Beliefs about the emotional consequences of eating and binge eating frequency

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Abstract

Emotions are implicated in the etiology and maintenance of binge eating (BE). It is largely unknown whether BE is more strongly tied to emotions for certain individuals. This study investigated whether beliefs about the function of eating moderate the relationship between positive and negative affect and the frequency of BE. A mixed eating disorder sample (n = 105) prospectively reported their weekly BE frequency and positive and negative affect for 12 weeks after completing the Eating Expectancy Inventory. Results indicated that holding the expectancy that eating helps to relieve negative affect prospectively predicts higher frequencies of BE, and holding the expectancy that eating is pleasurable and useful as a reward predicts lower frequencies. Further, increases in negative affect were associated with increases in BE, and increases in positive affect were associated with decreases in BE. Neither of the hypothesized relationships between affect and BE was moderated by expectancies. However, an interaction between negative and positive affect was found, indicating that only the combination of high positive and low negative affect is specifically related to reduced BE. Holding specific expectancies about the function of eating and fluctuations in both positive and negative affect appear to be associated with BE among individuals with eating disorders. Cognitive interventions should target eating-related expectancies that may maintain BE behavior.

1. Introduction

Binge eating is a prominent symptom in many eating disorder presentations (Fairburn et al., 2007), and it is prevalent in non-clinical populations as well, with nearly one-quarter of college students reporting binge eating during the prior month (Lavender, De Young, & Anderson, 2011; Luce, Crowther, & Pole, 2008). In addition, it is commonly associated with distress and impairment regarding its out of control nature and perceived weight-related consequences (Striegel, Bedrosian, Wang, & Schwartz, 2012).

A number of theorists have posited functions of binge eating that attempt to account for its regular occurrence in individuals who are generally aware of its undesirable consequences. Many of these models of binge eating suggest a pattern of negative reinforcement in which binge eating temporarily alleviates an emotionally aversive state, thereby increasing the likelihood of binge eating in the future under similar conditions. Perhaps the most well-known of these models, Heatherton and Baumeister’s (1991) escape theory of binge eating, states that the act of binge eating narrows one’s cognitive focus on food and the act of eating, thereby decreasing his or her self-awareness. The theory asserts that individuals are more likely to binge eat when they experience aversive states of self-awareness (e.g., the emotions entailed by negative affect such as guilt, sadness, and anxiety) from which they would like to escape. Escape theory does not explicitly state that binge eating is maintained through negative reinforcement (in fact, it implies that the aversive state of self-awareness may worsen following the binge), but because the theory suggests relief from the aversive state during binge eating, it is compatible with a negative reinforcement process.

Over the past two decades, a great deal of empirical support has accumulated for the relationship between binge eating and aversive emotional states, often described by the construct of general negative affect. In a 3- to 4-week diary study, Johnson, Schlundt, Barclay, Carr-Nangle, and Engler (1995) noted that binge eating was more likely to occur in the presence of increased negative affect than in its absence. Agras and Telch (1998) demonstrated that binge eating during a test meal is more likely to occur when individuals with binge eating disorder are distressed using an experimental mood induction. Stein et al. (2007) followed individuals with binge eating disorder for 7 days, asking them to report their moods and eating behavior via palm-top computers periodically throughout the day in a method known as ecological momentary assessment (EMA). They found that negative mood increased prior to binge eating. Smyth et al. (2007) found similar results in an EMA study of a large sample of women with bulimia nervosa followed over a period of 2 weeks, and Engel et al. (2010) recently replicated these findings in a group of women with anorexia nervosa followed over a period of 2 weeks.
nervosa. Thus, it is clear that binge eating is more likely to occur in the presence of negative affect than in its absence.

Positive affect, or the state of feeling enthusiastic, active, and alert, does not exist at the opposite end of the affective spectrum from negative affect (Watson, Clark, & Tellegen, 1988). In fact, Watson et al. suggest that they are two separate, orthogonal dimensions, such that an individual may have simultaneously high negative and low positive affect, experience high negative and positive affect, or any other combination. Positive affect is a putative consequence of many behaviors that are maintained through positive reinforcement (Lewinsohn & Graf, 1973). Although much research has focused on negative affect and binge eating, comparatively few studies have investigated the relationship between positive affect and binge eating. Among those that have, Johnson et al. (1995) noted that for a group of non-clinical binge eaters, binge eating episodes were associated with periods of heightened negative and positive affect. Specifically, they noted that some individuals appeared to binge eat when feeling particularly good, as if these eating episodes were celebratory. Additionally, in their detailed analysis of the timing of changes in affect and binge eating in women with bulimia nervosa, Smyth et al. (2007) found that positive affect decreased leading up to binge eating episodes and increased following them, consistent with a positive reinforcement process.

Little is known about person-level factors that influence sensitivity to the negative and positive reinforcement functions of binge eating. However, a recent analysis, combining an EMA study of women with anorexia nervosa with an EMA study of women with bulimia nervosa, found that individuals with bulimia nervosa experienced a larger decrease in guilt following binge episodes than individuals with anorexia nervosa (De Young et al., 2013). Further, individuals who tended to engage in self-induced vomiting within an hour following binge episodes, showed relatively stable levels of guilt following binge episodes, whereas individuals who tended not to engage in self-induced vomiting experienced a decrease in guilt. These findings suggest that binge eating may have different functions for different people.

Heterogeneity in the function of binge eating may complicate the interpretation of associations between affect and binge eating. For instance, searching for group level (i.e., mean) associations when binge eating may be used in an attempt to decrease negative affect on some occasions or for some individuals and be used to increase positive affect on other occasions or for other individuals may weaken the appearance of these relationships. Accounting for such heterogeneity may clarify the nature of the affect–binge eating link.

Eating expectancies are valuable constructs to evaluate for their potential to differentiate individuals by the functions of their binge eating. Expectancy theory states that expectancies are beliefs about the consequences of behavior that are the product of one's learning history (Hohlstein, Smith, & Atlas, 1998). For example, most people likely hold the expectancy that touching very hot objects with their bare hands. It follows that individuals who binge eat likely hold expectancies about the consequences of this behavior that predict their continued use of it, whether because they believe it brings them pleasure or diminishes their pain. Thus, expectancies regarding the consequences of binge eating might distinguish individuals whose binge eating is associated with negative affect and those whose binge eating is associated with positive affect.

Expectancy theory does not require that expectancies be correct (Jones, Corbin, & Fromme, 2001). As a result, expectancy theory has the potential to generate useful hypotheses about binge eating even if binge eating does not actually relieve discomfort or provide enjoyment. Thus, expectancy theory emphasizes individuals’ cognitions over the actual reinforcement value of their behaviors, focusing on understanding what individuals believe binge eating accomplishes rather than its actual effects.

As evidence of the importance of eating expectancies are studies demonstrating their predictive validity. In a 3-year longitudinal study, the expectancy that eating helps manage negative affect predicted the development of binge eating in adolescent girls (Smith, Simmons, Flory, Annus, & Hill, 2007). In a study of women with bulimia nervosa, the expectancy that eating is pleasurable and useful as a reward predicted a longer time to remission of binge eating (Bohon, Stice, & Burton, 2009). These studies illustrate that eating expectancies are implicated in both the development and maintenance of binge eating.

The purpose of the present study was to test whether eating expectancies distinguish individuals whose binge eating is associated with negative affect and those whose binge eating is associated with positive affect. There were two specific hypotheses. First, it was hypothesized that endorsing the expectancy that eating is negatively reinforcing (i.e., serves to manage negative affect) would moderate the relationship between binge eating and negative affect. Second, it was hypothesized that endorsing the expectancy that eating is positively reinforcing (i.e., eating is pleasurable) would moderate the relationship between binge eating and positive affect.

2. Method

2.1. Participants

Participants (n = 113) were women and men with eating disorders recruited from the community through internet postings and paper advertisements posted in a Northeastern city. Participants resided in 34 states and the District of Columbia. Three participants discontinued their participation before completing the first study procedure, and they are not included in any of the following descriptive information. Ninety-one (82.7%) of the participants were women. Participants' ages ranged from 18 to 62 years, with a mean (SD) of 32.68 (12.23) years and a median of 29.50 years. A total of 71.8% of participants identified their ethnicity as Caucasian, 9.1% as Asian/Pacific Islander, 8.2% as Black/African American, 7.3% as Hispanic, 0.9% as Native American, 1.8% indicated other/mixed, and 0.9% chose not to provide this information.

Participants met the following criteria to participate: (1) at least 18 years of age and (2) the presence of an eating disorder as indicated by at least one of the following: (a) body weight below a body mass index of 18 kg/m2 and undue influence of body weight or shape on self-evaluation, if cansensitive for this purpose (Anderson, De Young, & Walker, 2009). Two items on this measure assess body weight and shape disturbance. Participants were deemed to have satisfied the criterion of undue influence of weight or shape on self-evaluation, if they rated themselves at least a “4” on one of these 7-point scales. Two supplemental items were added to this scale for the present study to assess the magnitude of distress over the presence of purging behaviors and binge eating separately on a 7-point scale from “not at all distressed” to “extremely distressed”. Participants were deemed to have indicated marked distress regarding binge eating or purging if
they indicated that they were at least a “4” on one or both of these 7-point scales.

2.2.2. The Eating Expectancy Inventory (EEI; Hohlstein et al., 1998)

The EEI is a 34-item self-report questionnaire that assesses beliefs related to the effects and functions of food. Each item (e.g., eating makes me feel loved) is rated on a 7-point scale from “completely disagree” to “completely agree.” The items contribute to five scales including the following two used in the present study: Eating Helps Manage Negative Affect and Eating is Pleasurable and Useful as a Reward. Higher scores indicate endorsement of the expectancy. These scales demonstrated good internal consistency with Cronbach’s alphas at baseline equaling 0.96 for Eating Helps Manage Negative Affect and 0.89 for Eating is Pleasurable and Useful as a Reward.

2.2.3. Clinical Impairment Assessment (CIA; Bohn & Fairburn, 2008)

The CIA is a 16-item self-report measure of psychosocial impairment resulting from eating disorder symptoms over the previous 28 days and was included in the present study as an indication of eating disorder severity. Individuals rate items on a 4-point scale from “not at all” to “a lot,” and a single composite score is calculated that corresponds to the severity of impairment ranging from 0 to 48. Bohn and Fairburn reported that a cutoff score of 16 was best for identifying eating disorder status. For the baseline assessment in the present study, Cronbach’s alpha for the CIA was 0.94.

2.2.4. Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)

The PANAS assesses affect along two dimensions. Individuals rate the degree to which 20 affect-laden words describe how they have felt using a 5-point scale from “very slightly or not at all” to “extremely.” Participants completed the PANAS with instructions for how they have felt over “the past week” at each of twelve weekly assessments, which are instructions (and a time period) that have been validated by the test creators. Internal consistency for the PANAS at the twelve weekly assessments, as indicated by the average Cronbach’s alphas, was 0.95 for positive affect and 0.92 for negative affect.

2.2.5. Weekly Self-Monitoring Questionnaire (WSMQ)

Participants completed the WSMQ, which was developed for this study and assessed body weight in pounds and the frequency of binge eating, purging, fasting, and exercise. The wording of these items was very similar to how these behaviors are assessed by the EDDS.

2.3. Procedures

A total of 139 individuals interested in participating were screened over the telephone using the EDDS to determine eligibility. Those who were eligible and chose to enter the study completed a battery of self-report questionnaires via the internet, including the EEI and CIA, on three separate occasions that were each 6 weeks apart (i.e., baseline, 6-weeks, and 12-weeks). Participants also completed the WSMQ and the PANAS via the internet once each week during the entire 12-week study period. Participants were compensated with $5 for completion of the baseline questionnaires, $10 each for the two follow-up assessments, and $1.25 for each of the 12 weekly assessments for a total possible compensation of $40.

For the present study, participants were categorized into eating disorder groups that approximate those specified in the DSM-5 (APA, 2013), according to the criteria listed in Table 1. This was done in order to ensure that the sample represented eating disorders of clinical severity as described by the most recent edition of the DSM. Three participants were removed who would have met criteria for purging disorder but whose purging frequency was below 1×/week, and five participants were removed who would have met criteria for bulimia nervosa — purging type but who did not endorse overvaluation of body weight or shape. After these eight participants were removed, the resulting sample included 105 individuals at baseline. Participants fell in the following groups: (n = 7; 6.8%) anorexia nervosa, restricting type (ANr), (n = 10; 9.8%) anorexia nervosa, binge eating/purging type; (BNp) = bulimia nervosa, binge eating/purging type; (BED) = binge eating disorder; and (PD) = purging disorder. Asterisks indicate that either binge eating, purging, or both were required for that diagnosis.

2.4. Data analysis

The study hypotheses were evaluated using generalized estimating equations (GEE), which include both random and fixed effects. Fixed effects test for the relationship between variables of interest, and random effects estimate variation attributable to sampling error (Singer & Willett, 2003). The advantages of using this analysis over other techniques that can analyze repeated outcomes are that GEE can accommodate individuals who have a different number of repeated measures and model within individual correlations that are expected in this type of data. In addition, distributions for count data, which are analyzed in the present study, can be specified.

The number of binge eating episodes per week reported via the WSMQ (measured repeatedly over 12 weeks) served as the dependent outcome variable. Binge eating episodes represent a count variable that is not normally distributed. As such, the GEE were fit using a negative binomial distribution. The independent variables were weekly negative and positive affect as assessed by the PANAS, the Eating Helps Manage Negative Affect and Eating is Pleasurable and Useful as a Reward subscales of the EEI assessed at baseline, and all six two-way interactions.

Positive and negative affect scores were centered around each individual’s mean positive and negative affect ratings, respectively, so that high and low affect were relative to each individual and not absolute across individuals. This was done to evaluate how changes in individuals’ levels of affect are related to changes in their binge eating. In other words, a high affect score indicates affect that is high for that person and not high for the sample and likewise for low scores. EEI subscale scores were centered on the grand mean, such that high and low scores reflect individuals who hold those expectancies strongly or weakly compared to their peers in the study.

Models included a random intercept (allowing individuals to vary about their own average number of weekly binge eating episodes), and fixed effects to assess for main effects of affect, expectancies, and the interactions of these variables. In addition, week of participation (i.e., time) was specified as a repeated measure and fit using an autoregressive covariance structure. Parameters in the models were evaluated with statistical significance set at p < .05. Missing data were assumed to be missing at random (MAR; see Singer & Willett, 2003; p. 158).

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Table 1
Diagnostic scheme.

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>BMI &lt; 18 kg/m²</th>
<th>Binge eating ≥ 1×/week</th>
<th>Purging ≥ 1×/week</th>
<th>Undue influence of weight/shape</th>
<th>Distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANr</td>
<td>Required</td>
<td>—</td>
<td>—</td>
<td>Required</td>
<td>Optional</td>
</tr>
<tr>
<td>ANbp</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>BNp</td>
<td>—</td>
<td>Required</td>
<td>Required</td>
<td>Optional</td>
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</tr>
<tr>
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<td>—</td>
<td>Required</td>
<td>Required</td>
<td>Optional</td>
<td>Required</td>
</tr>
</tbody>
</table>

Note: ANr = anorexia nervosa, restricting type; ANbp = anorexia nervosa, binge eating/purging type; BNp = bulimia nervosa, binge eating/purging type; BED = binge eating disorder; and PD = purging disorder. Cells reading “required” indicate that the feature must have been present but was not required for the diagnosis; and cells reading “—” indicate that the feature must have been absent for that diagnosis. Asterisks indicate that either binge eating, purging, or both were required for that diagnosis.
3. Results

With respect to the severity of psychosocial impairment resulting from eating disorder symptoms in this sample, participants scored a mean (SD) of 28.71 (12.07) on the CIA at baseline. The mean (SD) body mass index of the individuals with anorexia nervosa as reported via the EDDS was 16.75 (0.89) kg/m². The mean binge eating and purging episodes per week across diagnoses as measured by the EDDS were 5.98 (±6.91; range = 0–33) and 4.99 (±7.59; range = 0–35), respectively.

Of the 105 individuals included in the present study, 94 (89.5%) completed at least 1 week of the WSMQ. The mean number of WSMQ’s completed was 9.53 (±4.17), with 61.9% of participants completing all 12 weekly assessments and an additional 8.6% completing 11 of the 12. As a result there were 997 total weekly reports of binge eating episodes and affect. The baseline means for the EEI Eating Helps to Manage Negative Affect and Eating is Pleasurable and Useful as a Reward subscales were 76.66 (±31.64; range = 18–126) and 25.60 (±10.75; range = 6–42) prior to centering, and they were significantly correlated (r = .58, n = 103, p < .001) with one another.

The main analyses in the study rest upon the assumption that individuals experienced variability in their negative and positive affect. The means for the PANAS negative and positive affect scales were 26.49 (±10.57; range = 10–50) and 28.44 (±10.54; range = 10–50), respectively. The average individual standard deviations for negative and positive affect (i.e., the average amount by which each individual varied around his/her personal mean affect ratings) were 4.30 and 2.65, respectively. The average individual standard deviations for negative and positive affect (i.e., the average amount by which each individual varied around his/her personal mean affect ratings) were 4.30 and 2.65, respectively.

The results of the GEE are depicted in Fig. 1. Despite the moderately strong correlation between the negative and positive eating expectancy scales in their raw form, after centering, conditional indices did not indicate the presence of collinearity in the model (Cheng, Edwards, Maldonado-Molina, Komro, & Muller, 2010). Regarding the first study hypothesis, that the EEI Eating Helps Manage Negative Affect subscale would moderate the relationship between negative affect and binge eating episodes, the results indicated the presence of a significant main effect of positive affect (Wald $X^2$ = 9.74; $df$ = 1; $p = .002$) and expectancies (Wald $X^2$ = 6.86; $df$ = 1; $p = .009$), but the affect by expectancy interaction (Wald $X^2$ = 0.02; $df$ = 1; $p = .886$) was not present while controlling for all other independent variables. The results suggest that, during weeks that individuals experience higher than usual positive affect, they report fewer binge eating episodes, and individuals who hold stronger expectancies about food being pleasurable and useful as a reward report fewer binge eating episodes than individuals who do not hold this expectancy (Fig. 1B).

Four additional two-way interactions were tested for which there were no a priori hypotheses. The results indicated the presence of a negative affect by positive affect interaction (Wald $X^2$ = 5.96; $df$ = 1; $p = .015$). This interaction suggests that binge eating episodes occurred less frequently only during weeks that were characterized by high positive and low negative affect (Fig. 1C). The negative affect by Eating is Pleasurable and Useful as a Reward expectancy (Wald $X^2$ = 0.48; $df$ = 1; $p = .487$), Eating Helps to Relieve Negative Affect expectancy by Eating is Pleasurable and Useful as a Reward expectancy (Wald $X^2$ = 1.08; $df$ = 1; $p = .299$), and the positive affect by Eating Helps to Relieve Negative Affect expectancy (Wald $X^2$ = 1.38; $df$ = 1; $p = .240$) interactions were not statistically significant.

It is conceivable that the nature of this mixed eating disorder diagnosis sample could have accounted for the main effects observed between affect and binge eating episodes and expectancies and binge eating episodes. More specifically, as described in Table 1, both individuals with ANr and PD denied the occurrence of binge eating episodes at the baseline assessment. If they also endorsed expectancies less strongly than individuals who reported binge eating episodes, diagnosis rather than expectancies may explain this pattern of findings.

Fig. 1. These graphs display the number of binge eating episodes per week (WSMQ) as a function of negative (EEI Neg Aff: Eating Helps to Relieve Negative Affect) and positive (EEI Pleas/Rew: Eating is Pleasurable and Useful as a Reward) eating expectancies and negative and positive affect.
To address this possibility, individuals with ANr or PD (n = 13 with weekly data) were removed from the sample and the analysis was re-run. The pattern of statistically significant results was unchanged and strengths of relationships were very similar. Additionally, to confirm that a lack of variability in binge eating episodes among a subset of participants was not responsible for the findings, individuals who never reported a binge episode during the 12 weeks of the study (n = 9) were removed from the sample and the analysis was re-run. Again, the pattern of statistically significant results was unchanged and strengths of relationships were very similar.¹

4. Discussion

The results of this study provide further evidence of the utility of eating expectancies for understanding individual differences in the frequency of binge eating episodes. Consistent with previous research (e.g., Smith et al., 2007), endorsing the expectancy that eating helps relieve negative affect was predictive of a greater frequency of binge eating. This study extends such findings through the use of a diverse, mixed eating disorder sample and by identifying the unique relationships between affect, eating expectancies, and binge eating episodes while controlling for other types of affect and eating expectancies. In doing so, the results reveal a number of important findings.

First, although individuals who held the expectancy that eating helps to relieve negative affect also tended to hold the expectancy that eating is pleasurable and useful as a reward, these two expectancies divergently predicted the frequency of binge eating while controlling for each other. In other words, holding the expectancy that eating helps to relieve negative affect appears to put individuals with eating disorders at risk of binge eating more frequently than their peers who do not hold this expectancy. However, holding the expectancy that eating is pleasurable and useful as a reward appears to protect individuals with eating disorders from more frequent binge eating episodes in comparison to their peers who do not hold this expectancy.

Second, negative and positive affect were associated with the frequency of binge eating episodes in the expected direction; however, an unanticipated interaction emerged between them. Interestingly, fewer binge eating episodes were reported by individuals in this study only during weeks characterized by lower-than-usual negative affect and higher-than-usual positive affect. Although the size of this effect is relatively small (i.e., a difference of approximately one binge eating episode per week), a great deal of research has focused on the relationship between negative affect and binge eating episodes that has not also included positive affect. The results of this study provide further evidence of the independence of these constructs (e.g., Watson et al., 1988) with respect to binge eating and represent an important consideration for future research.

Finally, the results of this study did not support the hypotheses that eating expectancies would moderate the relationships between affect and binge eating frequency. Instead, the nature of the combination of these effects appears to be additive. Regardless of the extent to which individuals endorsed the expectancy that eating helps to relieve negative affect, they experienced similar increases in their binge eating frequency with higher-than-usual negative affect. This finding may indicate that individuals are unaware of their expectancies surrounding eating during specific emotional states (i.e., individuals may state that they eat in response to negative affect but do not do so consistently). It is also possible that expectancies fluctuate with experience to an extent that their predictive value across 12 weeks is limited, although the largest effect observed was for the negative affect eating expectancy, which was an especially strong predictor of binge eating and seems to rule out the possibility that expectancies are not trait-like. One final possibility is that the level of measurement obscured the relationship between affect and binge eating. Binge eating episodes may have been precipitated by heightened negative affect, and they may even have been initiated in order to reduce negative affect. However, if they were effective, and negative affect was reduced, it is not entirely clear how individuals derived their estimates of their negative affect for the week to reflect these changes. The error associated with these estimates may have clouded an interactive relationship between expectancies and affect, which future studies better equipped to assess the timing of these events should aim to address.

The additive effects of expectancies and affect were also observed for positive affect and the expectancy that eating is pleasurable and useful as a reward, except in this case, holding this expectancy appeared to be equally protective regardless of the level of positive affect experienced. Interestingly, this finding appears inconsistent with the findings of Bohon et al. (2009) who found that the expectancy that eating is pleasurable and useful as a reward predicted a longer time to remission of binge eating in bulimia nervosa. Rather than being irreconcilable, it is possible that this eating expectancy is associated with less frequent binge eating episodes in the short-term but greater difficulty with reducing binge eating in the long run. Future research should aim to identify whether and how this belief interferes with treatment processes and the remission of binge eating.

The lack of the hypothesized interaction effects in this study may be interpreted as consistent with a lack of correspondence between beliefs about the consequences of eating and the actual consequences of eating. For instance, if it was the case that eating is pleasurable and useful as a reward for some individuals, it is reasonable to assume that they would report more binge eating episodes alongside more positive affect than would individuals who do not hold this expectancy; however, this was not the case. Expectancy theory posits that expectancies are a product of one’s learning history (Hohlstein et al., 1998) but it does not require that they are correct. Thus, it is possible that many individuals with eating disorders form expectancies based upon the function of eating during a time when they are not engaged in pathological eating behaviors. As the disordered eating processes emerge, the function of eating may change (e.g., although eating once relieved negative affect, it later worsens negative affect due to fears of weight gain that have since emerged). However, if the individual does not reassess and modify her expectancies in light of the changing contingencies of her behavior, she may continue to engage in behavior that no longer functions as it once did.

If individuals’ eating expectancies are accurate, treatment approaches may be improved by assessing these expectancies and fostering the development of alternative methods of affect regulation, like those included in dialectical behavior therapy (DBT; Safer, Telch, & Chen, 2009). If their expectancies are inaccurate, individuals may benefit from challenging their expectancies, through self-monitoring and hypothesis-testing behavioral experiments. Such challenges to inaccurate expectancies could sever the maintenance capacity of these beliefs and are becoming increasingly popular treatment techniques for a wide variety of problems (Bennett-Levy et al., 2004) including being used in treatments for eating disorders (Cooper, Whitehead, & Boughton, 2004).

This study adds to the existing research on the importance of eating expectancies in understanding the continued presence of binge eating. However, these results must be interpreted alongside limitations, including the diagnostic heterogeneity of this sample. Although the intention of this study was to identify relationships between affect, expectancies, and binge eating that cut across eating disorder diagnoses, it remains possible that differences between eating disorder diagnoses are partly responsible for the results obtained. Future studies, adequately powered for this purpose, should test whether these relationships vary across eating disorder diagnoses.

A second limitation involves the assessment of binge eating. Wording that closely resembles that used in a number of validated

¹ Detailed results are available from the first author upon request.
self-report measures of binge eating was used to assess binge eating in this study. Nevertheless, research indicates that self-reported binge eating may be more reliant on the experience of a loss of control than having eaten an objectively large amount of food (Telch, Pratt, & Niego, 1998). Thus, it is possible that not all reported instances of binge eating by participants reflect binge eating episodes as described in this study. Additionally, individuals participated via the internet. Thus, the location from which they completed assessments was not controlled, and it is unknown what impact, if any, this may have had on the data collected.

Finally, the design of this study is correlational. As such, the temporal order of weekly affect and binge eating frequencies cannot be determined. For instance, it cannot be known with certainty whether heightened negative affect preceded the occurrence of binge eating episodes during weeks when both were rated as high, whether negative affect followed these binge eating episodes, or whether they were both driven by other factors. Further, this study cannot address the accuracy of individuals’ eating expectancies.

Future research should explicate the nature of these relationships among individuals with different eating expectancies using EMA and experimental designs, which will disentangle antecedents from consequences and provide information regarding the accuracy of eating expectancies. Future studies should also experimentally manipulate affect in individuals with varying eating expectancies under conditions in which these individuals could engage in binge eating, which would clarify the nature of causal relationships. In addition, EMA studies should measure eating expectancies and evaluate the extent to which individuals’ expectancies align with the reality of their affect changes surrounding binge eating episodes. Further knowledge of eating expectancies may prove beneficial for understanding heterogeneity in affect changes prior to and following binge episodes.

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Contributors
Kyle De Young and Drew Anderson designed the study. Kyle De Young conducted the statistical analysis. Kyle De Young and Mary Zander wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of interest
All other authors declare that they have no conflicts of interest.

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