Motives for Eating Among Individuals Seeking Treatment for Weight-Related Behaviors: The Role of Distress Tolerance

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Abstract

Objective: Obesity is a prevalent public health concern, with greater attention needed to understand motivational processes that may guide health behaviors associated with obesity-related behaviors, including maladaptive eating. Distress tolerance is a key vulnerability factor in maladaptive eating, including overeating. However, more research is needed to understand motives for eating as well as the role of distress tolerance within this context. Participants: Participants included 161 adults (61.5% female, M_{age} = 31.4 years, SD = 10.47) who attended a baseline appointment for a larger randomized-controlled trial for an anxiety sensitivity reduction intervention for weight-related behaviors. Methods: The current study examined the role of distress tolerance in relation to emotional, external, and restrained eating motives for eating using three separate two-step hierarchical regression analyses. Results: Results suggested that lower distress tolerance was associated with greater emotional and external motives for eating. Distress tolerance was not significantly related to restrained eating. Conclusions: The present findings suggest the potential clinical utility of distress tolerance in terms of understanding the motivational basis of eating among individuals with obesity.

Keywords: obesity, distress tolerance, eating motives

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Introduction

Obesity is a prevalent individual and public health concern in the United States (US) with approximately 42.5% of the adult population in the US meeting criteria for obesity (Fryar et al., 2021) with that number expected to rise to 50% by 2030 (Finkelstein et al., 2012). Obesity is associated with a number of negative health consequences (e.g., cancer, heart disease; Centers for Disease Control and Prevention, 2024; Shetye, 2021) as well as increased financial burden (Kim & Basu, 2016). In an effort to improve obesity outcomes, individuals are often advised to engage in lifestyle modifications such as adopting a healthy eating plan and increasing physical activity (Wadden et al., 2020). Although these interventions have shown to be efficacious for some (Wilfley et al., 2018), such approaches neglect to address the psychological component that is often seen as a barrier to effective weight management, particularly related to maladaptive eating (Rand et al., 2017).

One construct that has been consistently related to maladaptive eating is distress tolerance (Mattingley et al., 2022). Distress tolerance refers to one's perceived or objective ability to withstand psychological or physiological states (Simons & Gaher, 2005). Existing theoretical work suggest that distress tolerance is regulated by multiple neurobiological processes that can be

targeted and modified by environmental, biological, and genetic factors (Trafton & Gifford, 2011). Extant work has found the inability to tolerate distress is associated with a number of maladaptive health behaviors (e.g., smoking; Leyro et al., 2010), including eating (Mattingley et al., 2022). For instance, lower distress tolerance is associated with various types of overeating (Kozak et al., 2017; Kozak & Fought, 2011) and elevated body mass index (BMI; Koball et al., 2016). Additionally, individuals who engage in binge eating have demonstrated greater difficulties with tolerating distress (Eichen et al., 2017). Regarding motives related to eating behavior, research among adults has found that interventions aimed to improve distress tolerance have resulted in favorable outcomes related to emotional eating (Frayn et al., 2020).

In the context of obesity and distress tolerance, it is important to consider what role or function (i.e., motives) eating may serve for individuals. Various motives for eating may include emotional (i.e., eating in response to negative affect such as boredom, anger, and fear), external (i.e., eating due to the sight or smell of food), and restrained (i.e., reduced eating to control weight; Van Strien et al., 1986). Past work has documented the role of various motives for eating and found that higher levels of emotional eating is associated with the consumption of more energy-dense foods, higher BMI, and higher body fat percentage (Konttinen, 2020). Previous research has also found high levels of external eating to be associated with higher intake of energy dense foods (Anschutz et al., 2009; Lluch et al., 2000) and elevated BMI (Elfhag & Morey, 2008; Ouwens et al., 2009), whereas high restrained eating is associated with less energy, fat, and carbohydrate intake measured via total kilocalories consumed daily (Anschutz et al., 2009; Lluch et al., 2000). Given the link between the various

motives related to eating and obesity-related processes, additional work is needed to further clarify factors that may drive these motivations, including distress tolerance.

Theoretically, lower distress tolerance may contribute to maladaptive motives related to eating (Forman et al., 2009; Frayn et al., 2020). For example, among individuals with obesity, lower distress tolerance may increase motives to eat to alleviate distress associated with various mood states (i.e., emotional eating) or food-related cues (i.e., external eating; e.g., presence of food). Moreover, individuals with lower distress tolerance may be more likely to struggle with restrained eating (e.g., reduced caloric intake to control weight) in an attempt to gain a sense of control. However, this type of behavior is often associated with greater binge eating frequency (Elran-Barak et al., 2015). Notably, a paucity of work has empirically evaluated distress tolerance in terms emotional, external, and restrained eating more broadly, or among individuals seeking treatment for weight-related concerns, specifically.

In the current study, the relationship between distress tolerance and sub-facets of motives related to eating among individuals seeking treatment for weight-related behaviors was examined. It was hypothesized that lower tolerance for distress would be associated with greater emotional, external, and restrained eating. It was also hypothesized that these associations would be evident after accounting for theoretically relevant covariates, including gender (Fragkos & Frangos, 2013; Walcott et al., 2003), race/ethnicity (Bucchianeri et al., 2016; Marques et al., 2011), BMI (Hayaki & Free, 2016), and anxiety sensitivity (i.e., fears of the potentially harmful consequences of anxiety-related sensations, a construct that is related but distinct from distress tolerance; Bernstein et al., 2009; Kauffman et al., 2021; Reiss & McNally, 1985).

Methods

Participants

Participants were 161 adults (61.5% female, M_{age} = 31.39, SD = 10.47) who attended a baseline appointment for a larger randomized-controlled trial for an anxiety sensitivity reduction intervention for weight-related behaviors (see Kauffman et al., 2022). Participants were invited to the baseline assessment based on meeting the following eligibility criteria at prescreen: being 18 years of age or older, current obesity status (i.e., BMI ≥ 30 calculated based on self-reported height and weight), and endorsing a score of 17 or higher on the Anxiety-Sensitivity Index-3 (ASI-3; Taylor et al., 2007). Participants were excluded from the study if they reported any upcoming legal matters that would have prevented them from completing the entirety of the study or not being fluent in English. Eligibility criteria were re-assessed at the baseline assessment, albeit the current study includes participant data from all participants who completed the baseline assessment, regardless of their eligibility for the larger trial. The racial/ethnic makeup of the sample was as follows: 61.5% White, 18.6% Black or African American, 9.3% Asian, 1.2% Native American/Alaskan Native, and 9.3% Other. Out of the total sample, 24.2% identified as Hispanic or Latino.

Measures

Demographics. Participants completed a brief demographic questionnaire to assess study eligibility criteria and to provide further characteristics of the sample (e.g., gender, race, and ethnicity).

Body Mass Index. Participants' self-reported height and weight was collected to calculate BMI according to the World Health Organization's recommended formula (i.e., [weight (pounds)]/[height (inches)]^2 x 703).

Anxiety Sensitivity. The Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007) was used to assess participants' fear of anxiety-related symptoms. The ASI-3 is an 18-item self-report measure of physical, cognitive, and social concerns related to anxiety symptoms. An example item is, "It is important for me not to appear nervous." Each item is rated on a 5-point Likert scale ranging from 0 (*Very little*) to 4 (*Very much*). Items are summed to create a total score, with higher scores representing higher anxiety sensitivity (possible range = 0-72). The ASI-3 has demonstrated good psychometric properties in past work (Jardin et al., 2018; Taylor et al., 2007). In the current study, internal consistency of the ASI-3 was excellent (α = .90).

Eating Behaviors. The Dutch Eating Behavior Questionnaire (DEBQ; Van Strien et al., 1986) is a 33-item self-report assessment of maladaptive eating behaviors. The DEBQ is comprised of three scales for restrained eating (e.g., "Do you watch exactly what you eat?"), emotional eating (e.g., "Do you have a desire to eat when you are frightened?"), and external eating (e.g., "Can you resist eating delicious foods?"). Participants respond to each item from a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Very often*). Each subscale is averaged to create a mean score (possible range for each subscale = 1-5), with higher scores indicative of greater restrained, emotional, and external eating. The DEBQ scales have demonstrated excellent internal consistency in past work (Van Strien et al., 1986). In the current study, the restrained, emotional, and external eating scales demonstrated good to excellent internal consistency (i.e., α's = .84-.94).

Distress Tolerance. Participants' capacity to tolerate distress was assessed with the 15-item Distress Tolerance Scale (DTS; Simons & Gaher, 2005). This self-report measure asks participants to rate each item on a 5-

point Likert-type scale ranging from 1 (*Strongly agree*) to 5 (*Strongly disagree*). An example item from this scale is, "Feeling distressed or upset is unbearable to me." Item subscales are averaged to create a mean score, with higher scores representing higher tolerance for distress (possible range = 1-5). In past work, the DTS has demonstrated good internal consistency, validity, and test-retest reliability (Simons & Gaher, 2005). The DTS total score exhibited excellent internal consistency in the current study (α = .92).

Procedures

This study was reviewed by and received approval from the Institutional Review Board from where the study took place. Participants were recruited nationally in the United States via multiple recruitment methods (e.g., posting flyers on local university campuses, local community health centers, Craigslist, Facebook, etc.). Online recruitment efforts consisted of advertisements for an online intervention targeted at people who experience stress and struggle with their weight. Participants were informed the intervention was designed to help them understand the relationship between anxiety sensitivity [stress] and health and how managing anxiety sensitivity [stress] may improve their health, particularly behaviors associated with their weight (e.g., emotional eating, exercise avoidance). Informed consent was obtained from each participant prior to engaging in study procedures. To establish initial eligibility, participants completed a brief pre-screen questionnaire. Eligible participants at the pre-screen survey were invited to complete a baseline assessment that included mental health (e.g., distress tolerance) and health behavior (e.g., motives for eating) assessments of interests. Participants were compensated $10 for completing this portion of the trial. Further details on the study procedures of larger randomized-controlled trial can be found elsewhere (see Kauffman et al., 2022).

Data analysis

Analyses for the current study were computed with SPSS version 28.0. A total of 163 participants completed the baseline assessment. Of those individuals, 161 participants provided complete data on the constructs of interest and were utilized in the current analysis (please see Kauffman et al., 2022 for the full consort table of the larger trial). First, descriptive statistics and zero-order correlations among study variables were evaluated. Next, three separate two-step hierarchical regression analyses were conducted to examine the association between distress tolerance and each of the three criterion variables: (1) emotional eating, (2) external eating, and (3) restrained eating. Step 1 of each model included covariates of gender (0 = male and 1 = female), race/ethnicity (0 = Non-Latinx White, 1 = All other race/ethnicities), BMI, and anxiety sensitivity. Distress tolerance was added to step 2 of each model. Model fit was evaluated with the F statistic. Change in R^2 and squared semi-partial correlations (sr^2) were used as a measure of effect size interpreted as .01 = small, .09 = moderate, and .25 = large (Cohen, 1988).

Results

Descriptive Statistics and Correlations

Zero-order correlations and descriptive statistics are displayed in Table 1. Distress tolerance was statistically significant and negatively associated with anxiety sensitivity, emotional eating, and external eating.

Table 1

Zero-Correlations among Study Variables

Variable	Mean/n (SD/%)	1	2	3	4	5	6	7	8
1. Gender	99 (61.5%)	-							
2. Race/Ethnicity	79 (48.5%)	-.087	-						
3. BMI	37.42 (6.01)	-.046	-.055	-					
4. Anxiety Sensitivity	41.57 (13.90)	-.017	-.101	-.092	-				
5. Distress Tolerance	2.48 (0.86)	-.046	.020	.046	-.417***	-			
6. DEBQ – Emotional Eating	3.54 (0.93)	.138	-.038	-.024	.255**	-.402***	-		
7. DEBQ – External Eating	3.67 (0.65)	.050	.011	-.053	.244**	-.461***	.688***	-	
8. DEBQ – Restrained Eating	2.89 (0.85)	.168*	-.012	-.023	.023	-.036	.107	.156*	-

Note. ***$p < .001$, **$p < .01$, and *$p < .05$. Gender: % listed as females (Coded: 0 = male and 1 = female); Race/Ethnicity: % listed as non-Latinx White (Coded: 0 = non-Latinx White and 1 = racial/ethnic minority).

Regression Analyses

Hierarchical regression results are presented in Table 2. Regarding emotional eating, step 1 of the model with covariates only was statistically significant ($R^2 = .09$, $F(4, 156) = 3.64$, $p = .007$). Anxiety sensitivity was a statistically significant predictor of emotional eating. In step 2 of the model, distress tolerance was added, and the model remained significant ($R^2 = .19$, $F(5, 155) = 7.08$, $p < .001$) and accounted for a statistically significant increase in variance explained ($\Delta R^2 = .10$, $F(1, 155) = 19.15$, $p < .001$). Distress tolerance was a statistically significant predictor.

Step 1 of the model with external eating was statistically significant ($R^2 = .07$, $F(4, 156) = 2.70$, $p = .033$). Anxiety sensitivity was a statistically significant predictor of external eating. The model remained significant when distress tolerance was added in step 2 ($R^2 = .22$, $F(5, 155) = 8.66$, $p < .001$) and accounted for a statistically significant increase in variance explained ($\Delta R^2 = .15$, $F(1, 155) = 30.47$, $p < .001$). Distress tolerance was a statistically significant predictor.

For restrained eating, step 1 of the model was not statistically significant ($R^2 = .03$, $F(4, 156) = 1.16$, $p = .329$). The model was not statistically significant when distress tolerance was added in step 2 ($R^2 = .03$, $F(5, 155) = 0.94$, $p = .459$) and did not account for a statistically significant increase in variance explained ($\Delta R^2 < .001$, $F(1, 155) = 0.06$, $p = .810$).

Discussion

The present study examined the relationship between distress tolerance and motives for eating among adults seeking treatment for weight-related behaviors. The results of this study indicated that lower distress tolerance was associated with greater emotional and external eating. These findings are broadly in line with past work focused on distress-tolerance motives for eating relations (Forman et al., 2009; Frayn et al., 2020). Moreover, the current relations were medium to large (sr^2 range = .10-.15). Contrary to our

Table 2
Hierarchical Regression Results

					Emotional Eating				
Model		b	SE	β	t	p	CI (l)	CI (u)	sr²
1	Gender	0.27	0.15	0.14	1.86	.065	-0.02	0.56	.020
	Race/Ethnicity	0.00	0.14	0.00	0.01	.992	-0.28	0.29	< .001
	BMI	0.00	0.01	0.01	0.09	.931	-0.02	0.03	< .001
	Anxiety Sensitivity	0.02	0.01	0.26	3.34	.001	0.01	0.03	.066
2	Gender	0.24	0.14	0.12	1.69	.093	-0.04	0.51	.015
	Race/Ethnicity	-0.02	0.14	-0.01	-0.12	.907	-0.28	0.25	< .001
	BMI	0.00	0.01	0.01	0.11	.915	-0.02	0.02	< .001
	Anxiety Sensitivity	0.01	0.01	0.11	1.38	.169	-0.00	0.02	.010
	Distress Tolerance	-0.38	0.09	-0.35	-4.38	< .001	-0.55	-0.21	.100
					External Eating				
Model		b	SE	β	t	p	CI (l)	CI (u)	sr²
1	Gender	0.08	0.10	0.06	0.73	.467	-0.13	0.28	.003
	Race/Ethnicity	0.05	0.10	0.04	0.51	.612	-0.15	0.25	.002
	BMI	-0.00	0.01	-0.03	-0.32	.749	-0.02	0.01	.001
	Anxiety Sensitivity	0.01	0.00	0.25	3.15	.002	0.00	0.02	.060
2	Gender	0.04	0.10	0.03	0.46	.647	-0.15	0.23	.001
	Race/Ethnicity	0.04	0.09	0.03	0.39	.695	-0.15	0.22	.001
	BMI	-0.00	0.01	-0.02	-0.33	.742	-0.02	0.01	.001
	Anxiety Sensitivity	0.00	0.00	0.07	0.83	.411	-0.00	0.01	.003
	Distress Tolerance	-0.33	0.06	-0.43	-5.52	< .001	-0.45	-0.21	.154
					Restrained Eating				
Model		b	SE	β	t	p	CI (l)	CI (u)	sr²
1	Gender	0.29	0.14	0.17	2.12	.036	0.02	0.57	.028
	Race/Ethnicity	0.01	0.14	0.01	0.06	.951	-0.26	0.28	< .001
	BMI	-0.00	0.01	-0.01	-0.16	.871	-0.02	0.02	< .001
	Anxiety Sensitivity	0.00	0.01	0.03	0.31	.756	-0.01	0.01	.001
2	Gender	0.29	0.14	0.17	2.09	.038	0.02	0.57	.028
	Race/Ethnicity	0.01	0.14	0.00	0.05	.957	-0.26	0.28	< .001
	BMI	-0.00	0.01	-0.01	-0.16	.872	-0.02	0.02	< .001
	Anxiety Sensitivity	0.00	0.01	0.02	0.18	.856	-0.01	0.01	< .001
	Distress Tolerance	-0.02	0.09	-0.02	-0.24	.810	-0.19	0.15	< .001

Note. N for analyses is 161. Gender coded: 0 = male and 1 = female; Ethnic Minority Status coded: 0 = Non-Latinx White, 1 = All other race/ethnicities.

hypothesis, the relationship between distress tolerance and restrained eating was not significant. Thus, future work is needed to determine if experiencing lower tolerance for distress contributes to restrained eating among individuals seeking treatment for weight-related behaviors. Future research may also benefit in exploring moderation analysis to further disentangle the relationship between distress tolerance and restrained eating. For example, it may be beneficial to explore if restrained eating serves as a moderating factor in the relationship between distress tolerance and other eating motives (e.g., emotional, external).

It is important to note that the observed findings were evident after accounting for the role of a number of theoretically-relevant demographic covariates (e.g., gender) as well as another transdiagnostic process (i.e., anxiety sensitivity) frequently implicated in eating behaviors (Otto et al., 2016). Utilizing a multi-risk factor model of eating behavior, current findings provide a better understanding of motives for eating, with a focus on the pivotal role of distress tolerance. Indeed, distress tolerance emerged as the only significant predictor after accounting for anxiety sensitivity, even though the sample may have been biased towards anxiety sensitivity-eating motives through the selection criteria (i.e., individuals were selected for inclusion based on initial screening criteria for elevated anxiety sensitivity).

The findings from this study suggest the clinical importance of distress tolerance in relation to motives for eating, particularly emotional and external eating. As such, screening for distress tolerance among individuals seeking treatment for weight-related behaviors may be useful in guiding case conceptualization. For example, individuals screening at low levels for distress tolerance may benefit from intervention strategies aimed to increase distress tolerance such as Dialectical Behavior Therapy (DBT) approaches (Braden et al., 2022). Such approaches may have clinical utility in building self-efficacy to manage a variety of motivational eating processes, which, in turn, may result in improved outcomes as it relates to weight-loss behaviors. Existing work has incorporated DBT components (e.g., mindfulness) to address emotional eating among individuals with overweight/obesity with initial success (Braden et al., 2022). Specifically, Braden et al. (2022) created a 16-week intervention (Live FREE: Freedom from Emotional Eating) for adults with self-reported emotional eating and overweight/obesity that targeted maladaptive eating via DBT skills training (sessions 1–9), followed by traditional weight management techniques (sessions 10–16). Results indicated improvements across a number of outcomes, including emotional eating and BMI. An additional therapeutic approach that may be beneficial for improving distress tolerance is Acceptance and Commitment Therapy (ACT) approaches (Vatanpanah et al., 2024). The goal of ACT is not to eliminate distress but instead work towards value-driven behavior in spite of such distress (Hayes & Strosahl, 2004). Previous work has implemented ACT protocols, including an eight-week group protocol of twice a week 90-minute sessions (Vatanpanah et al., 2024). Results indicated that individuals in the ACT intervention evidenced significant improvement with emotional eating. Promising ACT results for emotional eating have even been observed in more brief formats (e.g., 1-day workshops; Frayn et al., 2020). It is important to note that these studies examined emotional eating as an outcome, albeit less is known of the impact of these types of interventions for improving motives to eating in response to external cues. However, theoretically,

mindfulness-based approaches which are present in both DBT and ACT may help individuals become more presently aware of urges to eat in response to external cues and how to respond adaptively to such experiences. Given the findings from the current study, future work is needed to validate this proposed theory.

Limitations

The present study has several notable limitations. First, although the sample was rather diverse, the majority identified as female and White. As such, future studies may benefit from recruiting a more diverse group of participants as it relates to race/ethnicity and gender. Additionally, the sample consisted of individuals who were selected for elevated anxiety sensitivity at the pre-screen and were seeking treatment for weight-related behaviors. As such, future work would benefit from sampling from a more general population of individuals with obesity. Further, the current study utilized a cross-sectional design. Future longitudinal studies are needed to establish temporal precedence and directionality of the observed relations. Finally, primary study variables were assessed via self-report. Future work may be bolstered by utilizing both self-report and objective measures of distress tolerance (e.g., breath-holding task) and eating behaviors (e.g., mood-induction/food intake experimental paradigms).

Conclusion

The current results add a novel and meaningful perspective to literature on the role of distress tolerance and motives for eating among individuals seeking treatment for weight-related behaviors. Future research is needed to further explicate and validate the model, including the incorporation of longitudinal approaches. Moreover, future

work would benefit from extending findings to include measures of obesity. For example, it may be beneficial to explore the mediating role of emotional eating in the relationship between distress tolerance and obesity-related indicators (e.g., air displacement plethysmography).

Discussion Questions

What hypotheses do you have about why distress tolerance was not a statistically significant predictor of restrained eating in the present study?

What practical clinical implications do you think the findings from this study have on the treatment of overweight/obesity among individuals with low distress tolerance?

Data availability statement: The data that supports the findings of this study are available from the corresponding author, BYR, upon reasonable request.

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