



## Initial test of an emotional avoidance model of restriction in anorexia nervosa using ecological momentary assessment



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### ABSTRACT

It has been hypothesized that restrictive eating allows individuals with anorexia nervosa (AN) to avoid contact with negative emotions; however, this presumption has not been directly tested. In this study, we conducted an initial investigation examining whether restrictive eating serves an emotional avoidance function among individuals with AN. Females with AN ( $n = 118$ ) reported on negative and positive affect, anxiety/tension, and eating behaviors at multiple time points daily over a 2-week period using ecological momentary assessment methodology. Affective patterns were compared using generalized estimating equation models between days in which participants reported either: (1) relatively high restriction (without binge eating); (2) relatively low restriction (without binge eating); (3) binge eating; or (4) no restriction or binge eating. We hypothesized that, if restriction were functioning to avoid negative affect, average negative affect and anxiety/tension, as well as average negative and positive affect lability, would be lower and average positive affect would be higher on days characterized by high levels of restriction compared to other eating patterns. Contrary to hypotheses: (1) average negative affect, anxiety/tension, and positive affect were not significantly different between days characterized by high restriction and those characterized by low or no restriction; (2) Negative affect and anxiety/tension lability were higher on days characterized by high restriction compared to no restriction or binge eating days; (3) Anxiety/tension lability was higher on days characterized by high versus low levels of restriction. This patterns of findings does not support an avoidance model of restrictive eating for individuals with AN.

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Anorexia nervosa (AN) is a serious disorder associated with significant physical and psychological morbidity and elevated mortality rates (Braun et al., 1994; Crow et al., 2009; Mitchell and Crow, 2006). Despite recent empirical advancements, the psychological processes involved in the development and maintenance of AN are poorly understood and effective interventions for AN are lacking (Berkman et al., 2006). To improve treatment, a better understanding of the psychological processes linked to the disorder's etiology and maintenance is needed.

Emotion regulation etiological models have been receiving increasing attention in AN. Such models posit that individuals with AN experience deficits in the ability to effectively modulate emotional experiences and therefore rely on disordered eating behavior, such as dietary restriction, to alter emotional experiences (Haynos and Fruzzetti, 2011). While some models suggest that disordered eating behaviors, such as restrictive eating, serve primarily to escape existing aversive emotional experiences (Kaye et al., 2003), others emphasize avoidance, suggesting that behaviors such as restriction are performed to prevent the occurrence of uncomfortable emotional experiences (Wildes et al., 2010). Both escape and avoidance emotion regulation models share the assumption that affective difficulties are functionally associated

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with disordered eating among individuals with AN. In line with such models, studies have found that individuals with AN display elevated difficulties with emotion regulation (Haynos and Fruzzetti, 2011), which do not remit with weight restoration (Haynos et al., 2014), and predict long-term persistence of eating disorder symptoms (Racine and Wildes, 2014).

Several studies have also found evidence suggesting a functional link between emotional states and restrictive eating specifically in AN. One study found pre-meal anxiety to significantly correlate with caloric intake during a laboratory test meal among weight-restored individuals with AN, such that higher pre-meal anxiety was associated with reduced intake (Steinglass et al., 2010). Studies using ecological momentary assessment (EMA), an assessment methodology that allows tracking of mood and eating behavior in real time and naturalistic settings, have found that: (a) higher negative and lower positive affect on one day predicts restriction on the subsequent day (Engel et al., 2013); and (b) changes in affect and anxiety throughout the day are significantly associated with greater likelihood of restrictive eating episodes (Engel et al., 2005; Lavender et al., 2013a, 2013b). Though information is limited regarding the affective consequences of restriction, these studies suggest that affect is in some way functionally associated with restrictive eating.

However, other studies have reported conflicting findings regarding the associations between affect and restriction. One EMA study found that levels of negative affect co-occurring with restrictive episodes were equivalent to or lesser than other eating episodes (Goldschmidt et al., 2014), which potentially conflicts with an emotion regulation model, suggesting that affect is unrelated to restriction. However, because temporal relationships were not examined in this analysis, this finding could also reflect attenuation of negative affect following restriction. In another analysis, the relationship between affect and restrictive eating behavior varied according to the methodology used to examine affect changes (Engel et al., 2013). When examining affective changes using pre- and post-ratings, negative affect significantly decreased from immediately before to immediately after participants reported drinking fluids to curb appetite. However, when examining affective changes based upon multiple mood ratings in the hours prior to and following drinking fluids to curb appetite, no significant changes in negative affect were detected before or after the behavior. Finally, in an experimental study, individuals with AN did not consume significantly less at a single-item meal following a negative mood induction compared to a neutral mood induction (Wildes et al., 2012). These studies challenge the idea that increases in negative affect and/or decreases in positive affect serve as antecedents for restrictive eating and that decreases in negative affect and/or increases in positive affect serve as maintaining consequences of restriction.

It is possible that these mixed findings can be explained by restriction, unlike other disordered eating behaviors (e.g., binge eating), following an avoidance, rather than escape, affective pattern. An emotional escape pattern, in which increasing negative affect precedes a behavior and a reduction in negative affect follows the behavior, is the most frequently examined affect pattern when assessing an emotion regulation function of a behavior. However, when an individual engages in avoidance behavior, there should be little affective change directly before or after the behavior because the behavior prevents the occurrence of affect. This pattern has been observed in animal models; overt signs of anxiety dissipate with repeated trials in which an organism is taught to initiate avoidance behavior quickly after exposure to a feared stimulus (Solomon and Wynne, 1954). Therefore, if restriction in AN serves the function of emotional avoidance, as opposed to escape, this may

account for the mixed findings regarding affective experiences before and after restrictive eating.

An avoidance function has been noted for other chronic psychological concerns (Borkovec et al., 2004; Solomon and Wynne, 1954) and several researchers have theorized that restrictive eating serves an avoidance function for individuals with AN (Schmidt and Treasure, 2006; Wildes et al., 2010). There are empirical findings supporting this hypothesis. Individuals with AN are more likely than individuals without an eating disorder to report avoiding challenging emotional experiences (Oldershaw et al., 2012; Wildes et al., 2010). Further, restriction in AN tends to be more continuous than discrete, paralleling findings from animal models that avoidance responses need to be performed nearly continuously following an emotional cue in order to maintain emotional equilibrium (Solomon and Wynne, 1954). Finally, the marked persistence of restrictive eating in AN (Walsh, 2013) corresponds with basic findings suggesting that avoidance behaviors are particularly resistant to extinction (Solomon and Wynne, 1954).

In this study, we conducted an initial investigation examining whether restrictive eating serves an avoidance function among individuals with AN. We examined patterns of negative affect, positive affect, and affect lability on days characterized by relatively high levels of dietary restriction (without binge eating) compared to: (1) days in which restrictive eating occurred less frequently (without binge eating); (2) days characterized by binge eating; and (3) days in which both restriction and binge eating were not endorsed. Consistent with the hypothetical avoidance function of restrictive eating in AN, it was predicted that days characterized by relatively high levels of restriction, as compared to days characterized by other eating patterns, would demonstrate: (1) lower average levels of negative affect and anxiety/tension and higher levels of positive affect; and (2) less lability in negative affect, positive affect, and anxiety/tension. These results were hypothesized because it would be expected that frequent and/or pronounced restriction would allow participants to avoid experiencing difficult affective experiences, and thereby maintain stability of overall more positive affect levels.

## 1. Methods

### 1.1. Participants

Participants were 118 females meeting criteria for threshold or sub-threshold AN (restricting or binge-purge type). Eligibility criteria mandated that participants be  $\geq 18$  years old and meet Diagnostic and Statistical Manual of Mental Disorders 4th Edition (DSM-IV) (American Psychiatric Association, 2013) criteria for AN or criteria for sub-threshold AN by meeting all DSM-IV criteria for AN with the following exceptions: (1) body mass index (BMI) of 17.6–18.5 kg/m<sup>2</sup>, or (2) not meeting either the amenorrhea or body image disturbance and intense fear of weight gain criteria. In prior examinations of these data, it was found that full- and sub-threshold AN participants did not differ significantly on most baseline measures of eating disorder pathology and comorbid psychological concerns (Le Grange et al., 2013).

### 1.2. Assessments

#### 1.2.1. Baseline assessment

The Structured Clinical Interview for DSM-IV Axis-I Disorders, Patient Edition (SCID-I/P) (First et al., 1995) is a semi-structured interview to assess Axis-I psychiatric disorders. The SCID-I/P was used to determine DSM-IV diagnostic criteria for full- and sub-threshold AN. Interviews were recorded and a second

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