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Tests of an extension of the dual pathway model of bulimic symptoms to the state-based level

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ABSTRACT

The dual pathway model proposes that trait body dissatisfaction leads to bulimic symptoms via two distinct pathways: dieting and trait negative affect. As many of these modelled variables have state-based equivalents, the present study evaluated the generalisability of this model to predict associations between state body dissatisfaction and instances of disordered eating. 124 women aged 18 to 40 years completed an online survey (accessed via a mobile phone device with web access) over a 7-day period. The mobile phone device prompted participants at random intervals seven times daily to self-report their state body dissatisfaction, current mood experiences, dieting attempts, and disordered eating practices. Multi-level mediation modelling revealed that both negative mood states and dieting significantly mediated the state body dissatisfaction–disordered eating relationships, although the strength of these associations depended on the aspect of disordered eating measured and individual differences in trait body dissatisfaction, internalization of appearance standards, tendency towards dieting, and BMI. Collectively, these results not only support adapting the dual pathway model to the state-level, but also suggest that several of the model implied pathways may be more relevant for individuals with more pathological eating- and body-related concerns and behaviours.

Dissatisfaction with one's appearance is consistently shown to predict both onset and maintenance of bulimic symptomatology (i.e., over-valuation of body shape and weight, binge eating episodes, and inappropriate compensatory behaviours) (Stice, 2001; Stice & Shaw, 2002). One of the most common explanations for this association is the dual pathway model (Stice, 2001), which states that body dissatisfaction exerts influence on bulimic symptomatology via two separate pathways. First, it is proposed that body dissatisfaction prompts chronic and intense states of negative affect, which are resolved through distraction and/or comfort through food consumption. Alternatively, intentional efforts to restrict food intake for purposes of weight loss (dieting) may lead to increased focus on food and appearance, bouts of binge eating, and dietary restraint (differentiated from dieting in its designation as the tendency to oscillate between overeating and periods of dieting).

There is a wealth of cross-sectional and prospective studies supporting the dual pathway model (Ouwens, van Strien, van Leeuwe, & van der Staak, 2009; Stice, 2001; Stice & Agras, 1998; van Strien, Engels, van Leeuwe, & Snoek, 2005). These studies show that body dissatisfaction, dieting, and depressed mood precede BN onset (Stice & Shaw, 2002), and that without also treating body dissatisfaction, intervention-prompted cessation of bulimic symptoms tends to be short-lived (Jarry & Ip, 2005).

Although much of this earlier work has investigated processes that unfold gradually (over periods of months or years), and which predict an aggregate variable of bulimic symptoms, the dual pathway model may also generalise to a state-based level, predictive of *instances* of specific bulimic symptoms. For example, negative mood states may trigger an episode of comfort eating or even binge eating in an attempt to alleviate these aversive feelings. These state-based associations are supported by experience sampling and experimental studies that have demonstrated temporary increases in body dissatisfaction (i.e., state body dissatisfaction) are predictive of negative mood, dieting efforts, and disordered eating behaviours (Barker, Williams, & Galambos, 2006; Colautti et al., 2011; Lattimore & Hutchinson, 2010). Negative mood states and dieting efforts have also been shown to predict subsequent engagement in disordered eating episodes (Hilbert & Tuschen-Caffier, 2007; Stein et al., 2007; Zunker et al., 2011).

Despite these accumulated findings, to our knowledge, no studies have tracked the full sequence of state-based associations from state body dissatisfaction to disordered eating outcome in real time. As a consequence, key questions remain unanswered, such as whether the dual pathway model generalises to a state-level, and to specific disordered eating outcomes (rather than an aggregate), and which of the proposed

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mediators more strongly accounts for the association between state body dissatisfaction and disordered eating.

The overall aim of the present study was to rectify this, utilising the experience sampling methodology (ESM), which captures state-based variables repeatedly over a short period of time (in this study, up to 7 times per day over a period of one week) to determine whether dieting and/or negative mood can explain the relationship between state body dissatisfaction and the following disordered eating symptoms: (1) comfort eating, (2) unusually large portion of food, (3) rapid food consumption, (4) eating despite not being hungry, (5) eating until being uncomfortably full, (6) eating alone, and (7) feeling guilt or shame after the meal. Symptoms 1 and 2 were included to determine the motive for food consumption (symptom 1) and whether the amount consumed was atypical (symptom 2), whereas symptoms 3–7 were chosen because of their demonstrated correspondence with the loss of control characteristic of binge eating, as specified in the DSM (White & Grilo, 2011). Because of the potential for the mediators to have different effects on the chosen disordered eating symptoms, these symptoms were modelled separately instead of as an aggregate.

An important secondary aim of the present study was to evaluate the robustness of the mediational model across different subgroups of participants. This secondary aim was tested by regressing the mediation effects onto key trait-level individual difference factors thought to facilitate the state body dissatisfaction–disordered eating relationship, namely, trait body dissatisfaction, internalization of appearance standards, eating pathology, and BMI.

1. Method

1.1. Participants

A total of 124 women volunteered to participate in the current study, and had an age range of 18 to 40 years ($M = 24.72$, $SD = 4.15$). Just over a third of participants had a Bachelor's degree (38.4%) and most were working either full or part time in addition to studying (75.0%). Self-reported body mass indices (BMI = kg/m^2) ranged from 16.38 to 38.99 ($M = 23.96$, $SD = 4.19$). National Institute of Health (NIH, 1998) guidelines were applied to interpret body mass index (BMI) scores: 3% ($n = 4$) of this sample was "underweight" (BMI < 18.5), 63% ($n = 78$) was "normal weight" (BMI 18.5–24.9), 28% ($n = 35$) was "overweight" (BMI 25.0–29.9), and 6% ($n = 7$) was "obese" (BMI ≥ 30.0).

1.2. Materials

1.2.1. Trait measures (Phase 1)

1.2.1.1. Demographics. This questionnaire obtained information concerning the participants' age, height, weight, education level, and employment status.

1.2.1.2. Internalization of appearance standards. The 9-item internalization-general subscale of the Sociocultural Attitudes Towards Appearance Questionnaire—Version 3 (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) was used to assess the degree to which participants endorse and accept cultural ideals of physical appearance (e.g., "I would like my body to look like the models who appear in magazines."). Items were rated on a 5-point Likert scale from 1 (*definitely disagree*) to 5 (*definitely agree*). This subscale has been shown to be reliable and valid (Thompson et al., 2004). Cronbach's alpha in the current study for internalization-general scores was .89.

1.2.1.3. Trait body dissatisfaction. The Body Image Satisfaction subscale of the Body Change Inventory (BCI; Ricciardelli & McCabe, 2002) is a 10-item measure used to assess trait body satisfaction. Respondents indicated on a 5-point Likert scale how satisfied they were with their chest, abdominal region, shoulders, arms, hips, thighs, stomach, weight, shape, and muscles. Response choices ranged from 0 (*very unhappy*) to 4 (*very happy*). Item responses were summed and subtracted from 40 so that higher total scores indicated greater body dissatisfaction. Scores on the body satisfaction subscale have demonstrated concurrent validity with other key measures of body concerns, the Stunkard's Figure Body Drawings and the Body Dissatisfaction subscale of the Eating Disorders Inventory (Ricciardelli & McCabe, 2002). Cronbach's alpha in the present study was .89.

1.2.1.4. Dietary restraint. The restrained eating behaviour subscale of the Dutch Eating Behaviour Questionnaire (DEBQ; van Strien, Frijters, Berger, & Defares, 1986) was used to evaluate how often participants utilise different dietary restraint behaviours (e.g. "Do you try to eat less at meal times than you would like to eat?"). Items were rated on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*very often*), and averaged to form a single index of dietary restraint. The DEBQ has been shown to have good internal consistency and factorial validity (van Strien et al., 1986; Wardle, 1987). Cronbach's alpha for the current sample was .92.

1.2.2. State-based measures (Phase 2)

1.2.2.1. State-based body dissatisfaction. The Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) consists of six items designed to measure participant's momentary evaluative body image experiences at a given point in time. Participants rated their degree of satisfaction "right now at this very moment" in regard to the following domains of current body experience (1) physical appearance, (2) body size and shape, (3) weight, and (4) physical attractiveness. Furthermore, participants were asked to rate their current feelings regarding their looks relative to (5) how they typically felt, and (6) how the average person looks. Items were rated on a 9-point Likert scale ranging from 1 (*extremely dissatisfied*) to 9 (*extremely satisfied*). Scores for individual items were reverse coded and then summed together so that higher scores reflected greater state body dissatisfaction. The BISS has demonstrated high reliability and internal consistency scores (Rudiger, Cash, Roehrig, & Thompson, 2007). Using Geldhof, Preacher, and Zyphur's (2013) method for calculating internal consistency of state-based scales in a multi-level framework, the maximal reliability for the BISS in the present study was estimated as .87.

1.2.2.2. Negative mood. The two negative mood items from the Trait Affect Scale (TAS; Colautti et al., 2011) were used to measure negative state affect. The two items of the TAS were modified so that participants were required to indicate how they felt "right now" instead of "in general". Items were rated on an 11-point Likert scale ranging from 0 (*not at all*) to 10 (*extremely*). Previous research has shown this measure to be sensitive to moment-by-moment fluctuations in mood (Colautti et al., 2011). In the present study, the maximal reliability was estimated as .92.

1.2.2.3. Eating practices. Participants were asked whether they had consumed food and/or engaged in dietary restraint (deliberately restricting food intake) since the last assessment. When participants indicated they had consumed food, follow-up items were used to determine whether they engaged in comfort eating (*Did you eat to feel better?*) and/or showed any of the following symptoms of eating pathology (preceded by the stem '*Did you experience …*'): (a) rapid consumption of food, (b) eating until uncomfortably full, (c) eating despite not being hungry, (d) eating large quantities of food (relative to your usual meal size), (e) eating alone, or (f) feeling guilt and shame after eating. Each of these six symptoms, which derive from the Questionnaire for Eating and Weight Patterns—Revised (QEWP-R; Yanovksi, 1993), were given a score of 1 for 'Yes' and 0 for 'No'. Although past studies (e.g., Fuller-Tyszkiewicz & Mussap, 2008) have tallied these 6 items to produce an