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The Mediational Significance of Negative/Depressive Affect in the Relationship of Childhood Maltreatment and Eating Disorder Features in Adolescent Psychiatric Inpatients

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Abstract

Objective—Childhood maltreatment is a risk factor for eating disorder and negative/depressive affect appears to mediate this relation. However, the specific elements of eating- and body-related psychopathology that are influenced by various forms of childhood maltreatment remain unclear and investigations among adolescents and men/boys have been limited. This study investigated the mediating role of negative affect/depression across multiple types of childhood maltreatment and eating disorder features in hospitalized adolescent boys and girls.

Method—Participants were 148 adolescent psychiatric inpatients who completed an assessment battery including measures of specific forms of childhood maltreatment (sexual, emotional, and physical abuse), negative/depressive affect, and eating disorder features (dietary restriction, binge eating, and body dissatisfaction).

Results—Findings suggest that for girls, negative/depressive affect significantly mediates the relationships between childhood maltreatment and eating disorder psychopathology, although effects varied somewhat across types of maltreatment and eating disorder features. Generalization of mediation effects to boys was limited.

Keywords

Childhood Maltreatment; Eating Disorders; Body Image; Negative Affect; Depression; Mediation; Gender

Childhood maltreatment is prevalent, associated with a plethora of negative sequelae, and represents a major public health issue (1). Studies with adolescents consistently find that those who report having experienced childhood maltreatment are characterized by a complex array of heightened psychological and behavioral problems relative to their peers who deny maltreatment (2). Childhood maltreatment is thought to represent a broad risk factor for psychological disturbance in general and perhaps a vulnerability factor for diverse specific problems including, for example, eating disorders (EDs) (3-4). Although childhood

sexual abuse has garnered the most empirical attention with regard to its influence on ED (3-5), emerging research in eating and weight disorders has increasingly highlighted both the prevalence and the significance of other forms of childhood maltreatment (6-9). It is becoming apparent that it may be most fruitful for studies to examine associations between *specific* forms of maltreatment and particular aspects or features of ED psychopathology (6-7, 9-12).

Knowledge of potential pathways through which different forms of childhood maltreatment might lead to eating- or body-related psychopathology is currently limited. Several authors have hypothesized mediating links between childhood maltreatment and eating disturbance, including elements of negative affect (9-18) such as depression (19-20). The mediating role of negative/depressive affect in the maltreatment-ED relation is an important issue as other research has found that negative/depressive affect is a marker for more severe ED psychopathology and poorer outcomes in diverse groups with eating or weight problems (21-24).

However, findings have been inconsistent, and inconsistencies may relate in part to limitations of previous research. First, most previous research has used either non-clinical or ED samples. Research that relies on study groups either with low rates of psychopathology (e.g., college students) or with restricted ranges due to all subjects having EDs may suffer from limited variability in ED features, and thus decreased likelihood of detecting hypothesized effects because limited variance generally attenuates validity coefficients. Second, etiological studies often conflate of different forms of ED psychopathology. However, it is well-established that eating pathology reflects a multi-dimensional construct with important sub-components including body dissatisfaction, binge eating, and dietary restriction (25), and each of these components may be responsive to different antecedents. Third, limited attention has been paid to the potentially moderating role of demographic factors, particularly including gender, on contributing effects. Given that rates and causes of ED differ across men and women (26-27), mediators of ED antecedents may also differ as a function of gender.

With these issues in mind, this study built upon prior research in order to elucidate further the nature of possible associations amongst childhood maltreatment, negative/depressive affect and eating disorder psychopathology. We studied a clinical group of adolescent boys and girls with a range of psychiatric disturbances. Studying adolescents rather than adults may contribute to increased statistical power to detect mediational effects because the influence of childhood maltreatment could be expected to continue to exert powerful influences on behavior in such a group, whereas these influences might attenuate during the transition to adulthood. Furthermore, adolescence represents a period of high risk for the development of body image disturbances and ED features. We chose to study adolescents with a range of ED features because clinical and epidemiological research has found that adolescents typically experience the onset of one or two ED symptoms rather than multiple symptoms or full-blown diagnoses (28-29). Such sub-threshold levels of eating and body image disturbances are of significant clinical concern as they are the most common presentations in routine clinical practice settings (30) including those for adolescents (31), and are associated with risk for future full-blown ED as well as with substantial future psychiatric and psychosocial problems (32-33).

This study tested the mediational effects of negative affect across a series of theoretically selected independent and dependent variables, facilitating specificity relative to previous studies. Given uncertainties with regard to the nature of the types of maltreatment that might be associated with ED psychopathology, we considered three specific forms of abuse: childhood sexual, physical, and emotional abuse. Rather than considering ED

psychopathology as a unitary construct, we considered three specific domains: body dissatisfaction, binge eating, and dietary restriction. We hypothesized that (a) childhood maltreatment would be positively associated with eating pathology, (b) childhood maltreatment would be positively associated with negative/depressive affect, and (c) the influence of childhood maltreatment on eating disorder features would be mediated by negative/depressive affect. We further explored whether results would generalize across genders.

Method

Participants were a nearly consecutive series of 148 adolescents (ages 13-19, mean = 15.90, S.D. = 1.41) admitted to the adolescent general treatment unit of a private, not-for-profit, psychiatric teaching hospital. One hundred fifteen (77.7%) were Caucasian, 18 (12.2%) were Hispanic, 14 (9.5%) were African-American, and one did not report ethnicity; 82 (55.4%) were female and 66 (44.6%) were male. Participants were admitted due to their need for inpatient-level psychiatric intervention and no other selection processes were used. Participants were hospitalized for a variety of serious psychiatric problems (i.e., this was not a specialty unit for eating disorders). All participants were initially assessed by staff clinicians to determine their appropriateness for participating in the assessment protocols, and very few were excluded. Exclusions were due to difficulty with reading or language comprehension, active psychosis, agitation, refusal, or confusion. Human subjects (IRB) approval was obtained for chart review of the psychological assessments. Written informed consent was obtained from all participants at the time of admission and after complete explanation of the assessment procedures. For minors, assent was obtained from participants and consent was obtained from their parents or guardians.

Measures

Assessments were conducted as part of an overall evaluation procedure, completed within one to four days after admission. For this study, we chose specific measures from the assessment battery that would evaluate relevant eating- and body-related psychopathology, childhood maltreatment, and negative/depressive affect. The following is a brief description of these measures.

The Millon Adolescent Clinical Inventory (MACI; 34) consists of 160 true-false items and was developed and normed in clinical samples (34-35). The MACI comprises 27 scales that tap clinical syndromes, expressed concerns, and personality styles and contains validity checks, which all participants included in the current study passed. The MACI has demonstrated acceptable internal consistency, test-retest reliability, and has been validated against various measures by several different research groups (35-38). The MACI includes two scales (Eating Dysfunction and Body Disapproval) that assess global constructs related to ED psychopathology. These scales, however, include an admixture of items ranging from ten prototypic items (these are weighted most heavily in the usual scoring) (34) that clearly reflect clinically-meaningful ED-related features to items that are less directly associated with EDs. We generated three variables given our interest in specific features of EDs (binge eating, dietary restriction, and body dissatisfaction). The Binge Eating scale consists of three items (e.g., "I go on eating binges a couple times a week") with scale scores ranging from 0 to 3. The Restriction scale consists of three items assessing extreme attempts to restrict dietary intake (e.g., "I'm willing to starve myself to be even thinner than I am") with total scale scores ranging from 0 to 3. The Body Dissatisfaction scale consists of 5 items assessing adolescent's thoughts and feelings about their body shape and weight and appearance (e.g., "I think I have a good body," which is reverse scored) with scale scores ranging from 0 to 5.

The Beck Depression Inventory (BDI 21-item version; 39) is a well-established inventory of the symptoms and severity of depression. The BDI is used widely and has been shown to have excellent psychometric properties including good internal consistency, test-retest reliability, and validity across diverse patient groups (40) including adolescent inpatients (41). Higher scores reflect higher levels of depressive symptoms and, more broadly, negative affect and psychopathology (21-22).

The Rosenberg Self-Esteem Scale (RSE; 43) is a 10-item measure of global self-esteem. Studies in adolescents have demonstrated acceptable reliability and validity (44). Given previous research linking low self-esteem to negative affectivity (45) and that it is symptomatic of DSM-IV depression, we used the RSE to supplement the BDI in depicting a broad negative/depressive affect dimension (46-47).

The *Childhood Trauma Questionnaire* (CTQ short-version; 48) is a self-report instrument that assesses childhood maltreatment in five areas: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. Participants rate statements about childhood experiences on five-point Likert-type scales (ranging from “never true” to “very often true”). Most items are phrased in objective terms (e.g., “When I was growing up, someone touched me in a sexual way or made me touch them”), whereas some items require subjective evaluation (e.g., “When I was growing up, I believe I was sexually abused”). Items about emotional abuse are general (e.g., “People in my family said hurtful or insulting things to me”) and do not assess whether the commentary targeted physical appearance or shape/weight. Reliability and validity of the CTQ have been established, including reliability and stability over time, convergent and discriminant validity with structured trauma interviews, and corroboration using independent data across diverse patient groups (49-50) including adolescent psychiatric patients (51). In this study, we focused on scores from the three childhood abuse scales measuring emotional, physical and sexual forms of abuse.

Analyses

We investigated the mediating role of negative/depressive affect in the relation between childhood maltreatment and ED psychopathology using the logic described by Baron and Kenny (52) for testing mediation. This general mediation model is depicted in Figure 1, in which coefficient a reflects the path from the independent variable to the mediator, b reflects the relation of the mediator with the dependent variable with the independent variable controlled, c reflects the path between independent and dependent variables, and c' reflects this same path with the mediator controlled. Mediation is thought to occur when $|c'| < |c|$, as this suggests that the relation between independent and dependent variables is partially (if c' is significantly different than 0) or fully (if c' is not significantly different than 0) accounted for by the mediating variable.

Several mediation models were tested in SPSS 17.0 using the bootstrapping routine described by Preacher and Hayes (53). We first tested a general model with the three broad variables of interest. We created component scores for these variables by conducting within-domain principal components analyses for the sets of independent (emotional, physical, and sexual abuse), mediator (depression and self-esteem), and dependent (restraint, body image dissatisfaction, and bingeing) variables. Next, we tested independent (childhood maltreatment) markers one at a time using component mediator and dependent variables (e.g., emotional abuse – eating disorder component association mediated by negative/depressive affect component), and then dependent (eating disorder) markers one at a time using component mediator and independent variables (e.g., childhood maltreatment – restraint link mediated by negative/depressive affect component), in order to assess the relative influence of different maltreatment variables and the effects on different kinds of

eating pathology. Potential gender effects were tested by constructing a moderated mediation model (54).

Results

Table 1 shows the descriptive statistics and inter-correlations of study variables for boys and girls. These data indicate that (a) collapsing scores within the domains of childhood maltreatment, ED features, and negative/depressive affect and (b) testing mediational models was justified by moderate to strong correlations among study variables for both genders. The first step for testing study hypotheses involved computing standardized principal component scores for the three domains of interest. These variables were modeled in the full sample because initial analyses suggested very similar pattern coefficients when analyses were conducted separately by gender and in order to enhance component score reliability. The childhood maltreatment component explained 64% of the variance in emotional, physical, and sexual abuse variables. The negative/depressive affect component explained 89% of the variance in depression and self-esteem. The ED component explained 68% of the variance in body dissatisfaction, bingeing, and restriction variables.

We next tested a series of mediation models. As described above, we first tested a general model using the three component scores. Next, we tested the more specific influences of each of the three measured childhood maltreatment variables, using component scores to represent negative/depressive affect and ED features. We then tested the mediating influence on different features of ED, using component scores to represent childhood maltreatment and negative/depressive affect. Mediation is thought to occur when path c' is significantly weaker than path c , suggesting that the mediator 'carries' the influence of the independent variable on the dependent variable (52), and the difference in these coefficients represents the magnitude of mediation. Initial tests in the full sample suggested the moderating influence of gender across most models. Specifically, whereas childhood maltreatment led to negative/depressive affect similarly for boys and girls, the influence of negative affect on ED psychopathology was significantly ($p < .05$) stronger for girls than boys in every model except one in which body image dissatisfaction represented the outcome. Thus, further analyses were conducted separately by gender.

The first and most general model tested mediation among the component scores. Mediation occurred for both genders, but, as discussed above, was stronger for girls ($c - c' = .31$) than boys (.09). We next tested several models with more specific indicators of childhood maltreatment. Mediation was significant for both genders in models for which emotional abuse represented the independent variable, although the effect was again stronger for girls (.34) than boys (.08). Mediation was not significant for boys when either physical or sexual abuse represented independent variables, but preliminary criteria (52) were also not met: among boys, physical and sexual abuse did not lead to negative affect or to ED psychopathology more generally. For girls, mediation was significant for both physical and sexual abuse models. However, sexual abuse appeared to remain influential on ED psychopathology even with negative affect controlled, an effect referred to as 'partial' mediation.

We next tested several models with more specific indicators of ED features. Again, all three models indicated a significant mediation effect for girls whereas only one of three yielded significant mediation for boys. Among girls, negative/depressive affect fully mediated the relations between childhood maltreatment and both body dissatisfaction (.26) and binge eating (.30). By contrast, the influence of childhood maltreatment on dietary restraint was only partially mediated by negative/depressive affect (.21) among girls. For boys, neither negative/depressive affect nor childhood maltreatment had significant bivariate associations

with dietary restraint. Childhood maltreatment did significantly relate to binge eating, but this was not mediated by negative/depressive affect. The only mediation effect in boys was between childhood maltreatment and body dissatisfaction (.19), and this model was statistically comparable for boys and girls.

Discussion

Our findings clarify previous research on the relations between childhood maltreatment and ED psychopathology and its mediation by negative/depressive affect. Among girls, results consistently supported the hypotheses that (a) childhood maltreatment is related to ED psychopathology, (b) childhood maltreatment is related to negative/depressive affect, and (c) the influence of childhood maltreatment on ED features is mediated by negative/depressive affect. However, these findings did not consistently generalize to boys, and the mediation effect among girls was stronger for some variables than for others.

Every mediation effect tested in this study was statistically significant among girls. Furthermore, mediation was more or less ‘full’ (indicating that childhood maltreatment no longer influenced ED features with negative/depressive affect controlled) for all variable combinations tested, except for the relation between sexual abuse and dietary restriction which was only partially mediated by negative/depressive affect. This consistency is foreshadowed by previous research showing the broad influence of abuse, regardless of the specific kind of abuse, on eating pathology among girls (55). These findings suggest that, consistent with study hypotheses, one reason that childhood maltreatment is related to ED features involves its relation with negative/depressive affect, which in turn may influence ED features. Previous research contextualizes these results by suggesting that childhood maltreatment may contribute to negative affect in a variety of ways, including feelings of shame, guilt, fears related to social relationships, body image problems, and diminished self-esteem (3, 56-57). Furthermore, negative affect has been found to represent an important determinant of the maintenance of eating disorder psychopathology (24) and signals a more disturbed variant of eating problems in both adolescents (21) and adults (6, 24). Research has also found that negative affect is a prospective predictor of poorer course (24) and treatment outcomes (23).

Clinically, these findings suggest that negative/depressive affect represents an important treatment target in girls with ED psychopathology (58). Clinicians treating girls with features of EDs should assess history of childhood maltreatment and, in cases where girls have been abused or neglected, consider the possible role of negative affect in the maintenance of the eating disorder psychopathology. Evolving and enhanced versions of cognitive-behavioral therapy (59) and adaptations of dialectical behavior therapy for eating disorders (60) include specific strategies for helping patients with coping with negative affect, distress tolerance, and better emotional regulation, and thus may be useful in this regard.

However, these data generally suggest that existing research in females may not serve as an optimal guidepost for ongoing research on the influences of childhood maltreatment or other factors for the development of ED psychopathology in males. Unlike for girls, most of the mediation models tested here were not significant for boys, and mediation effects that were significant for both genders tended to be weaker for boys relative to girls. This result may relate to different coping patterns or sequelae of childhood maltreatment among boys relative to girls (61), as prior research on gender differences in response to stress has concluded that women experience greater levels of negative affect in response to emotional stress than men (62). This gender difference in response to stressful experiences may partially explain our findings and it should be explored further in this context. In any case,

limited clinical recommendations can be made for boys with maltreatment histories or eating disorder psychopathology based upon these results, which, in concert with other evidence of different etiologies for EDs in boys and girls (26) may signal the need for different conceptualizations and measurement tools for ED in males.

Several study limitations implicate the need for further investigation. Generalization of effects observed in these psychiatrically hospitalized adolescents to other adolescent groups is uncertain. Future research should examine these issues in diverse samples, including non-treatment-seeking and community-based samples. Further, given that social influences likely affect links between childhood maltreatment and diverse difficulties in living (2, 63), the nature and extent of the sequelae of childhood maltreatment on adolescents may have been altered by additional interpersonal and multiple other factors during continued development. Our study relied on self-report measures and further research should employ multi-method assessments in order to increase confidence in the findings (64,65). We note, however, that our self-report measure for assessing childhood maltreatment has received considerable psychometric support including good convergence with independent corroboration of maltreatment experiences (50). Moreover, it is possible that such self-report measures might facilitate disclosure of embarrassing or sensitive topics. Varying patterns of diagnosis across samples may lead to different results, suggesting the need for replication of these findings across different clinical samples. Although our study considered specific forms of abuse during childhood we could not determine specific timing or age at abusive experiences. Future research should test other mediator or moderator variables not investigated here. For example, beyond understanding the intrapersonal determinants of EDs in both males and females, investigating the relational context can widen knowledge of such influences (66). Finally, optimal tests of mediation are longitudinal or experimental, but like this study, most research in this area utilizes cross-sectional designs. It will be important for future research to extend the findings obtained in this cross-sectional study using such designs.

Overall, this study has added specificity to previous research on the relation of childhood maltreatment with ED psychopathology and the mediation of this general relation by negative/depressive affect. Results suggest that influences on ED psychopathology differ as a function of gender. These influences among boys continue to be poorly understood and remain an important area for future investigation. Among girls, this evidence supports the hypothesis that childhood maltreatment is related to negative/depressive affect, which in turn may link to ED psychopathology.

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Figure 1. Mediation of relation between child maltreatment and eating disorder features by negative/depressive affect.

Table 1

Correlations and descriptive statistics for study measured and latent variables separately for girls and boys.

	Measured Variables					Latent Variables					
	EA	PA	SA	D	S	R	BD	BIN	CM	NA	ED
EA	-	67	37	49	-47	19	24	34	82	51	31
PA	44	-	49	39	-30	25	17	17	89	37	23
SA	20	32	-	40	-26	47	24	31	75	37	41
D	44	11	01	-	-79	48	46	50	53	95	57
S	-39	-06	02	-78	-	-45	-52	-48	-43	-94	-56
R	23	07	12	31	-20	-	67	49	36	51	87
BD	33	-08	-11	49	-55	25	-	51	26	51	86
BIN	30	12	25	13	-09	33	25	-	31	53	80
CM	79	83	58	28	-22	19	09	29	-	53	37
NA	46	10	-01	93	-95	27	56	10	27	-	61
ED	41	03	08	46	-44	63	80	69	25	47	-
σ M	10.26	7.82	6.38	13.67	27.53	0.35	1.47	0.28	-	-	-
σ SD	5.00	4.05	3.17	12.02	8.26	0.79	1.79	0.55	-	-	-
η M	12.44	8.32	8.21	20.11	25.93	1.84	2.62	0.67	-	-	-
η SD	5.75	5.08	5.78	13.20	6.67	1.88	2.11	0.98	-	-	-

Note. EA = emotional abuse, PA = physical abuse, SA = sexual abuse, D = depression, S = self-esteem, R = restriction, BD = body dissatisfaction, BIN = bingeing, CM = childhood maltreatment component, NA = negative affect component, ED = eating disorder component. Coefficients among boys are below the diagonal. Decimals were removed from correlation coefficients.

Mediation-relevant path coefficients across markers of childhood maltreatment and eating disorder features for adolescent girls and boys.

Table 2

	Girls				Boys					
	a	b	c	c - c'	a	b	c	c' - c		
Full Model	.47*	.66*	.42*	.11	.31*	.34*	.25*	.19*	.10	.09*
IV = emotional abuse	.50*	.69*	.39*	.05	.34*	.45*	.19*	.26*	.18*	.08*
IV = physical abuse	.33*	.71*	.24*	.01	.23*	.10	.28*	.02	-.01	.03
IV = sexual abuse	.32*	.62*	.44*	.25*	.19*	-.01	.28*	.02	.03	-.01
DV = dietary restriction	.47*	.45*	.41*	.20*	.21*	.34*	.21	.25	.17	.08
DV = body dissatisfaction	.47*	.56*	.28*	.02	.26*	.34*	.57*	.13	-.06	.19*
DV = bingeing	.47*	.65*	.35*	.05	.30*	.34*	.03	.37*	.36*	.01

Note. All variables were standardized within genders before analysis and are thus interpretable as correlations.

Mediation was tested using the bootstrap method described in Preacher and Hayes (2008). a = path from independent variable to mediator, b = path from mediator to dependent variable controlling for independent variable, c = path from independent to dependent variable, c' = path from independent to dependent variable controlling for mediator. Statistical significance of mediation is indicated by * on c - c' (as indicated by all three hypothesis tests in Preacher & Hayes, 2008), otherwise significance of the indicated path (a, b, or c) is indicated. All models except body dissatisfaction were moderated by gender such that the path between mediator and outcome was stronger for girls.

* = p < .05.