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HEALTH PSYCHOLOGY | RESEARCH ARTICLE

A moderated-mediation model of disordered eating behavior using family functioning, alexithymia, and rational processing style

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Abstract: Both alexithymia and family functioning are predictive of disordered eating behavior. However, few studies have considered their relationship to occur as a mediation. Additionally, no literature has considered the influence that a rational processing style, as defined by Cognitive-Experiential Theory, may have on this relationship. The current study aimed to test the prediction that the negative relationship between family functioning and disordered eating behavior may occur through alexithymia. Further, it was predicted that greater rational processing, which has been argued to be protective of maladaptive, emotionally driven behaviors, would reduce the indirect effect of family functioning on disordered eating (a moderated-mediation model). Two hundred and two women, aged 18–25, completed a questionnaire booklet assessing the relevant constructs, including emotional, external, and restrained eating. An indirect effect of family functioning on disordered eating, through alexithymia, was present only for restrained eating. Contrary to prediction, this effect became stronger at higher levels of rational processing. The study provides initial support for the importance of considering processing style alongside familial and emotional predictors of disordered eating

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PUBLIC INTEREST STATEMENT

Body image concerns and the related problem of eating disorders are increasingly pervasive in modern society. While eating disorders are themselves problematic so too are the negative consequences for mental health. Understanding the roots of eating disorders allows a more complete appreciation of both the nature of the problem and potentially the treatment options likely to be most effective. Though there is widespread agreement that environmental (social), and personal (psychological) factors are probable influences on eating disorders, specific situations and dispositions require clarification. In our research we have tested a model in which family influences and a reduced ability to appropriately process emotions, termed alexithymia, were examined for their relevance to disordered eating. Additionally, the unique contribution of rational information processing was added to the model. Although not conclusive, initial support was provided for the importance of considering processing style alongside familial and emotional predictors of eating disorders.

behavior, as it may modify their relevance. This has potential implications for current and future developmental and treatment models.

Subjects: Psychological Science; Health Psychology; Psychological Disorders

Keywords: Disordered eating; alexithymia; cognitive processing; family functioning; moderated-mediation

1. Introduction

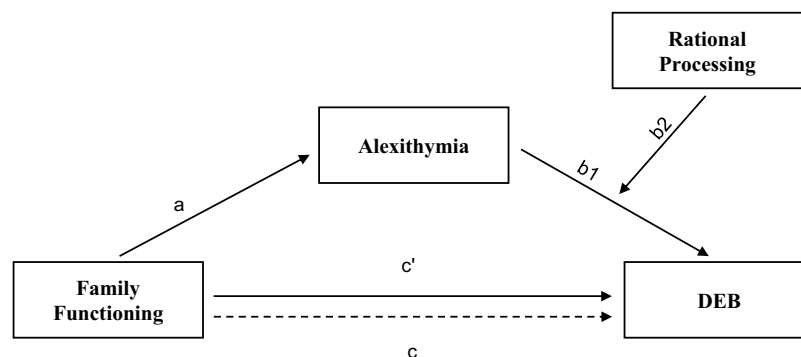
The prevalence of disordered eating behavior (DEB), particularly among young women, continues to increase (Hay et al., 2008; Mitchison et al., 2014). Peak onset is typically during mid to late adolescence, remaining either stable or increasing from adolescence to young adulthood (Neumark-Sztainer et al., 2011; Pearson et al., 2017). DEB refers to a continuum of behaviors such as restrained or compulsive eating, binge eating, emotional eating, or irregular eating patterns (Quick et al., 2013; Ricciardelli & McCabe, 2004). While DEB assessment tools do not necessarily provide precise indications of a clinical condition (e.g., bulimia, anorexia, binge eating disorder, etc.), more severe DEBs do suggest an increased likelihood of a concurrent, or future, eating disorder (Jacobi et al., 2004). Also, like clinical eating disorders, DEBs are noted to be associated with negative physical and psychological outcomes such as depression, anxiety, and stress (Gan et al., 2011), suicidal ideation (Herpertz-Dahlmann et al., 2008), narcotic use (Pisetsky et al., 2008), and poor self-rated health (Kärkkäinen et al., 2018).

The current research examined the roles of two constructs, family functioning and alexithymia, for which there is already substantial support in the DEB literature (Croll et al., 2002; Hanna & Bond, 2006; Karukivi et al., 2010), and also assessed the potential role of cognitive processing, as characterized in Cognitive-Experiential Theory (CET; Epstein, 2014), for which there is only limited research. Given that uncertainty remains concerning the factors that may be associated with DEB, examining new constructs, and new ways in which existing constructs may interact, may lead to a better understanding of effective prevention and treatment techniques. Based on previous DEB research and the tenets of CET, a moderated-mediation model was designed and conducted that comprised hypothesized relationships among all of family functioning, alexithymia, and processing style in the context of DEB (see, Figure 1). The key components of the model, and support for the proposed relationships are discussed below.

2. Family functioning

Family functioning describes the ability of a family to achieve day-to-day tasks that assist its members in the development and maintenance of positive social, psychological, and biological health (Epstein et al., 1978). In studying family functioning the focus can be on general functioning, referring to the health or pathology of the family as a whole (Cassels et al., 2018), or on more specific elements such as cohesion and parental bonding (Gatta et al., 2017; Kench & Irwin, 2000).

Figure 1. Illustration of the proposed relationships between family functioning and DEB, mediated by alexithymia and moderated by rational processing. Direct paths are indicated as \rightarrow and indirect paths as \dashrightarrow . The term DEB is used to represent the successive use of emotional eating, external



There is a well-established link between poor family functioning and increased DEB (path c' of the proposed model) using constructs such as parental bonding, support, communication, care, and cohesion (Ackard et al., 2006; Cromley et al., 2010; McVey et al., 2002; Miller-Day & Marks, 2006; Turner et al., 2005). Family connectedness and a positive atmosphere during family meals have also been shown to be protective against the likelihood of DEB (Croll et al., 2002; Neumark-Sztainer et al., 2007).

3. Alexithymia

Individuals with high levels of alexithymia may find it hard to distinguish emotions from bodily sensations and have difficulty in explaining their feelings to those around them (Westwood et al., 2017). Deficits can further apply to others' emotions, resulting in poor communication and a lack of empathy. Additionally, conflict and stressful situations are typically avoided (Taylor et al., 1997). Rather than a clinical disorder, alexithymia is better understood as a stable personality trait, which is more prevalent in women (Taylor, 1994). There is evidence of negative associations between alexithymia and family constructs including general functioning, cohesion, emotional expression, family behavior control, and problem solving (Kench & Irwin, 2000; Topino et al., 2021). Conversely, alexithymia shares positive associations with conflict, neglectful parenting style, and fear of separation (Gatta et al., 2017; Kench & Irwin, 2000; King & Mallinckrodt, 2000).

While explanations vary, Taylor et al. (1997) suggest that poor childhood emotional support, distance between family members, and inconsistent relationships, inhibit emotional development and the ability to control feelings, thus increasing "alexithymic" tendencies. Path a in Figure 1 represents the link between family functioning and alexithymia in the proposed model. There is also an established relationship (path b1 in Figure 1) between alexithymia and DEB (Karukivi et al., 2010; Ridout et al., 2010; Westwood et al., 2017). It has been proposed that DEB may develop as an avoidance/coping mechanism in the attempt to relieve uncomfortable or confusing emotional states. Women with higher alexithymia are argued to be at increased risk of DEB due to the difficulty in identifying feelings, resulting in limited ability to internally manage such feelings. This promotes DEB as an emotional management strategy (Sim & Zeman, 2006).

4. Cognitive processing

A unique aspect of the current research is the consideration of cognitive processing. CET was considered by Epstein (2014) to be a process theory of personality that, instead of describing traits such as neuroticism or extraversion, provided a model for how information is processed, leading to behavioral choices. Although personality characteristics have been identified as robust predictors of DEB (Eggert et al., 2007), an approach such as that offered by CET has largely remained untested. CET posits that information is processed via two independent but simultaneous thinking styles or systems termed rational and experiential (Epstein, 2003, 2014; Handley et al., 2000). The rational system is conscious, sequential, effortful, and time-consuming. It does not involve emotional connections and can be altered without difficulty through logical reasoning and evidence. Those who prefer rational processing will typically enjoy critical thinking and solving complex problems (Epstein et al., 1996). The experiential system is characterized by unconscious, automatic and heuristic-based processing that perceives holistically rather than in detail. It is therefore relatively fast and effortless, using previous emotional outcomes to facilitate positive, and avoid negative, emotions. Those with a greater preference for an experiential style are more trusting of their intuition when making difficult decisions (Epstein, 2003).

It is important to acknowledge that both systems (cognitive processing styles) can be either protective (adaptive) or harmful in the development and/or maintenance of healthy and unhealthy behaviors. Neither is "superior" as both have strengths and weaknesses depending on context. Key to the current study is the critical function played by the rational system in recognizing spontaneous, maladaptive, inappropriate thoughts and behavioral urges, substituting them with more appropriate behavioral responses (Epstein, 2014; Epstein et al., 1996; Pacini & Epstein, 1999). That is, the rational system can "correct" irrational influences from the experiential system. This has

been supported, for example, by research demonstrating a negative relationship between rational processing and psychological adjustment (e.g., anxiety, depression; Epstein, 2003; Epstein et al., 1996).

On this basis a greater preference for rational processing is hypothesized to play a protective role in the direct relationship between alexithymia and DEB (path b2). It is suggested that having higher levels of rational processing will regulate the use of DEB as a coping technique for dealing with confusing and unwanted emotional states and thus be associated with lower levels of DEB. That is, the direct relationship between alexithymia and DEB is expected to be moderated by the preference for rational processing. This will in turn moderate the strength of the proposed mediation pathway, as the negative indirect effect of family functioning on DEB, through alexithymia, is expected to be contingent upon whether an individual reports higher or lower rational processing. A greater preference for rational processing is expected to reduce the strength of this indirect effect (see, Figure 1).

5. Current study

The goal was to examine potential predictors of DEB that may inform current and future developmental, maintenance, and treatment initiatives. In the model tested, which is illustrated in Figure 1, poorer family functioning was hypothesized to have a negative indirect effect on DEB through its influence on alexithymia (path c in Figure 1). Support for the multivariate components of the model is provided by similar models. For example, a mediating role for alexithymia in the relationship between childhood emotional and physical neglect and DEB has been found (Minnich et al., 2017), as has a mediation relationship between childhood emotional abuse and DEB involving both alexithymia and psychological distress (Hund & Espelage, 2006). Consideration of this protective role of rational processing provides a unique addition in understanding this complex behavior. Note that while experiential processing was also measured, there were no expectations of a role for experiential processing in the model.

6. Method

Approval was granted by the authors' institutional research ethics committee. The study was cross-sectional, comprising measures of family functioning (independent variable), alexithymia (mediator), rational processing (moderator), and DEB (dependent variable).

6.1 Participants and procedure

Participants were sourced from an introductory psychology class and from community groups comprising the target demographic (N = 202). Age was capped at 25 years to increase the likelihood that participants were either still living with their family of origin or able to remember events without an excessively long recall. Those aged below 18 years were not recruited due to ethical considerations. Initial contact included an overview of the purpose of the study, allowing potential participants to evaluate their decision to be involved. A dedicated online link to the survey was also provided. This link led to a detailed Letter of Introduction and Information Sheet which offered greater detail of the nature of the study. Importantly, participants were informed that participation was confidential and anonymous, and that they were free to withdraw at any time or decline to answer any individual question(s). No incentives were offered to encourage participation. Informed consent was assumed by the questionnaire's completion.

6.2 Measures

6.2.1. Disordered eating behavior

The Dutch Eating Behaviour Questionnaire (Van Strien et al., 1986; Wardle, 1987) comprises 33 items which encompass three subscales: Emotional Eating (13 items; e.g., "Do you get the desire to eat when you are anxious, worried or tense?") which evaluates eating in response to internal stimuli and sensations such as emotional arousal; External Eating (10 items; e.g., "If you see or smell something delicious do you have a desire to eat it?") which assesses responses to external

stimuli such as the sight and smell of food; and Restrained Eating (10 items; e.g., “When you have eaten too much do you eat less than usual the following day?”) which focusses on dieting behavior (Van Strien et al., 1986). Five-point responses (“never true” to “very often true”) are averaged (ranges 1–5). Higher scores indicate greater DEB. Internal reliabilities (α) were .93 (Emotional Eating), .85 (External Eating), and .93 (Restrained Eating).

6.2.2. Family functioning

The McMaster Family Assessment Device comprises six scales derived from the McMaster Model of Family Functioning (Epstein et al., 1983, 1978). However, as is common, only General Functioning was used in the current study. These 12 items assess the overall health of the family (e.g., “In times of crisis we can turn to each other for support”). Participants rate each item for its perceived accuracy with respect to their family of origin (4-point scale; “strongly agree” to “strongly disagree”). Responses were averaged (range 1–4) and reverse coded such that higher scores indicated better family functioning (current α = .94).

6.2.3. Alexithymia

The 20-item Toronto Alexithymia Scale (Bagby et al., 1994) is commonly used in studies of DEB and family functioning (Gatta et al., 2017; Minnich et al., 2017; Westwood et al., 2017). Responses to statements such as “I am often confused about what emotion I am feeling” comprise a 5-point scale (“strongly disagree” to “strongly agree”). Higher summated scores (range 20–100) indicate higher alexithymia (current α = .86).

6.2.4. Cognitive processing

The 24-item version of the Rational-Experiential Inventory (REI; Norris & Epstein, 2002) comprises statements such as “I don’t think it is a good idea to rely on one’s intuition for important decisions” (rational; 12 items), and “I often go by my instincts when deciding on a course of action” (experiential; 12 items). Five-point response scales (“definitely false” to “definitely true”) reference how accurate each item is of participants. Both rational and experiential scores range from 12–60 with higher scores suggesting a greater preference for the respective processing style (current α was .86 for both scales).

6.2.5. Sociodemographic details

The final section of the questionnaire requested sociodemographic details. Education level, relationship status and living arrangements (e.g., with or without family of origin) were sought. Estimated height and weight enabled Body Mass Index (BMI) to be calculated for use as a covariate as it is a consistent predictor of DEB (Lunner et al., 2000; Walker et al., 2015). Age was also included as a covariate due to its known association with REI responses (Sladek et al., 2010).

6.2.6. Statistical analyses

Analyses were conducted using SPSS (v25.0). Correlations established the bivariate associations among study variables while moderated-mediation and simple mediation were conducted for each of the three DEB scores (emotional eating, external eating, and restrained eating), in turn, using PROCESS (v3; Hayes, 2018). The direct effect of family functioning on DEB and the indirect effect, the multiplicative relationship between path a (family functioning to alexithymia) and path b1 (alexithymia to DEB) in Figure 1, were tested. The moderation of the path between alexithymia and DEB by rational processing (the hypothesised interaction) was then tested. Finally, the indirect effect (path c) was evaluated as conditional to rational processing at -1 SD, Mean, and $+1$ SD. A significant difference between these three effects is inferred through the “index of moderated-mediation” which, if significant, supports the proposition that rational processing moderates the strength of the indirect effect. That is, the mediation depends on the level of the moderator.

As the product of two regression coefficients results in a sampling distribution that is non-normal, PROCESS provides bootstrap estimates ($N = 10,000$) of 95% bias-corrected confidence intervals and standard errors to allow inference regarding the indirect effects (Hayes, 2018). All

predictor and moderator variables were mean-centered prior to analyses to aid interpretation. Also, as moderation effects are often small, all coefficients and associated statistics are presented to three decimal places to better represent the obtained outcomes.

7. Results

7.1. Sample description

Participants were predominantly tertiary educated ($n = 140$, 75.3% enrolled; $n = 19$, 10.2% qualified), living with their family of origin ($n = 130$, 69.9%), and single ($n = 83$, 44.6%). The average age was toward the lower end of the target range ($M = 19.76$, $SD = 1.80$) and mean BMI was 23.28 ($SD = 4.63$).

7.2 Bivariate associations

As predicted, there were significant negative relationships between family functioning and both alexithymia and DEB, albeit only for emotional eating (Table 1). The predicted positive relationship between alexithymia and DEB was evident only for emotional and restrained eating. The predicted negative relationship between rational processing and DEB occurred for both emotional and external eating. However, rational processing was significantly positively related to restrained eating. Family functioning was not related to rational processing, although it shared a significant positive relationship with experiential processing. Alexithymia demonstrated a significant negative association with both rational and experiential processing. In accord with CET, rational and experiential processing were unrelated. As predicted, experiential processing was also unrelated to DEB. For this reason, and the study's primary focus on the protective role of rational processing, no additional analyses were conducted using experiential processing.

7.3. Family functioning to alexithymia (Path a)

As with the bivariate analyses, regression coefficients for the direct effect of family functioning (and covariates) on alexithymia (Table 2) were significant and negative. The model explained 12.8% of the variance in alexithymia ($F_{(4,165)} = 6.04$, $p < .001$).

7.4. Alexithymia to DEB (Path b1) and the influence of rational processing (Path b2)

Regression coefficients for the effect of alexithymia, and the interaction between alexithymia and rational processing, on each of the DEB scores are shown in Table 3. In terms of the covariates, BMI was significantly positively related to both emotional and restrained eating, while age was not related to any DEB measure.

A significant effect of alexithymia was only evident for restrained eating. Similarly, rational processing only moderated the association between alexithymia and restrained eating. However, as noted for the simple correlation, the direction of effect was opposite to hypothesis. With increases in rational processing scores, the relationship between alexithymia and restrained eating became stronger. Due to the differences in the scales of alexithymia and restrained eating, the strength of this interaction is best interpreted visually (Figure 2) and by the variance explained rather than the b coefficient. The model explained 13.4% of the total variance in restrained eating ($F_{(7,162)} = 3.59$, $p < .001$), of which the interaction between alexithymia and rational processing explained 2.6% ($F_{(1,162)} = 4.84$, $p < .05$).

7.5. Direct effect of family functioning on DEB (Path c')

With other variables held constant, family functioning was not directly related to any of emotional eating ($b = -0.152$, $SE = 0.100$, 95% CIs = $-0.350, 0.045$), external eating ($b = -0.073$, $SE = 0.078$, 95% CIs = $-0.228, 0.082$), or restrained eating ($b = -0.146$, $SE = 0.105$, 95% CIs = $-0.354, 0.062$).

7.6. Conditional indirect effects

The indirect effects of family functioning on DEB, through alexithymia (path c), were evaluated conditional to rational processing at -1 SD, the Mean, and $+1$ SD. A non-significant index of moderated-mediation was noted for both emotional eating ($b = 0.005$, $SE = 0.004$, 95%

Table 1. Descriptive data and bivariate correlations among key study variables and covariates

	Range	M	(SD)	1	2	3	4	5	6	7	8
1. Age	18-25	19.76	(1.80)								
2. BMI	16.53-42.32	23.28	(4.63)	.03							
3. Family functioning	1.17-4.00	2.92	(0.66)	.09	.01						
4. Alexithymia	24.00-81.00	53.45	(11.72)	-.05	.02	-.26***					
5. Rational processing	21.00-59.00	41.99	(6.92)	.01	-.04	.06	-.30***				
6. Experiential processing	27.00-57.00	42.21	(6.52)	-.03	-.10	.22**	-.28***	.12			
7. Emotional eating	1.00-4.85	2.77	(0.83)	-.07	.15	-.17*	.19**	-.20**	-.03		
8. External eating	1.60-5.00	3.36	(0.61)	-.06	-.04	-.10	.09	-.15*	-.10	.51***	
9. Restrained eating	1.00-5.00	2.85	(0.89)	.02	.12	-.12	.15*	.19**	.06	.12	-.13

Note. * p < 0.05; ** p < 0.01; *** p < 0.001 (two-tailed).

Table 2. Predictors of alexithymia, with covariates

Measures	Alexithymia		
	b	(SE)	95% CIs
Constant	-0.206	(0.912)	-2.097, 1.595
Family functioning	-4.109**	(1.341)	-6.757, -1.461
Covariates			
BMI	0.005	(0.186)	-0.363, 0.373
Age	-0.205*	(0.474)	-1.141, -0.731

Note.* $p < 0.05$; ** $p < 0.01$.

bs presented are unstandardized regression coefficients.

CI = -0.002, 0.014) and external eating ($b = 0.002$, $SE = 0.003$, 95% CIs = -0.003, 0.010). Similarly, the evaluation of simple mediation, in which the indirect effect of family functioning was averaged across rational processing also produced a non-significant result for both emotional eating ($b = -0.050$, $SE = 0.033$, 95% CIs = -0.125, 0.002) and external eating ($b = -0.015$, $SE = 0.023$, 95% CIs = -0.063, 0.028).

However, a significant index of moderated-mediation ($b = -0.008$, $SE = 0.005$, 95% CIs = -0.018, -0.001) indicated that the indirect effect of family functioning on restrained eating, through alexithymia, differed significantly when conditional to rational processing. That is, the mediation of the relationship between family functioning and restrained eating, by alexithymia, was moderated by rational processing. The three conditional indirect effects of family functioning on restrained eating are summarized in Table 4.

Figure 2 shows that alexithymia demonstrated no direct relationship with restrained eating at -1 SD. However, as rational processing increased, so did the direct relationship between alexithymia and restrained eating. The associated indirect effect (Table 4) in turn became more negative. That is, rational processing increased the indirect effect of family functioning on restrained eating, rather than reduced it. However, even the strongest significant indirect effect (at +1 SD rational processing) was small. A one unit increase in family functioning corresponded to a reduction of 0.11 in restrained eating scores.

8. Discussion

The novel contribution of this study was that it tested the proposition that the mediation relationship describing the role of family functioning and alexithymia in DEB may better be understood by acknowledging rational processing as a protective, moderating variable. First, as with previous studies, poor family functioning was aligned with emotional deficits (Gatta et al., 2017; Kench & Irwin, 2000), measured in this research by alexithymia. However, the proposed mediation held only for restrained eating. Further, the purported benefits of rational processing, including the recognition of maladaptive, experientially-driven behaviors and their replacement with more adaptive ones (Epstein, 2014) were not found. This was despite significant negative bivariate associations between rational processing and both emotional and external eating.

Perhaps the absence of these effects can be attributed to the sample composition of the current study. Previous research has reported similar associations among participants with a clinical eating disorder (Pinaquy et al., 2003), those who were concerned about their weight (Larsen et al., 2006), and those who were clinically obese (Ouwens et al., 2009). Conversely our sample comprised general community members who may or may not have had any or all of these characteristics. Further, unlike restrained eating, which is a deliberate decision to restrict food intake, emotional eating and external eating reflect an increase in intake driven by internal and external stimuli, respectively. This may be an important distinction between DEB outcomes when considering family

Table 3. Predictors of DEB, with covariates

Measures	Emotional Eating			External Eating			Restrained Eating		
	b	(SE)	95% CIs	b	(SE)	95% CIs	b	(SE)	95% CIs
Constant	2.753***	(0.070)	2.617, 2.889	3.346***	(0.054)	3.240, 3.453	2.892***	(0.072)	2.749, 3.035
Alexithymia	0.009	(0.006)	-0.002, 0.021	0.002	(0.005)	-0.007, 0.011	0.014	(0.006)	0.001, 0.026
Rational processing	-0.017	(0.010)	-0.036, 0.001	-0.011	(0.008)	-0.025, 0.004	0.030**	(0.010)	0.010, 0.050
Interaction	-0.001	(0.001)	-0.003, 0.000	-0.001	(0.001)	-0.002, 0.001	0.002*	(0.001)	0.000, 0.004
Covariates									
BMI	0.027*	(0.014)	0.000, 0.054	-0.010	(0.012)	-0.027, 0.015	0.024*	(0.014)	0.005, 0.052
Age	-0.019	(0.034)	-0.087, 0.049	-0.020	(0.027)	-0.073, 0.033	-0.023	(0.036)	-0.048, 0.095

Note. * p < 0.05; ** p < .01; *** p < 0.001.
 bs are unstandardized regression coefficients.

Figure 2. Restrained eating scores by alexithymia levels, contingent to rational processing.

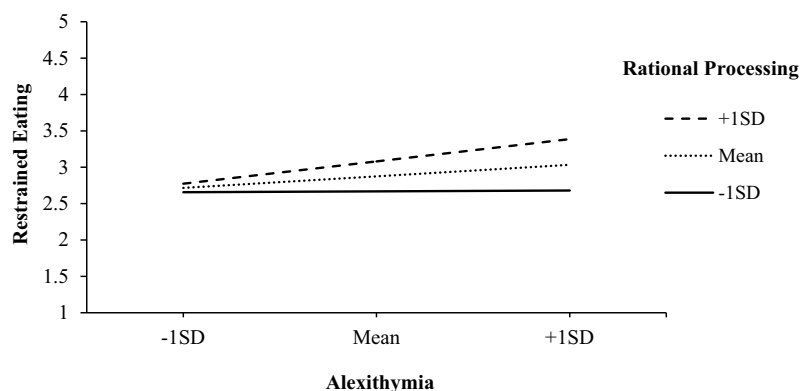


Table 4. Conditional indirect effect of family functioning on restrained eating through alexithymia, contingent to rational processing

	Restrained Eating		
	B	(SE)	95% CIs
Path a(family functioning to alexithymia)	-4.109	(1.341)	-6.757, -1.461
Path c'(direct path, family functioning to DEB)	-0.146	(0.105)	-0.354, 0.062
Path b1 x b2(interaction of alexithymia to DEB by rational processing)	0.002	(0.001)	0.000, 0.003
Path c(indirect path, family functioning to DEB) for:			
-1 SD rational processing	-0.004	(0.035)	-0.073, 0.071
M rational processing	-0.056	(0.036)	-0.140, -0.001
+1 SD rational processing	-0.107	(0.058)	-0.240, -0.018

Note.bs are unstandardized regression coefficients. Confidence intervals (CIs) and standard errors (SE) are bootstrapped estimates (N = 10,000). The term DEB implies restrained eating in this table.

functioning, alexithymia, and rational processing as potential precursors. Rational processing, for example, may have greater relevance as a predictor of behaviors in cases of abstinence (Epstein, 2014).

For restrained eating, the influences of family functioning and alexithymia on DEB were appropriately presented as a mediation, with family functioning negatively related to DEB through alexithymia. Importantly, at low levels of rational processing, family functioning had no indirect effect. Its influence only occurred at or above the Mean. These indirect effects were small, although this is typical for broad predictor variables applied to a non-specific sample (Aiken & West, 1991). This relationship indicated that for restrained eating, considering family functioning and alexithymia as independent in their association with DEB is not accurate. That is, family functioning had no direct effect on restrained eating once alexithymia was accounted for.

The effect of rational processing on the relationship between alexithymia and restrained eating, and therefore the mediation model, occurred in an unexpected direction. The pathway became stronger at higher levels of rational processing. This suggests that rational processing may impact differentially on specific DEBs. For example, it is of note that emotional and external eating are

considered “disinhibited” (impulsive eating in response to stimuli or emotions; Elfhag & Morey, 2008; Wardle, 1987). Conversely, restrained eating is “inhibited”, referring to more systematic, controlled behaviors (Van Strien et al., 1986). Importantly, individuals high in rational processing are typically characterized by a strong sense of self-control, direction, and conscientiousness (Epstein, 2014). It may be that instead of playing a protective role, a greater preference for rational processing demonstrates how restrictive eating becomes a preferred coping response when uncomfortable and uncontrollable emotional states arise (e.g., high alexithymia). Restrained eating behavior could allow a need for control to be satisfied.

In summary, the current findings suggest how a detail-focused thinking style may interact with emotional deficits, in turn modifying eating behaviour. The findings provide initial support for the importance of considering processing style alongside more traditional familial and emotional predictors of eating behaviours, evidence which does have potential implications for future prevention initiatives. This should be interpreted with caution however, as these relationships may not be related to clinical outcomes such as those achieved using the Maudsley model (Schmidt et al., 2014). The relevance of our findings to this intervention is further expanded below.

Finally, while only a moderate amount of variance in restrained eating was explained by the total model, and the interaction between rational processing and alexithymia explained little of this, it should be noted that moderation effects are typically small in social science research, with 1–3% of variance common (Champoux & Peters, 1987; Chaplin, 1991), allowing the obtained interaction to still be considered meaningful. One reason for low variance explained is the often multitude of factors involved in a phenomenon such as eating behavior. It must be noted that while this study has attempted to disentangle the interactions among a unique combination of constructs, there is a proliferation of potentially confounding factors in the DEB literature. While beyond the scope of the current study, future work may look to consider potential covariates beyond age and BMI, with two key candidates being depression and socioeconomic status (Gan et al., 2011).

8.1. Limitations and future research

An important caveat to the interpretation of this study is its cross-sectional design. While plausible theoretical foundations were established for all paths tested, reverse causation cannot be discounted. For example, high alexithymia may affect family functioning, with poor emotional awareness and communication influencing how conflicts are discussed and resolved. Further, DEB could result in current or retrospective negative biases toward how the family unit is perceived or how the individual feels they are treated. Woodside et al. (1995) found that child perceptions of family conflict reduced alongside treatment for DEB, while parental perceptions remained stable.

Additionally, the specific operationalization of family functioning appears to be an important consideration. Beyond general family functioning, as measured in this study, measures of abuse and neglect (Hund & Espelage, 2006; Minnich et al., 2017) and family cohesion (Mazzeo et al., 2008) have proven predictive of DEB. Indeed, in the bivariate analyses presented general family functioning was not significantly associated with rational processing, external eating, or restrained eating. This could further explain the small size of the negative indirect effects reported. To address these issues, future research could employ an objective measure or measures of family functioning, assessing different levels of severity, within a prospective design.

Age may impact upon the relevance of certain predictors of DEB. With increasing age and independent living arrangements, the family environment may become less relevant, or it may be that time away leads to more opportunity to reflect on family interactions. Additionally, males may present with a quite different pattern of relationships. Minnich et al. (2017) found an indirect effect of childhood neglect on DEB through alexithymia to occur for women but not for men.

It is important to acknowledge the available sample which comprised a relatively young non-clinical group of women. Not only are there potentially gender-specific nuances but the role of

rational processing may be expressed differently in a clinical population, where a relationship between alexithymia and emotional eating has previously been shown (Pinaquy et al., 2003). The restrictions of the sample in terms of being mainly comprised of university students who were opportunistically recruited also needs to be acknowledged. Finally, the relatively small size of the sample may have contributed to the lack of significant findings for external and emotional eating due to insufficient statistical power. Generalizing the obtained results may therefore be inappropriate and future research should consider specific applications of the tested model using a range of cohorts.

8.2. Implications for practice

Incorporating rational processing into established treatment models may lead to more efficient and tailored treatments. For example, models that include deficits in emotional functioning. This may include the Maudsley model of anorexia treatment in adults (Schmidt et al., 2014) that proposes the maintenance of anorexia nervosa by four factors: a rigid, detail focused processing style, socioemotional impairments, favorable beliefs about anorexia nervosa, and enabling or accommodating behaviors of close contacts. Specifically, results may provide insight into the interactive role a detailed processing style has on emotional impairments and its link with eating behavior. The functional model of emotional avoidance in anorexia nervosa (Wildes et al., 2010), positing that emotional avoidance mediates a relationship between depressive and anxiety symptoms and eating disorders, may also be informed by an enabling role of a rational processing style in this pathway. Lastly, Neumark-Sztainer et al. (2003) suggest that family connectedness and peer weight norms influence personal factors such as psychological wellbeing and health attitudes, which in turn play a role in unhealthy weight control behaviors. A consideration of processing style may provide insight into the key areas of psychological wellbeing that lead to these behaviors.

9. Conclusion

While the hypothesized protective function of rational processing in the family functioning to alexithymia to DEB relationship was not supported, preliminary evidence was offered that rational processing may still be important when understanding inhibited forms of DEB. Greater rational processing increased, rather than weakened, the strength of the mediated relationship. Targeting emotional functioning to reduce this inhibited form of DEB is not likely useful when rational processing is low.

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References

- Ackard, D. M., Neumark-Sztainer, D., Story, M., & Perry, C. (2006). Parent-child connectedness and behavioral and emotional health among adolescents. *American Journal of Preventive Medicine*, 30(1), 59–66. <https://doi.org/10.1016/j.amepre.2005.09.013>
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- Bagby, R. M., Parker, J. D., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale-I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research*, 38(1), 23–32. [https://doi.org/10.1016/0022-3999\(94\)90005-1](https://doi.org/10.1016/0022-3999(94)90005-1)
- Cassels, M., van Harmelen, A. L., Neufeld, S., Goodyer, I., Jones, P. B., & Wilkinson, P. (2018). Poor family functioning mediates the link between childhood adversity and adolescent nonsuicidal self-injury. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 59(8), 881–887. <https://doi.org/10.1111/jcpp.12866>
- Champoux, J. E., & Peters, W. S. (1987). Form, effect size and power in moderated regression analysis. *Journal of Occupational Psychology*, 60(3), 243–255. <https://doi.org/10.1111/j.2044-8325.1987.tb00257.x>
- Chaplin, W. F. (1991). The next generation of moderator research in personality psychology. *Journal of Personality*, 59(2), 143–178. <https://doi.org/10.1111/j.1467-6494.1991.tb00772.x>

- Croll, J., Neumark-Sztainer, D., Story, M., & Ireland, M. (2002). Prevalence and risk and protective factors related to disordered eating behaviors among adolescents: Relationship to gender and ethnicity. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 31(2), 166–175. [https://doi.org/10.1016/S1054-139X\(02\)00368-3](https://doi.org/10.1016/S1054-139X(02)00368-3)
- Cromley, T., Neumark-Sztainer, D., Story, M., & Boutelle, K. N. (2010). Parent and family associations with weight-related behaviors and cognitions among overweight adolescents. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 47(3), 263–269. <https://doi.org/10.1016/j.jadohealth.2010.02.009>
- Eggert, J., Levendosky, A., & Klump, K. (2007). Relationships among attachment styles, personality characteristics, and disordered eating. *The International Journal of Eating Disorders*, 40(2), 149–155. <https://doi.org/10.1002/eat.20351>
- Elfhag, K., & Morey, L. C. (2008). Personality traits and eating behavior in the obese: Poor self-control in emotional and external eating but personality assets in restrained eating. *Eating Behaviors*, 9(3), 285–293. <https://doi.org/10.1016/j.eatbeh.2007.10.003>
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster family assessment device. *Journal of Marital and Family Therapy*, 9(2), 171–180. <https://doi.org/10.1111/j.1752-0606.1983.tb01497.x>
- Epstein, N. B., Bishop, D. S., & Levin, S. (1978). The McMaster model of family functioning. *Journal of Marital and Family Therapy*, 4(4), 19–31. <https://doi.org/10.1111/j.1752-0606.1978.tb00537.x>
- Epstein, S. (2003). Cognitive experiential self theory of personality. In T. Millon & M. J. Lerner (Eds.), *Handbook of psychology: Vol. 5. Personality and social psychology* (pp. 159–184). Wiley.
- Epstein, S. (2014). *Cognitive-experiential theory: An integrative theory of personality*. Oxford University Press.
- Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. *Journal of Personality and Social Psychology*, 71(2), 390–405. <https://doi.org/10.1037/0022-3514.71.2.390>
- Gan, W. Y., Mohd Nasir, M. T., Mohd Shariff, Z., & Hazizi, A. S. (2011). Disordered eating behaviors, depression, anxiety and stress among Malaysian university students. *College Student Journal*, 45(2), 296–309. <http://psasir.upm.edu.my/id/eprint/24653>
- Gatta, M., Balottin, L., Mannarini, S., Chesani, G., Del Col, L., Spoto, A., & Battistella, P. A. (2017). Familial factors relating to alexithymic traits in adolescents with psychiatric disorders. *The Clinical Psychologist*, 21(3), 252–262. <https://doi.org/10.1111/cp.12098>
- Handley, S. J., Newstead, S. E., & Wright, H. (2000). Rational and experiential thinking: A study of the REI. In R. J. Riding & S. G. Rayner (Eds.), *International perspectives on individual differences* (Vol. 1, pp. 97–113). Ablex Publishing.
- Hanna, A. C., & Bond, M. J. (2006). Relationships between family conflict, perceived maternal verbal messages, and daughters' disturbed eating symptomatology. *Appetite*, 47(2), 205–211. <https://doi.org/10.1016/j.appet.2006.02.013>
- Hay, P. J., Mond, J., Buttner, P., & Darby, A. (2008). Eating disorder behaviors are increasing: Findings from two sequential community surveys in South Australia. *PLoS ONE*, 3(2), e1541. <https://doi.org/10.1371/journal.pone.0001541>
- Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.) Guilford Press.
- Herpertz-Dahlmann, B., Wille, N., Hölling, H., Vloet, T. D., & Ravens-Sieberer, U. (2008). Disordered eating behaviour and attitudes, associated psychopathology and health-related quality of life: Results of the BELLA study. *European Child & Adolescent Psychiatry*, 17(S1), 82–91. <https://doi.org/10.1007/s00787-008-1009-9>
- Hund, A. R., & Espelage, D. L. (2006). Childhood emotional abuse and disordered eating among undergraduate females: Mediating influence of alexithymia and distress. *Child Abuse & Neglect*, 30(4), 393–407. <https://doi.org/10.1016/j.chiabu.2005.11.003>
- Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin*, 130(1), 19–65. <https://doi.org/10.1037/0033-2909.130.1.19>
- Kärkkäinen, U., Mustelin, L., Raevuori, A., Kaprio, J., & Keski-Rahkonen, A. (2018). Do disordered eating behaviours have long-term health-related consequences? *European Eating Disorders Review: the Journal of the Eating Disorders Association*, 26(1), 22–28. <https://doi.org/10.1002/erv.2568>
- Karukivi, M., Hautala, L., Korpelainen, J., Haapasalo-Pesu, K.-M., Liuksila, P.-R., Joukamaa, M., & Saarijärvi, S. (2010). Alexithymia and eating disorder symptoms in adolescents. *Eating Disorders*, 18(3), 226–238. <https://doi.org/10.1080/10640261003719518>
- Kench, S., & Irwin, H. J. (2000). Alexithymia and childhood family environment. *Journal of Clinical Psychology*, 56(6), 737–745. [https://doi.org/10.1002/\(SICI\)1097-4679\(200006\)56:6<737::AID-JCLP4>3.0.CO;2-U](https://doi.org/10.1002/(SICI)1097-4679(200006)56:6<737::AID-JCLP4>3.0.CO;2-U)
- King, J. L., & Mallinckrodt, B. (2000). Family environment and alexithymia in clients and non-clients. *Psychotherapy Research: Journal of the Society for Psychotherapy Research*, 10(1), 78–86. <https://doi.org/10.1080/10713663595>
- Larsen, J. K., van Strien, T., Eisinga, R., & Engels, R. C. (2006). Gender differences in the association between alexithymia and emotional eating in obese individuals. *Journal of Psychosomatic Research*, 60(3), 237–243. <https://doi.org/10.1016/j.jpsychores.2005.07.006>
- Lunner, K., Werthem, E. H., Thompson, J. K., Paxton, S. J., McDonald, F., & Halvaarson, K. S. (2000). A cross-cultural examination of weight-related teasing, body image, and eating disturbance in Swedish and Australian samples. *The International Journal of Eating Disorders*, 28(4), 430–435. [https://doi.org/10.1002/1098-108X\(200012\)28:4<430::AID-EAT11>3.0.CO;2-Y](https://doi.org/10.1002/1098-108X(200012)28:4<430::AID-EAT11>3.0.CO;2-Y)
- Mazzeo, S. E., Mitchell, K. S., & Williams, L. J. (2008). Anxiety, alexithymia, and depression as mediators of the association between childhood abuse and eating disordered behavior in African American and European American women. *Psychology of Women Quarterly*, 32(3), 267–280. <https://doi.org/10.1111/j.1471-6402.2008.00435.x>
- McVey, G. L., Pepler, D., Davis, R., Flett, G. L., & Abdoell, M. (2002). Risk and protective factors associated with disordered eating during early adolescence. *The Journal of Early Adolescence*, 22(1), 75–95. <https://doi.org/10.1177/0272431602022001004>
- Miller-Day, M., & Marks, J. D. (2006). Perceptions of parental communication orientation, perfectionism, and disordered eating behaviors of sons and daughters. *Health Communication*, 19(2), 153–163. https://doi.org/10.1207/s15327027hc1902_7
- Minnich, A. M., Gordon, K. H., Kwan, M. Y., & Troop-Gordon, W. (2017). Examining the mediating role of alexithymia in the association between childhood neglect and disordered eating behaviors in men and

- women. *Psychology of Men & Masculinity*, 18(4), 414–421. <https://doi.org/10.1037/men0000060>
- Mitchison, D., Hay, P., Slewa-Younan, S., & Mond, J. (2014). The changing demographic profile of eating disorder behaviors in the community. *BMC Public Health*, 14(1), 943. <https://doi.org/10.1186/1471-2458-14-943>
- Neumark-Sztainer, D., Wall, M., Haines, J., Story, M., Sherwood, N., & van den Berg, P. (2007). Shared risk and protective factors for overweight and disordered eating in adolescents. *American Journal of Preventive Medicine*, 33(5), 359–369. <https://doi.org/10.1016/j.amepre.2007.07.031>
- Neumark-Sztainer, D., Wall, M., Larson, N., Eisenberg, M., & Loth, K. (2011). Dieting and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Journal of the American Dietetic Association*, 111(7), 1004–1011. <https://doi.org/10.1016/j.jada.2011.04.012>
- Neumark-Sztainer, D., Wall, M., Story, M., & Perry, C. (2003). Correlates of unhealthy weight-control behaviors among adolescents: Implications for prevention programs. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 22(1), 88–98. <https://doi.org/10.1037/0278-6133.22.1.88>
- Norris, P., & Epstein, S. (2002). The investigation of some fundamental issues concerning rational-analytical and intuitive-experiential thinking styles with a short form of the rational-experiential inventory. Unpublished manuscript. Department of Psychology, University of Massachusetts at Amherst.
- Ouwens, M. A., van Strien, T., & van Leeuwe, J. F. (2009). Possible pathways between depression, emotional and external eating. A structural equation model. *Appetite*, 53(2), 245–248. <https://doi.org/10.1016/j.appet.2009.06.001>
- Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology*, 76(6), 972–987. <https://doi.org/10.1037/0022-3514.76.6.972>
- Pearson, C. M., Miller, J., Ackard, D. M., Loth, K. A., Wall, M. M., Haynos, A. F., & Neumark-Sztainer, D. (2017). Stability and change in patterns of eating disorder symptoms from adolescence to young adulthood. *The International Journal of Eating Disorders*, 50(7), 748–757. <https://doi.org/10.1002/eat.22692>
- Pinaquy, S., Chabrol, H., Simon, C., Louvet, J. P., & Barbe, P. (2003). Emotional eating, alexithymia, and binge-eating disorder in obese women. *Obesity Research*, 11(2), 195–201. <https://doi.org/10.1038/oby.2003.31>
- Pisetsky, E. M., May, C. Y., Dierker, L. C., May, A. M., & Striegel-Moore, R. H. (2008). Disordered eating and substance use in high-school students: Results from the youth risk behavior surveillance system. *The International Journal of Eating Disorders*, 41(5), 464–470. <https://doi.org/10.1002/eat.20520>
- Quick, V. M., Byrd-Bredbenner, C., & Neumark-Sztainer, D. (2013). Chronic illness and disordered eating: A discussion of the literature. *Advances in Nutrition*, 4(3), 277–286. <https://doi.org/10.3945/an.112.003608>
- Ricciardelli, L. A., & McCabe, M. P. (2004). A biopsychosocial model of disordered eating and the pursuit of muscularity in adolescent boys. *Psychological Bulletin*, 130(2), 179–205. <https://doi.org/10.1037/0033-2909.130.2.179>
- Ridout, N., Thom, C., & Wallis, D. J. (2010). Emotion recognition and alexithymia in females with non-clinical disordered eating. *Eating Behaviors*, 11(1), 1–5. <https://doi.org/10.1016/j.eatbeh.2009.07.008>
- Schmidt, U., Wade, T. D., & Treasure, J. (2014). The Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA): Development, key features, and preliminary evidence. *Journal of Cognitive Psychotherapy*, 28(1), 48–71. <https://doi.org/10.1891/0889-8391.28.1.48>
- Sim, L., & Zeman, J. (2006). The contribution of emotion regulation to body dissatisfaction and disordered eating in early adolescent girls. *Journal of Youth and Adolescence*, 35(2), 207–216. <https://doi.org/10.1007/s10964-005-9003-8>
- Sladek, R. M., Bond, M. J., & Phillips, P. A. (2010). Age and gender differences in preferences for rational and experiential thinking. *Personality and Individual Differences*, 49(8), 907–911. <https://doi.org/10.1016/j.paid.2010.07.028>
- Taylor, G. J. (1994). The alexithymia construct: Conceptualization, validation, and relationship with basic dimensions of personality. *New Trends in Experimental & Clinical Psychiatry*, 2(10), 67–74.
- Taylor, G. J., Bagby, R. M., & Parker, J. D. (1997). *Disorders of affect regulation: Alexithymia in medical and psychiatric illness*. Cambridge University Press.
- Turner, H. M., Rose, K. S., & Cooper, M. J. (2005). Parental bonding and eating disorder symptoms in adolescents: The meditating role of core beliefs. *Eating Behaviors*, 6(2), 113–118. <https://doi.org/10.1016/j.eatbeh.2004.08.010>
- Van Strien, T., Frijters, J. E., Bergers, G., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *The International Journal of Eating Disorders*, 5(2), 295–315. [https://doi.org/10.1002/1098-108X\(198602\)5:2<295::AID-EAT2260050209>3.0.CO;2-T](https://doi.org/10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T)
- Walker, M., Thornton, L., De Choudhury, M., Teevan, J., Bulik, C. M., Levinson, C. A., & Zerwas, S. (2015). Facebook use and disordered eating in college-aged women. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 57(2), 157–163. <https://doi.org/10.1016/j.jadohealth.2015.04.026>
- Wardle, J. (1987). Eating style: A validation study of the Dutch Eating Behaviour Questionnaire in normal subjects and women with eating disorders. *Journal of Psychosomatic Research*, 31(2), 161–169. [https://doi.org/10.1016/0022-3999\(87\)90072-9](https://doi.org/10.1016/0022-3999(87)90072-9)
- Westwood, H., Kerr-Gaffney, J., Stahl, D., & Tchanturia, K. (2017). Alexithymia in eating disorders: Systematic review and meta-analyses of studies using the Toronto Alexithymia Scale. *Journal of Psychosomatic Research*, 99, 66–81. <https://doi.org/10.1016/j.jpsychores.2017.06.007>
- Wildes, J. E., Ringham, R. M., & Marcus, M. D. (2010). Emotion avoidance in patients with anorexia nervosa: Initial test of a functional model. *The International Journal of Eating Disorders*, 43(5), 398–404. <https://doi.org/10.1002/eat.20730>
- Woodside, D. B., Shekter-Wolfson, L. F., Garfinkel, P. E., & Olmsted, M. P. (1995). Family interactions in bulimia nervosa II: Complex intrafamily comparisons and clinical significance. *The International Journal of Eating Disorders*, 17(2), 117–126. [https://doi.org/10.1002/1098-108X\(199503\)17:2<117::AID-EAT2260170203>3.0.CO;2-H](https://doi.org/10.1002/1098-108X(199503)17:2<117::AID-EAT2260170203>3.0.CO;2-H)



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