWD was associated with daughters' restrained eating both directly and indirectly through SAA. These findings suggest that family-informed prevention efforts may benefit from addressing maternal BWD, appearance-related communication, and adolescents' SAA, while also considering potentially different pathways in mother-son and mother-daughter dyads.

Abbreviations

APIM

Actor-Partner Interdependence Model

APIMeM

Actor-Partner Interdependence Mediation Model

BMI

Body mass index

BWD

Body weight dissatisfaction

CFI
Comparative fit index
CI
Confidence interval
DEBQ
Dutch Eating Behavior Questionnaire
FIML
Full information maximum likelihood
MLR
Maximum likelihood estimation with robust standard errors
NPSS-F
Negative Physical Self Scale–Fat Subscale
OSF
Open Science Framework
RMSEA
Root mean square error of approximation
SAA
Social appearance anxiety
SAAS
Social Appearance Anxiety Scale
SD
Standard deviation
SE
Standard error
SPSS
Statistical Package for the Social Sciences
SRMR
Standardized root mean square residual
SSS
Subjective social status
TLI
Tucker–Lewis index

Declarations

Conflicts of Interest

The authors declare no conflicts of interest.

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Author Contributions

Lilin Long: Formal analysis, Writing – original draft, Writing – review & editing. Ting Wang: Writing – original draft, Writing– review & editing. Yunyi Cheng: Writing – original draft, Writing– review & editing. Peiyi Wang: Writing – original draft, Writing– review & editing. Wesley R. Barnhart: Writing – original draft, Writing– review & editing. Jason M. Nagata: Writing– review & editing. Gui Chen: Conceptualization, Funding acquisition, Project administration, Investigation, Supervision, Formal analysis, Writing – original draft, Writing – review & editing. Jinbo He: Conceptualization, Supervision, Writing – review & editing.

Ethical Approval

Ethical approval was obtained from the Research Ethics Office at Hengyang Normal University (No. 2026IIIw004).

Human Ethics and Consent to Participate declarations

Informed consent was obtained from all participants and their custodians.

Data Availability

The datasets and analysis materials supporting the conclusions of this article are available in the Open Science Framework repository: <https://osf.io/5e3u6/>.

Declaration of Generative AI in Scientific Writing

During the preparation of this work, the authors used ChatGPT 5.4 to improve the language of the manuscript. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the content of the published article.

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Figures

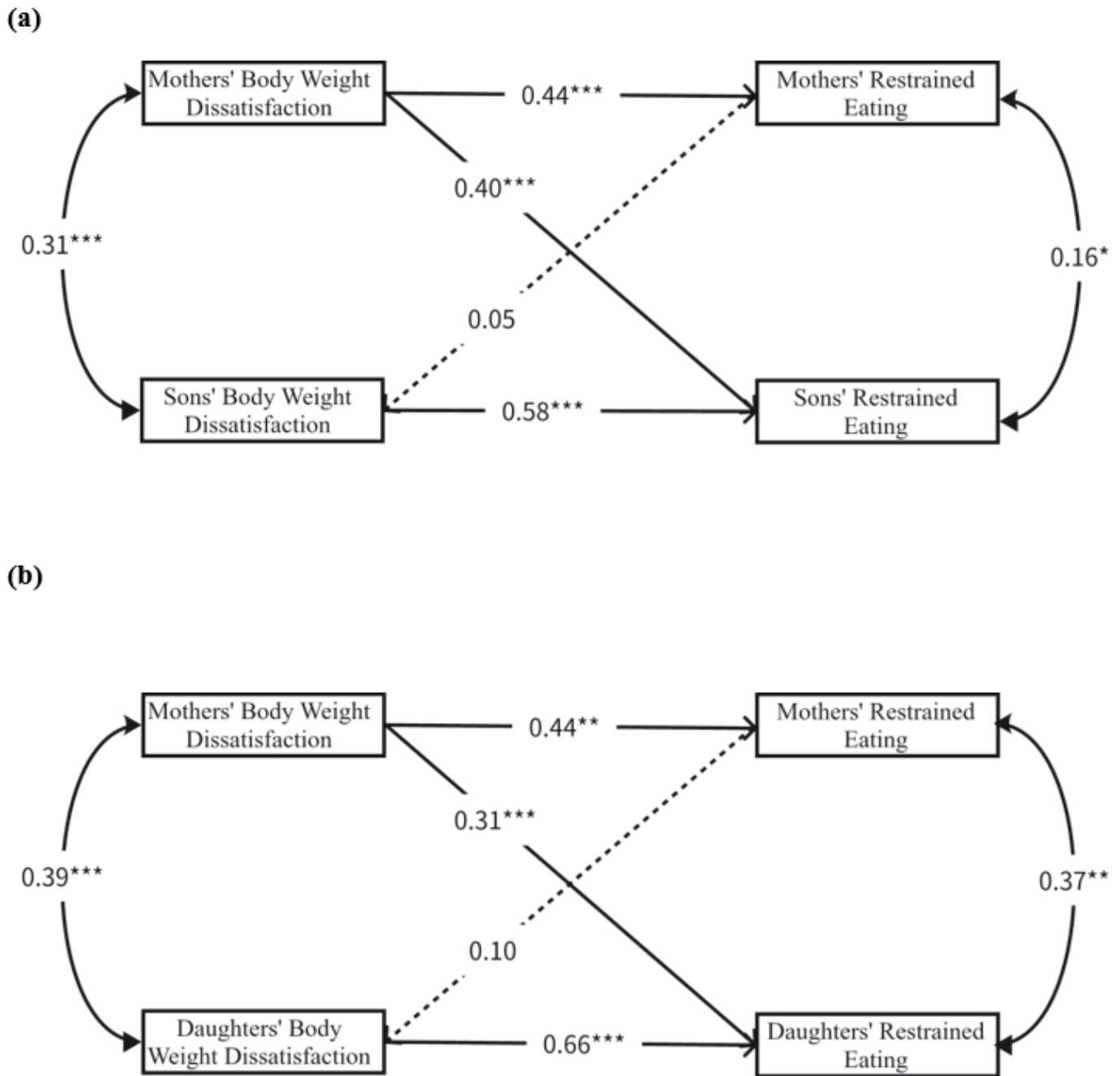
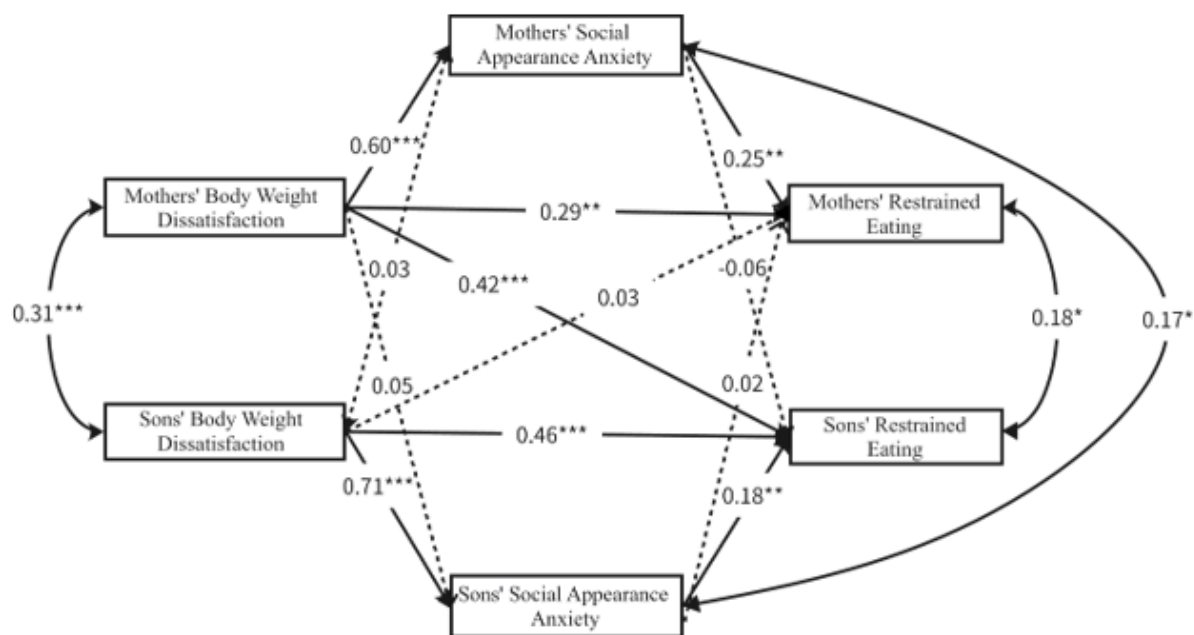


Figure 1

Actor-partner associations between body weight dissatisfaction and restrained eating.

(a)



(b)

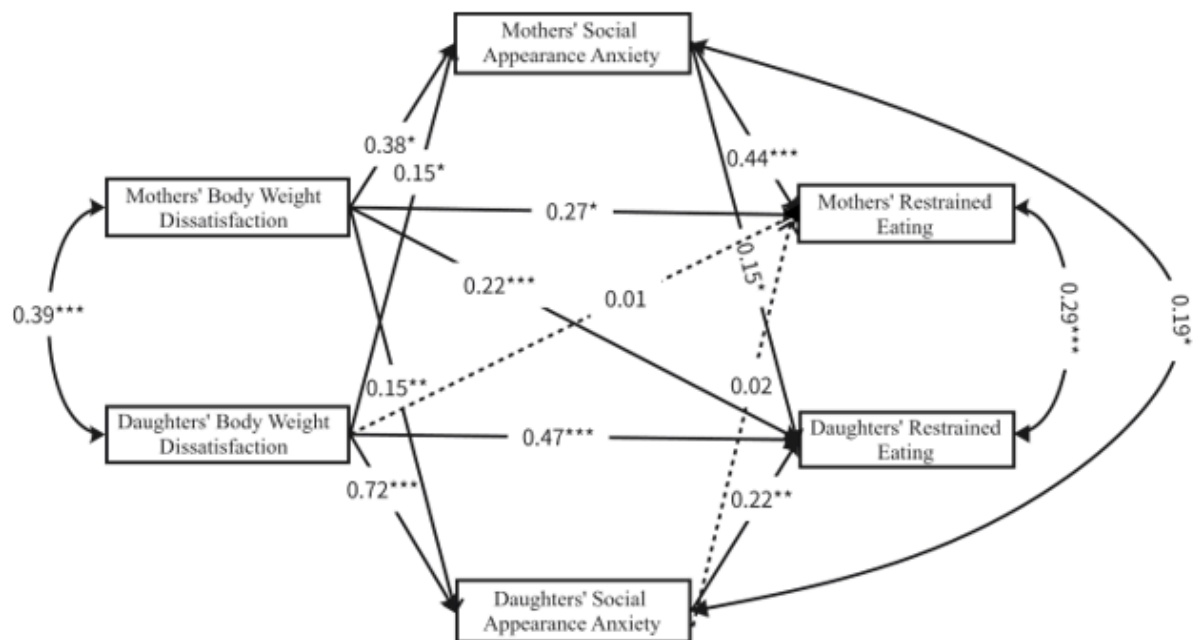


Figure 2

Social appearance anxiety as a mediator of body weight dissatisfaction and restrained eating.