



Positive and negative emotional eating have different associations with overeating and binge eating: Construction and validation of the Positive-Negative Emotional Eating Scale



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ABSTRACT

Research on emotional eating mostly focuses on negative emotions. Much less is known about how positive emotions relate to overeating and binge eating (BE). The aim of the current study was to construct a scale for positive and negative emotional eating and to assess its predictive validity. In study 1, the Positive-Negative Emotional Eating Scale (PNEES) was constructed and tested on 531 women, who also completed Eating Disorders Assessment Scale (EDAS). Results showed that a two-factor model constituting Positive emotional eating (PNEES-P) and Negative emotional eating (PNEES-N) fit the data well. PNEES-N also showed good convergent validity in assessing binge eating, correlating highly with EDAS subscale Binge eating. Further, a path analysis showed that after controlling for the mediating effect of PNEES-N, PNEES-P continued to significantly predict binge eating. In study 2 ($N = 60$), experience sampling method was used to assess overeating and BE in the natural environment. Palmtop computers were given to participants for a three-day study period that prompted them with questions regarding emotional experience, overeating, and BE. Results indicated that PNEES-P significantly predicted overeating, whereas PNEES-N predicted overeating and BE episodes only in a subsample of women who had experienced at least one overeating or BE episode. Thus, positive and negative emotional eating might have different relations with overeating and BE, with the latter being more characteristic of the severity/frequency of overeating and BE. New assessment tools that in addition to negative emotional eating also address positive emotional eating could be of potential help in planning intervention. Further, the tendency to overeat in response to positive emotions could be integrated into current models of eating disorders, especially when addressing relapse prevention.

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1. Introduction

In most people, emotional stress elicits changes in appetite (Macht, 2008). Acute severe stress is associated with the activation of the hypothalamic-pituitary-adrenal (HPA) axis (Gold & Chrousos, 2002) that results in the suppression of appetite (Adam & Epel, 2007; Majzoub, 2006), whereas mild to moderate stress could lead to increased food intake in some individuals (Oliver, Wardle, & Gibson, 2000; Rutters, Nieuwenhuizen, Lemmens, Born, & Westerterp-Plantenga, 2009), referred to as an atypical response by Van Strien, Donker, and Ouwens (2016). This tendency to increase one's food intake in response to negative emotions has been

defined as emotional eating (Arnow, Kenardy, & Agras, 1995). It is believed that emotional eating has its roots in operant conditioning, according to which excessive eating, preceded by negative affect, is maintained by negative reinforcement (Meyer, Waller, & Waters, 1998). Thus, emotional eating might provide a mechanism to downregulate one's negative affect.

A desire to eat in response to negative affect to alleviate one's negative affect has also been associated with binge eating, which, according to DSM-5 is defined as consuming significantly larger amount of food than usual during a limited period of time (American Psychiatric Association [APA], 2013). In addition, loss of control over eating is also considered to be an important diagnostic feature of binge eating (Pollert et al., 2013). Several studies have demonstrated that emotional eating and binge eating are linked, as significant associations between these two constructs have been found in clinical and in non-clinical samples (Stice, Presnell, &

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Spangler, 2002; Van Strien, Engels, van Leeuwe, & Snoek, 2005). Further, Vainik, Neseliler, Konstabel, Fellows, and Dagher (2015) demonstrated that negative emotional eating and binge eating could be placed on a continuum of uncontrolled eating, as they share a similar underlying factor. Thus, emotional eating might characterize intermediate and binge eating severe levels of uncontrolled eating. Therefore, emotional eating might be a useful marker in identifying early disordered eating behaviour (Haedt-Matt et al., 2014).

Even though the vast majority of scientific literature pertaining to emotional eating focuses on negative emotional eating, several authors have found that positive emotions can also increase eating (Bongers, Jansen, Havermans, Roefs, & Nederkoorn, 2013; Bongers, Jansen, Houben, & Roefs, 2013; Bongers, de Graaff, & Jansen, 2016; Evers, de Ridder, & Adriaanse, 2009). Bongers, Jansen, Houben, et al. (2013) found that emotional eaters who were identified via the implicit association test ate more after the positive compared to the negative mood induction. An increase in food consumption after positive mood induction compared to negative or neutral has been established by few other studies (Evers, Adriaanse, de Ridder, & de Witt Huberts, 2013; Patel & Schlundt, 2001). In addition, a recent meta-analysis (Cardi, Leppanen, & Treasure, 2015) showed that healthy participants consumed significantly more food following positive or negative mood induction in comparison to neutral mood (average effect sizes were similar). In contrast, some studies conducted in laboratory settings have demonstrated that emotional eaters tend to overeat following negative mood induction, whereas no differences between neutral and positive mood induction have been found (Macht & Simons, 2000; Van Strien et al., 2013). Thus, the relationship between positive emotional eating and real-life eating behaviour is mixed.

In comparison to negative emotional eating, the mechanisms behind positive emotional eating are less clear. Several researchers believe that positive and negative emotional eating are two different constructs (Macht & Simons, 2000; Van Strien et al., 2013). For example, Van Strien et al. (2016) showed that body-mass index (BMI) and items measuring negative emotional eating loaded onto the same factor, whereas items measuring positive emotional eating and external eating loaded onto the other factor. Similarly, Bourdier et al. (2017) found that BMI had a modest negative correlation with positive emotional eating, and modest positive association with negative emotional eating. Thus, it is plausible that even though positive emotions may elicit eating, they do not necessarily mirror disordered eating. Eating in response to positive emotions might rather be related to hedonic (Macht, 1999) or external eating (Van Strien et al., 2016). This assumption is likely, given that in a meta-analysis by Cardi et al. (2015), there was a trend for more food to be consumed during the positive mood induction when participants were offered both sweet and savoury food compared to sweet or savoury food alone. Additionally, positive emotions have been linked to enhanced pleasantness of food and an increased motivation to enjoy food (Macht, 1999; Macht, Roth, & Ellgring, 2002).

Although several self-report measures of emotional eating, e.g. the Dutch Eating Behaviour Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986) have been developed, it is less clear how accurately the self-report measure of emotional eating mirrors real-life eating behaviour. Domoff, Meers, Koball, and Musher-Eizenman (2013) included 12 studies in their meta-analysis that compared self-reported emotional eating with food intake in laboratory settings. According to authors, self-report measures predicted actual food intake in emotional eaters only in five studies, e.g. after watching a sad film clip (Van Strien, Herman,

Anschutz, Engels, & de Weerth, 2012), and after stress-induction (Oliver et al., 2000). This relationship, however, was not observed in some other studies (e.g., Adriaanse, de Ridder, & Evers, 2011). The validity of self-reported emotional eating questionnaires is also questioned in a recent paper by Bongers and Jansen (2016) who reviewed several experimental and naturalistic studies, and reported that the effect of self-reported emotional eating on subsequent food intake is observed in some studies, whereas in others, it is ambiguous or not observed. However, Van Strien et al. (2012) have argued that in order to detect such an effect, there must be enough participants with extreme scores on the moderating variable. By including emotional eaters who scored above the 80th percentile and non-emotional eaters who scored below the 20th percentile on the emotional eating subscale of the DEBQ, they found that emotional eaters ate more after the sad mood and stress induction, whereas non-emotional eaters ate less. The fact that the evidence for the effect of self-reported emotional eating on actual eating behaviour is mixed across laboratory and naturalistic studies implies that emotional eating might be a more complex phenomenon than it has been believed (Bongers & Jansen, 2016). Therefore, the predictive and discriminative validity of self-reported emotional eating is in serious need of further validation.

Thus, upon constructing and validating an emotional eating scale, it would be crucial to show how the scale reflects real-life eating behaviour. One method of collecting data that more closely mirrors real-life behaviour in comparison to laboratory experiments and self-report measures is to use ecological momentary assessment (EMA; Stone, Hufford, & Shiffman, 2008), also known as the experience sampling method (ESM; Hektner, Schmidt, & Csikszentmihalyi, 2007). EMA/ESM involves repeated measurements of thoughts, behaviours, and/or physiological markers in participants' natural environments. Furthermore, as retrospective emotional ratings and eating behaviour are prone to retrospective memory biases, EMA/ESM provides a way to produce results that are more ecologically valid. Several researchers have investigated binge eating using ESM (Crosby et al., 2009; Smyth et al., 2007; Wegner et al., 2002).

Since the role of positive emotions regarding eating behaviour has somewhat been neglected, the aim of the present study was to construct the Positive-Negative Emotional Eating Scale (PNEES), which captures eating in response to both positive and negative emotions, and to assess its predictive validity via ESM. Even though there already are emotional eating scales (i.e., Emotional Appetite Questionnaire (EMAQ); Nolan, Halperin, & Geliebter, 2010) measuring eating in response to positive emotions, we wanted to include more variety in terms of positive emotional experience as well as the phrasing of items. For these purposes, we conducted two separate studies. The aim of the first study was to construct the Positive-Negative Emotional Eating Scale (PNEES). The aim of the second study was to assess the scale's predictive validity by testing whether the scores on a self-report emotional eating scale predict overeating (eating episodes without loss of control) and binge eating (eating episodes with loss of control) episodes measured via experience sampling method. The following hypotheses were postulated for this study:

- 1) In comparison to positive emotional eating, negative emotional eating is more strongly associated with binge eating.
- 2) Negative emotional eating predicts overeating (without LoC) and binge eating (with LoC) episodes measured via experience sampling method.
- 3) Positive emotional eating predicts overeating (without LoC) episodes measured via experience sampling method.

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