

HEDVIG SULTSON

Refining the constructs of positive
and negative emotional eating



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and negative emotional eating



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LIST OF ORIGINAL PUBLICATIONS

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The author of the current dissertation contributed to the listed publications as follows:

- In **Study 1**, wrote the manuscript as the first author, participated in data collection, carried out the data analyses, interpreted the results.
- In **Study 2**, wrote the manuscript as the first author, formulated the research questions, carried out the data analyses, interpreted the results.
- In **Study 3**, wrote the manuscript as the first author, participated in data collection, carried out the data analyses, interpreted the results.

LIST OF ABBREVIATIONS

BE	binge eating
BED	binge eating disorder
BMI	body-mass index
BN	bulimia nervosa
DERS	Difficulties in Emotion Regulation Scale
ED	eating disorder
EDAS	Eating Disorders Assessment Scale
EE	emotional eating
EMA	ecological momentary assessment
ER	emotion regulation
LOC	loss of control
LPA	latent profile analysis
NA	negative affect
OE	overeating
PA	positive affect
PNEES	Positive-Negative Emotional Eating Scale
PNEES-P	Positive-Negative Emotional Eating Scale, subscale Positive emotional eating
PNEES-N	Positive-Negative Emotional Eating Scale, subscale Negative emotional eating

1. INTRODUCTION

Food intake is an essential function of the organism aimed at maintaining the energy homeostasis that is regulated by several systems in the body, including the gastrointestinal, endocrine and the nervous system (Strominger & Brobeck, 1953). From a physiological perspective, normal eating entails eating in response to physiological cues of hunger and satiety, such that eating is elicited in response to physiological hunger cues and stopped in response to satiety cues (Polivy & Herman, 1987). Thus, normal eating is driven by homeostatic need for food that is sufficient to maintain healthy body weight (Herman & Polivy, 1996; Natenshon, 2020). From a psychological perspective, however, defining normal eating is not as easy, as the psychological factors that affect eating could be considered normal under some circumstances, and abnormal during others (Herman & Polivy, 1996). Nonetheless, researchers emphasize that normal eating is relatively free of psychological constraints on the consumption of food (i.e., dieting), mainly driven by homeostatic processes rather than internal (i.e., emotions) or external cues (i.e., availability of food, the influence of other people) in the environment, and flexible in the face of differing circumstances (Herman & Polivy, 1996).

Unfortunately, many individuals are prone to eat excessively or show aberrant patterns of eating behaviour that diverge from the umbrella of normal eating. The opposite of normal eating could be broadly conceptualized as dysregulated eating, although other terms, such as non-homeostatic eating (Corwin & Hajnal, 2005) or disordered eating are also used. As dysregulated eating is associated with several adverse health outcomes, such as weight gain and eating disorders, studying the psychological underpinnings of these behaviours is warranted.

1.1 Overeating and binge eating

Binge eating (BE), and to a lesser extent, overeating (OE) are often studied as the correlates of dysregulated eating (Goldschmidt, 2017). According to the DSM-5, binge eating refers to the consumption of an unusually large amount of food within a short period of time that is accompanied by the feeling of loss of control (LOC) over eating (American Psychiatric Association, 2013). BE is a core symptom of bulimia nervosa (BN) and binge eating disorder (BED), and thus, constitutes a core aspect of eating disorder (ED) psychopathology. In various cross-sectional and longitudinal studies, BE has been found to be associated with weight gain and obesity (Stice, Presnell, & Spangler, 2002), distress over eating (Goldschmidt et al., 2012), and greater eating disturbances and general psychopathology (Goldschmidt et al., 2015; Latner et al., 2007). Taken together, the presence of BE represents a serious level of dysregulated eating behaviour.

Furthermore, as the loss of control over eating has been found to be a more important indicator of ED psychopathology than the amount of food eaten (Jenkins et al., 2012), researchers and clinicians have also started to distinguish between subjective BE and objective BE (Brownstone et al., 2013). Objective BE

includes both dimensions of BE described above, whereas subjective BE entails perceived loss of control over eating, but without consuming a large amount of food. In some studies, subjective BE is also referred to as LOC eating (e.g., Berg et al., 2015). All in all, loss of control component of BE seems to be a particularly important aspect of ED psychopathology, and thus, eating pathology might be present even in the absence of large amounts of food. However, in this dissertation, subjective and objective BE will not be distinguished, and BE will be used as an umbrella term.

Contrary to BE, OE has not been incorporated into any ED diagnostic criterions and is most often conceptualized as a risk factor for weight gain and obesity (Wolfe et al., 2009). Specifically, OE refers to the consumption of an unusually large amount of food, but without the feeling of loss of control (Goldschmidt, 2017). As the amount of food eaten has been considered to be less important than the presence of LOC in terms of eating pathology (Jenkins et al., 2012), OE is seen as a less pathological form of dysregulated eating than BE. Nevertheless, the presence of OE has also been associated with several adverse health outcomes besides weight gain, such as depressive symptoms, extreme weight control behaviours, and low self-esteem (Goldschmidt et al., 2015).

Although most often associated with individuals with eating disorders, both OE and BE are also found among non-clinical samples. In fact, the occurrence of both OE and BE has consistently been reported to be around 5–10% in population-based samples among both men and women (Goldschmidt et al., 2015; Sonnevile et al., 2013). In some studies, the prevalence has been even higher, indicating that around 14% of women and 6% of men have endorsed BE, and 45% of women and 49% of men have engaged in OE at least sometimes (Mustelin et al., 2017).

1.2 Emotional eating

In addition to OE and BE, a construct called emotional eating (EE) has also been extensively researched, as a wide array of studies show that emotions, particularly negative emotions, can have a significant impact on subsequent eating behaviour. EE refers to the desire to eat in response to negative emotions (Arnou et al., 1995; Van Strien et al., 1986), although such terms as ‘stress eating’, ‘stress-induced eating’, or ‘comfort eating’ (Gibson, 2012) are sometimes also used.

EE appears to be quite a prevalent phenomenon, as its occurrence has been observed among healthy individuals with no psychopathology (Cardi et al., 2015), individuals with concurrent overweight/obesity (Davis et al., 2004; Gibson, 2012), as well as clinical populations, specifically among individuals with BN and BED (Courbasson et al., 2008; Davis et al., 2008; Masheb & Grilo, 2006).

Emotional eating shares similarities with both OE and BE, although by definition, EE appears to be more associated with OE, as EE is often also referred to as emotional overeating. Several studies have shown that EE and BE are linked, as significant associations between the two constructs have been found in clinical

and in non-clinical samples (Stice, Presnell, & Spangler, 2002; Van Strien, Engels, van Leeuwe, & Snoek, 2005). Moreover, EE is found to be a risk factor for developing BE and subsequent eating pathology (Stice et al., 2002).

1.3 Continuum of dysregulated eating

Some researchers argue that dysregulated eating behaviours could be viewed on a continuum. For example, according to the healthy eating continuum (Natenshon, 2020), on one end of the continuum lie healthy eating behaviours that help an individual sustain a fit body and a healthy weight, and on the other side of it lie disordered eating behaviours characteristic of a clinical ED. Most disordered eating behaviours are then represented somewhere on the continuum between the two polarities, and at times, are also shared by otherwise healthy eaters.

Similarly, Davis (2013) has proposed that OE could be viewed on a spectrum depending on the compulsiveness and severity of OE. In this view, OE might represent the middle point of the continuum and precede BE in terms of severity and compulsiveness of the disordered eating behaviour. Vainik et al. (2015) also demonstrated that EE and BE could be placed on a continuum of uncontrolled eating, as they seem to represent the same underlying construct. By this account, EE might characterize intermediate levels of uncontrolled eating, whereas BE points towards more severe levels of uncontrolled eating. In a similar vein, Haedt-Matt et al. (2014) have proposed that EE might be viewed as a sub-threshold BE, and therefore, might serve as a useful marker in identifying early disordered eating behaviour.

The dimensional approach to dysregulated eating is also useful to consider, as it has clinical implications. Specifically, in addition to the extremities, it is important to study all of the eating behaviours that lie somewhere on the continuum, as these could provide valuable insight into how dysregulated eating behaviours develop and evolve. Thereby, investigating early disordered eating, such as EE, could provide valuable information that, in turn, might help design better ED prevention strategies.

1.4 Underlying mechanisms of emotional eating

Below, I will now give an overview of the most relevant theories of EE that help shed light on the potential underlying mechanisms.

1.5 Early theories of emotional eating

In the etiology of EE, several theories have been put forward. The earliest theory of emotional overeating, proposed by Kaplan & Kaplan (1957) and further advocated for by Bruch (1961), linked obesity causally to overeating. According to the psychosomatic theory of EE, some individuals lack the ability to

distinguish their internal arousal states (e.g., emotions) from hunger and satiety. This inability to differentiate between hunger signals and unpleasant bodily sensations associated with emotions is thought to be a byproduct of early learning experiences. Thus, struggling to differentiate between these sensations, some obese individuals respond to them with excessive eating. The psychosomatic theory has received some support, as individuals with EE tend to have lower interoceptive awareness (Bullock & Goldbacher, 2021; Van Strien & Ouwens, 2007), but it does not explain all the variance in EE.

The second important theory of EE concerns dietary restraint. Restraint theory, proposed by Herman & Polivy (1980), states that restricting food intake leads to subsequent overeating, when experiencing stress or negative affect (NA). As restricting food intake requires conscious cognitive effort, the experience of NA interferes with the ability to maintain that much-needed cognitive control over eating (Polivy & Herman, 1993). Therefore, among those who chronically restrict their food intake, increased NA disinhibits cognitive control over eating, which, in turn, results in binge eating (Polivy & Herman, 1993). Restraint theory has indeed received empirical support, as studies show that individuals high in dietary restraint are more prone to eat when experiencing negative emotions (for review, see Evers et al., 2018). Moreover, the history of dieting has been causally linked to the onset of EE/BE in several studies (Goldschmidt et al., 2012; Neumark-Sztainer et al., 2006). Nonetheless, although restraint theory has received empirical support, it is not sufficient to fully explain the etiology of EE, as not all individuals with EE restrict their food intake.

1.6 Emotion regulation theories of emotional eating

Emotion regulation (ER) refers to how an individual tries to influence one's emotional experience (Gross, 2008). Specifically, ER includes both automatic and controlled processes on a physiological, cognitive, and behavioural level, by which an individual modulates the intensity and duration of one's emotions (Gross, 2008). ER can be considered adaptive or maladaptive, depending on the strategies used. Several lines of research suggest that EE/BE might constitute a maladaptive attempt at emotion regulation (e.g., Whiteside et al., 2007).

Currently, one of the most empirically supported theories of BE is affect regulation theory (Polivy & Herman, 1993), which has been put forward to explain the role of negative affect in the maintenance of BE, but the theory is also emphasized in the etiology of EE. Namely, affect regulation theory posits that BE is precipitated by NA, and engaging in BE helps to reduce NA. Affect regulation theory has its roots in operant conditioning, suggesting that BE is maintained by negative reinforcement (Meyer, Waller, & Waters, 1998), as NA decreases after BE.

Thus, this theory has two important conditions that have to be met: a) the level of NA is relatively high or increasing before BE occurs, b) the level of NA is relatively low or decreasing after BE occurs (Haedt-Matt & Keel, 2011). The first

tenet of affect regulation theory has received wide-spread support, as NA is one of the most often cited triggers for BE (see subsection 1.7 Support for emotion regulation theories of emotional eating).

The evidence for the second part is mixed, as some studies show that NA decreases after BE (e.g., Smyth et al., 2007), whereas others demonstrate that NA further increases after the BE episode (for review, see Haedt-Matt & Keel, 2011). It is likely, however, that different analytical approaches used on the data produce different results, depending on the timing of pre- and post-binge ratings included in the analyses (for more information on the comparison between the two analytical approaches, see Berg et al., 2017). Nonetheless, the second part of the affect regulation model goes beyond the scope of this dissertation.

Alternatively, another emotion regulation theory of EE/BE has been put forward, which also emphasizes the role of NA in eliciting EE/BE. According to the escape theory (Heatherton & Baumeister, 1991), individuals engage in EE/BE to temporarily escape the aversive self-awareness that accompanies negative emotions. Hence, engaging in EE/BE provides relief from self-awareness, as during eating, attentional focus is shifted from higher-level abstract thinking towards the more immediate environment, which is food. Therefore, reductions in NA occur due to the lowered self-awareness during eating. Contrary to affect regulation theory, however, escape theory posits that NA increases after BE is over when self-awareness returns.

All in all, negative emotions seem to play a crucial role in eliciting and maintaining EE/BE.

1.7 Support for emotion regulation theories of emotional eating

As mentioned above, the first tenet of the affect regulation theory has received support in several studies, as NA has consistently been found to precipitate OE and BE in clinical and non-clinical samples.

1.7.1 Clinical populations

NA appears to be an important and widely researched antecedent to BE, especially among individuals with ED. In particular, Haedt-Matt & Keel (2011) conducted a meta-analysis on the ecological momentary assessment (EMA) studies of the relationship between affect and BE among women with ED (i.e., BN and BED). Analysing the studies, unequivocal support was found for the first tenet of the affect regulation model, as the level of NA was significantly higher prior to BE compared to regular eating. Moreover, the effect sizes for NA were larger for women with BED compared to women with BN. In a similar vein, Leehr et al. (2015) conducted a systematic review of the experimental studies pertaining to the relationship between NA and BE in obese individuals with and without BED.

The authors also found strong support for the affect regulation model among individuals with BED, as NA precipitated BE, but not among obese individuals without BED. Similarly, it has been found that higher NA predicts subsequent BE in women with BN (Lavender et al., 2016) and that increased NA precedes BE in patients with BED (Munsch et al., 2012). Furthermore, the prevalence of BE has been found to be the highest on days that are characterized by high or increasing levels of NA in women with BN (Smyth et al., 2007).

1.7.2 Healthy individuals

Among healthy individuals with no eating pathology and among individuals with obesity, the evidence is more mixed. In a few studies, it has been found that the likelihood of BE is associated with greater momentary NA in obese men and women (Smith et al., 2018) as well as global higher NA (Berg et al., 2015), whereas others studies have failed to find a consistent relationship between NA and subsequent BE in obese individuals (without BED) (Leehr et al., 2015).

Nonetheless, Cardi et al. (2015) conducted a meta-analysis on the experimental studies of eating behaviour among healthy individuals as well as individuals with ED, and found that experimentally induced negative mood was associated with increased food intake (i.e., overeating) among individuals with BED, in obese individuals and among individuals with no history of psychopathology. However, food intake was higher among clinical groups compared to obese individuals and individuals with no psychopathology. Moreover, Haedt-Matt et al. (2014) conducted a study where individuals from a community-sample had to rate their EE urges and NA/PA for 45 consecutive days. They found that greater NA was associated with higher subsequent EE urges, showing that NA also serves as a trigger for EE.

In conclusion, NA appears to be an important antecedent to BE, especially among the clinical population. However, there is mixed evidence for the relationship between NA and OE/EE among individuals with no eating pathology and individuals with obesity. Nonetheless, it seems that the relationship between NA and OE/EE in a non-clinical population might mirror the same trajectory, as BE and NA among eating-disordered individuals (Haedt-Matt et al., 2014), thereby constituting an attempt to regulate NA. Therefore, it is possible to view EE as a sub-threshold BE.

1.8 The role of emotion regulation difficulties

Several studies, however, suggest that high levels of NA itself might not necessarily lead to EE or BE. Rather, EE/BE seems to be indicative of a general problem with emotion regulation, as eating, instead of something more adaptive, is used as a way to regulate emotions.

In the ED psychopathology literature, the multidimensional model of emotion regulation and dysregulation, measured via the self-report questionnaire of

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), has been used extensively as a general framework for assessing problems with ER. This framework is suitable for research purposes, as it is clinically informed (i.e., the model was developed specifically to tackle emotion dysregulation in relation to maladaptive behaviours seen in various forms of psychopathology), and has extensively been used in numerous studies of ED (Lavender et al., 2015).

According to the multidimensional model of ER (Gratz & Roemer, 2004), successful emotion regulation includes the following components: a) awareness and understanding of one's emotions, b) acceptance of one's emotions, c) the ability to engage in goal-directed behaviour, and refrain from impulsive behaviour, when experiencing negative emotions, d) access to adaptive emotion regulation strategies. Deficits in any of these areas could be seen as risk and/or maintenance factors for various forms of psychopathology, including eating pathology (Lavender et al., 2015).

1.9 Specific facets of emotion dysregulation

Various studies utilizing this multidimensional model indicate that deficits in all areas of ER have been found to be a transdiagnostic risk/maintenance factor for ED, with no significant differences between the subtypes of ED (Brockmeyer et al., 2014; Svaldi et al., 2012). Nonetheless, some facets of emotion dysregulation stand out in various studies.

1.9.1 Poor emotional clarity and limited access to the more functional ER strategies

Whiteside et al. (2007) have suggested that emotional overeating is used as a maladaptive ER strategy, particularly due to limited access to the more functional ER strategies. In line with this, limited access to the more functional ER strategies often emerges as a prominent predictor of EE (Gianini et al., 2013) and BE (Racine & Horvath, 2018; Whiteside et al., 2007). In addition, difficulties in identifying and differentiating between one's emotions, referred to as poor emotional clarity, has been found to be another important predictor of EE (Gianini et al., 2013) and BE (Racine & Horvath, 2018; Vine & Aldao, 2014; Whiteside et al., 2007).

In more detail, Racine & Horvath (2018) compared women from the community-sample with objective BE, LOC-eating only, OE-only and women with no eating pathology on the domains of emotion dysregulation. They found that objective BE was associated with the most severe level of emotion dysregulation (i.e., overall emotion dysregulation, difficulties with impulse control, and limited access to functional ER strategies) compared to other groups. However, women with OE-only were similar to women with no eating pathology in several facets of ER dysregulation, with the exception of emotional clarity. Specifically, women with OBE and women with OE did not differ in emotional clarity, suggesting that

poor emotional clarity might specifically relate to OE. In contrast, Kukk & Akkermann (2017) found that general ER difficulties, limited access to functional ER strategies and difficulties with goal-directed behaviour when distressed differentiated women with healthy eating from women with BE and OE, suggesting that OE is in a similar way associated with ER difficulties as BE.

1.9.2 Inability to engage in goal-directed behaviour when distressed

Another facet of emotion dysregulation associated with BE is the impaired ability to engage in goal-directed behaviour when distressed. Both poor distress tolerance, referring to the extent to which an individual finds negative emotions tolerable (Anestis et al., 2007), and negative urgency, referring to the tendency to act rashly in response to extreme NA (Cyders & Smith, 2007) map onto this dimension of emotion dysregulation (Lavender et al., 2015).

Specifically, BE has repeatedly been associated with negative urgency and low distress tolerance in clinical (Anestis et al., 2009) and non-clinical samples (Anestis et al., 2007). Previously, Kukk & Akkermann (2017) showed that community-sample women with OE and BE had significantly higher scores on DERS subscale Difficulties engaging in goal-directed behaviour when distressed compared to women with healthy eating. Moreover, community-sample men with BE in their study had significantly higher levels of impulse control difficulties as well as general impulsivity compared to men with healthy eating, indicating that impulsivity might be a specifically important predictor of BE in men. Additionally, in a non-clinical sample of students, Anestis et al. (2007) found that distress tolerance predicted bulimic symptoms (measured via the Bulimia subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983)), even when several covariates, such as NA and gender, were controlled for. Moreover, the combination of low levels of distress tolerance and high levels of negative urgency were associated with the highest level of bulimic symptoms. Similarly, Anestis et al. (2009) found that negative urgency also predicted bulimic symptoms (measured via EDI subscale Bulimia) in a clinical sample, even when a host of other relevant constructs such as NA, gender, and other facets of impulsivity, were controlled for. Taken together, BE seems to be endorsed by individuals who are characterized by the inability to withstand negative emotions, not by the high levels of NA themselves.

Nonetheless, in a study by Racine et al. (2013), BE and EE showed different relations with negative urgency and NA. In more detail, it was found that trait-level negative urgency was the best predictor of BE over and beyond NA (which remained insignificant in the model), whereas for EE, NA was the strongest predictor, followed by negative urgency. Thus, high levels of NA in combination with the tendency to act rashly in the face of NA seem to be important risk factors for dysregulated eating, although the effect of negative urgency might be more pronounced for BE.

2. THE ROLE OF POSITIVE EMOTIONS ON EATING BEHAVIOUR

So far, research indicates that high levels of NA are characteristic to almost all forms of psychopathology (Stanton & Watson, 2014; Whittle et al., 2006), whereas the presence of positive affect (PA) is considered to be protective of mental health (Gloria & Steinhardt, 2016). Thus, the role of PA in relation to psychopathology (including eating disorders) has been considerably less studied. Consequently, the research on the role of positive emotions on eating behaviour has also been scarce.

Nonetheless, in the past decade, there has been an ever-growing interest in how positive emotions affect eating. In fact, numerous studies have demonstrated that there is also a link between positive emotions and subsequent (over)eating (e.g., Bongers et al., 2013a, 2013b; Cardi et al., 2015; Evers et al., 2013). Furthermore, Cardi, Leppanen, & Treasure (2015) conducted a meta-analysis of the laboratory studies pertaining to the effects of positive and negative mood induction (compared to neutral) on eating behaviour. They found that healthy individuals with no history of psychopathology consumed significantly more food after positive or negative mood induction in comparison to neutral condition. Moreover, the average effect sizes (*ES*) for positive and negative mood were similar (*ES* = 0.260 for positive mood, *ES* = 0.261 for negative mood), albeit small.

These results indicate that similarly to negative emotions, positive emotions can also elicit eating. Therefore, it is feasible to also talk about such a construct as positive emotional eating (positive EE), which, similarly to its counterpart negative EE, refers to the tendency to eat in response to positive emotions. However, contrary to negative EE, it is not clear whether positive EE is associated with adverse health outcomes the same way as negative EE is, and thus, the underlying mechanisms of positive EE are in need of further research.

2.1 Possible underlying mechanisms of positive emotional eating

Currently, the underpinnings of positive EE are not clear. However, several researchers view positive and negative EE as two different constructs (Macht & Simons, 2000; Van Strien et al., 2013, 2016), with different underpinnings and consequences for mental and physical health.

In favour of this, self-report measures of positive and negative EE have been found to be weakly inversely correlated (Nolan et al., 2010). Furthermore, the desire to eat in response to negative emotions has been shown to be positively correlated with BMI, whereas the desire to eat in response to positive emotions has been found to be negatively correlated with BMI (Geliebter & Aversa, 2003; Nolan et al., 2010). Taking these differences into account, Van Strien et al. (2016) argue that eating in response to positive emotions is a 'normal eating behaviour', whereas negative EE could be viewed as an atypical eating behaviour.

2.1.1 Eating in response to positive emotions as part of normal eating behaviour

One point of view then supports the idea that eating when feeling positive emotions might actually be a normal response characteristic of typical eating behaviour (Van Strien et al., 2016), as it is seen among both healthy and clinical populations, whereas negative EE seems to be more specific to clinical samples (Cardi et al., 2015). Moreover, Herman & Polivy (1996) argue that the spectrum of normal eating also includes being sensitive to various cues in the environment, such as the presence of others or the sight and smell of palatable food. Such cues are generally also associated with positive emotions (Macht, 1999; Macht et al., 2002).

Thus, positive emotions might be more closely related to hedonic eating (Lowe & Butryn, 2007; Macht, 1999) or external eating (Van Strien et al., 2016) – constructs that both reflect the tendency to eat in response to the hedonic and rewarding properties of food, such as pleasant taste or smell. The link with positive EE is likely, as Van Strien et al. (2016) also demonstrated that items measuring positive EE and external eating loaded onto the same factor, whereas BMI and negative EE loaded onto the other. Further supporting this view, eating when in a positive mood (compared to a negative mood) has been associated with higher pleasantness and enjoyment of food (Macht, 1999; Macht et al., 2002) and increased taste-eating (i.e., consuming snacks, instead of main meals) (Reichenberger et al., 2018) among healthy individuals. Lastly, in their meta-analysis of experimental studies on eating behaviour, Cardi, Leppanen & Treasure (2015) found a trend for the food intake to be higher during positive mood induction when participants were offered both sweet and savoury foods, instead of just one type of food, which indirectly refers to external eating. In conclusion, it is likely that positive emotions enhance the tendency to eat due to the availability and the palatability of food.

2.1.2 Positive emotions in relation to dysregulated eating

Although higher levels of PA are generally considered to be protective of mental health (Gloria & Steinhardt, 2016), some associations between higher levels of PA and psychopathology nonetheless exist. For example, high levels of PA are characteristic of such disorders that are characterized by excessive reward and excitement seeking (e.g., substance abuse) (Stanton & Watson, 2014), which point towards difficulties linked to regulating positive emotions.

Similarly to positive EE itself, the literature on the regulation of positive emotions is scarce. There is some evidence, however, that difficulties in experiencing and regulating a range of intense positive and negative emotions might lead to various mental health problems (for review, see Gilbert, 2012). Thus, it is plausible that analogous to negative EE, PA might lead to OE/BE in the face of positive emotion dysregulation. Moreover, a concept called positive urgency (Cyders & Smith, 2007) has been put forward corroborating this claim. Positive urgency, analogous to its counterpart negative urgency, refers to the tendency to

act rashly in the face of intense or high PA (Cyders & Smith, 2007). Previously, positive urgency has been associated with food addiction, albeit to a lesser degree than negative urgency (Murphy, Stojek, & MacKillop, 2014).

In conclusion, it is likely that among some individuals, the inability to regulate both intense PA and NA could lead to dysregulated eating. This renders the constructs of positive and negative EE similar to each other in their associations with dysregulated eating. The hypothetical continuum of dysregulated eating with the inclusion of positive and negative EE is presented below (see Figure 1).

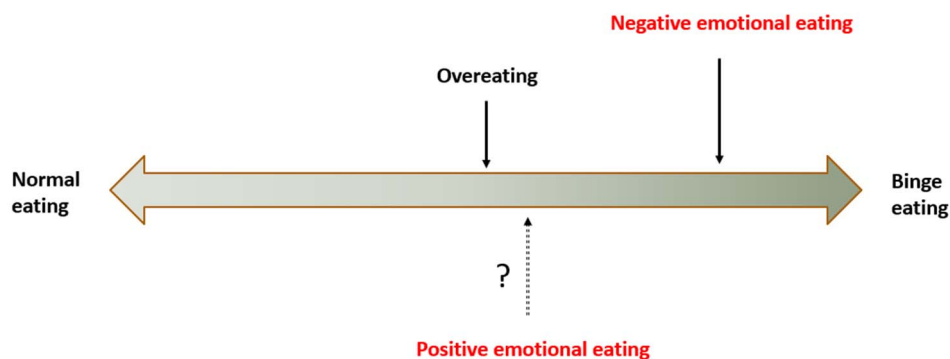


Figure 1. The continuum model of dysregulated eating with positive and negative emotional eating.

2.2 Current controversies around the emotional eating construct

One of the most common ways of measuring EE is to use a self-report questionnaire. Over the years, several self-report measures of EE have been developed, such as the Emotional Eating subscale of The Dutch Eating Behavior Questionnaire (DEBQ; Van Strien et al., 1986), or the Emotional Eating Scale (EES; Arnow, Kenardy, & Agras, 1995). Generally, participants are asked to rate their desire to eat when feeling a particular emotion (e.g., sadness) on a Likert-type scale in terms of frequency (DEBQ) or in the magnitude of the urge to eat (EES).

However, in the past decade, the construct of EE has started to receive criticism regarding its construct and predictive validity. In fact, several authors have demonstrated that self-reported EE does not reliably predict actual eating behaviour (i.e., increased food intake) in the laboratory settings nor in the natural environments (for review, see Bongers & Jansen, 2016; Domoff et al., 2014). Bongers & Jansen (2016) even suggest that EE, particularly negative EE might be a more nuanced phenomenon than is otherwise believed, as positive emotions can also elicit eating (e.g., Bongers et al., 2013a, 2013b; Cardi et al., 2015; Evers et al., 2013), and moderate-to-strong correlations are seen with other eating-related constructs, such as external eating. All in all, the self-report measures of EE are in need of further construct and validity testing.

2.2.1 Construct validity of self-reported emotional eating

One way to improve the construct of EE would be to additionally include eating in response to positive emotions in the self-report measures of EE. Fortunately, a growing interest in the role of positive emotions has indeed led to the development of scales that also measure eating in response to positive emotions. For example, Emotional Appetite Questionnaire (EMAQ; Nolan et al., 2010) and the Salzburg Emotional Eating Scale (SEES; Meule et al., 2018) have been developed that measure both positive and negative EE.

Secondly, it would be feasible to measure several potential moderators alongside positive and negative EE to see whether they have an influence on eating behaviour. One potential moderator might be BMI or body weight, as it has been extensively associated with EE (Konttinen et al., 2010; Van Strien, Donker, & Ouwens, 2016). Another moderator might be the participant's sex, as eating in response to NA seems to be more prevalent in women, whereas eating in response to PA appears to be more common in men (Meule, Reichenberger, & Blechert, 2018; Wouters et al., 2018). Lastly, contextual and situational factors surrounding eating could also be a fruitful avenue for research, as these have shown to influence eating behaviour (Patel & Schlundt, 2001; Tanofsky-Kraff et al., 2007).

2.2.2 Predictive validity of self-reported emotional eating

As self-reported EE has not been shown to reliably predict actual eating behaviour, it is pivotal to also further assess the predictive validity of EE scales. One promising method of testing whether the scales reflect real-life eating behaviour would be to use the experience sampling method (ESM; Hektner, Schmidt, & Csikszentmihalyi, 2007), also known as the ecological momentary assessment (EMA; Shiffman, Stone, & Hufford, 2008). EMA/ESM (subsequently referred to as EMA) is a method that consists of repeated measurements of certain behaviours, or physiological and psychological states in a naturalistic setting (i.e., in the environment where it occurs). As self-report measures are subject to recall biases – a participant has to recall their typical behaviour over a specific time, using EMA allows researchers to minimize these recall biases due to momentary measurements. Moreover, this method is more ecologically valid and generalizable as measurements are performed when the participant engages in his/her daily life.

In a typical EMA study of eating behaviour, participants carry palmtop computers or smartphones with them. During the study period, they are prompted several times a day for consecutive days (e.g., 7 days) to answer questions pertaining to their emotional state (the rate to which one experiences various negative and positive emotions) and eating behaviour. For eating behaviour, the outcome variable could be OE or BE, snacking, eating a full meal, etc. EMA has extensively been used in the research of BE. For example, by using EMA, higher levels of NA have been found to precede BE episodes (for review, see Haedt-Matt & Keel, 2011).

3. AIMS OF THE DISSERTATION

The major aim of this dissertation was to assess the construct of emotional eating and test its predictive validity in relation to real-life eating behaviour.

For this purpose, I first aimed to assess the construct of emotional eating, while differentiating between eating in response to positive emotions (positive EE) and eating in response to negative emotions (negative EE) (**Studies 1 and 2**). Furthermore, I aimed to test the predictive validity of self-reported negative and positive EE in relation to real-life dysregulated eating behaviour such as overeating and binge eating (**Study 1**).

Secondly, in order to assess the clinical utility of positive and negative EE, I sought to examine the emotion regulation difficulties and eating disorder related features among individuals with differing levels of positive and negative EE (**Study 2**).

Lastly, I aimed to explore how the participant's sex and situational/social variables influence the relation between positive/negative affect and overeating/binge eating (**Study 3**).

4. MATERIALS AND METHODS

4.1 Participants

4.1.1 Self-report data

For **Studies 1 and 2**, the same dataset was used. As part of a bigger research project aimed at studying affect regulation, a web-based survey was carried out during the period of September 2013 – March 2014 at the online survey centre Kaemus of the Institute of Psychology. Participants were recruited via university mailing lists and social media and were offered course credit for participation as well as personality-related feedback. The study design was approved by the Research Ethics Committee of the University of Tartu.

The initial sample consisted of 748 adults. Due to low participation rate ($N = 71$), men were excluded from subsequent analyses. Women who were pregnant or breastfeeding were also excluded ($N = 24$). In **Study 1**, women who had missing data on the relevant self-measures for the study were also excluded. Thus, the final sample for **Study 1** consisted of 531 women aged 15–61 ($M = 29.6$, $SD = 9.5$). More than half (54%) of the participants had completed higher education, 28.5% secondary education, 10% primary education, and 7.5% vocational education.

In **Study 2**, women who had missing data on the indicator variables used in the latent profile analysis (LPA) ($N = 46$) and two women with extremely high body mass indices ($BMI > 50 \text{ kg/m}^2$) were excluded, which rendered the final sample size to be 605 women with the mean age of 29.8 ($SD = 9.6$) and BMI of 23.4 ($SD = 4.7$, range 16.3–45.7). Half (54.7%) of the participants had completed higher education, 27.8% secondary education, 9.3% primary education, and 8.2% vocational education.

The same data set has also previously been used by Vainik et al. (2015).

4.1.2 EMA data

The same EMA data was used in **Study 1** and **Study 3**. The data was collected in 2014–2015 and the preliminary sample consisted of 97 women and 61 men from a community-sample. Participants were invited to participate in a study of eating behaviour and emotion regulation in exchange for course credit via various mailing lists and social media. The study design was approved by the Research Ethics Committee of the University of Tartu.

For **Study 1**, women who had also filled out Positive-Negative Emotional Eating Scale (PNEES) were included in the analyses. Thus, the final sample for **Study 1** consisted of 60 women (out of 97) with the mean age of 21.6 ($SD = 2.85$). As the aim of Study 1 was to validate the self-report EE scale with EMA data, men were not included in the analyses.

In **Study 3**, 87 women (out of 97) with the mean age of 21.3 years ($SD = 2.9$) and the BMI of 21.5 kg/m^2 ($SD = 3.0$) were included in the analyses. 10 women were excluded from the analyses due to methodological reasons. 84.8% of women were students or had already attained higher education (i.e., students, 67.4%), 5.8% had primary education, 8.2% secondary education, and 1.2% vocational education. In order to gain sufficient power to also conduct analyses on men, EMA data from another study conducted among men in 2017 was added to the preliminary EMA data for **Study 3**. The aim of the second EMA study was to specifically explore eating behaviour in men. Thus, 43 men were added to the sample of 61 men. The final sample consisted of 94 men with the mean age of 27.1 years ($SD = 7.9$) and the BMI of 24.0 kg/m^2 ($SD = 2.8$). 72.8% of men were students or had already attained higher education (i.e., students, 36.9%), 3.3% had primary education, 6.5% had vocational education, and 17.4% secondary education.

The same EMA data has been used in a PhD dissertation investigating the risk factors of OE and BE (see Kukk, 2020).

4.2 Measures

4.2.1 Positive-Negative Emotional Eating Scale

Positive-Negative Emotional Eating Scale (PNEES; Sultson, Kukk, & Akkermann, 2017) is a 19-item self-report questionnaire that measures eating in response to various positive (e.g., excitement, joy, confidence, contentment, etc.) and negative emotions (e.g., sadness, loneliness, anger, anxiety, irritation, disappointment, etc.). The participant has to indicate on a 5-point Likert-type scale ranging from 0 (never) to 4 (very often) how often the item describes their eating behaviour. PNEES has two subscales – Positive emotional eating (7 items; subsequently referred to as positive EE or PNEES-P) and Negative emotional eating (11 items; subsequently referred to as negative EE or PNEES-N).

4.2.2 Eating Disorders Assessment Scale

Eating Disorders Assessment Scale (EDAS; Akkermann, 2010) is an Estonian 29-item self-report questionnaire measuring the eating disorder symptoms characteristic of anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED). The participant has to indicate on a 6-point Likert-type scale ranging from 0 (never) to 5 (always) the extent to which the item describes their eating behaviour within the last 3 months. EDAS consists of four subscales: Restrained eating, Binge eating, Purging, and Preoccupation with body image and body weight. Total scale and subscales Binge eating and Purging have shown good discriminant validity in differentiating between AN, BN, and BED patients. Further, construct validity of EDAS has been confirmed by strong correlations between EDAS and EDI-2 subscales Bulimia, Drive for thinness, and Body dissatisfaction (e.g., correlation coefficients between the EDAS total score and

EDI-2 subscales range from .69 to .80). EDAS has been used in several studies conducted among clinical (Soidla & Akkermann, 2020) as well as community samples (Kukk & Akkermann, 2017, 2020; Uusberg et al., 2018; Vainik et al., 2015).

4.2.3 Difficulties in Emotion Regulation Scale

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004; the Estonian version by Vachtel, 2011) is a 34-item self-report questionnaire that measures multiple aspects of emotion dysregulation. The participant has to indicate on a 5-point Likert-type scale ranging from 1 (never) to 5 (almost always) the extent to which the item describes their behaviour. DERS consists of 6 subscales: Non-acceptance of emotional responses, Difficulties engaging in goal-directed behaviour, Impulse control difficulties, Lack of emotional awareness, Lack of emotional clarity, and Limited access to emotion regulation strategies.

4.2.4 Mean levels of positive and negative affect

In the EMA questionnaire, participants were asked on a 4-point Likert-type scale ranging from 1 (not at all) to 4 (to a large extent) the extent to which the item describes their current emotional state. Participants were inquired about 5 positive (excitement, joy, satisfaction, self-confidence, motivation) and 11 negative emotional states (guilt, irritation, sadness, anxiety, anger, loneliness, disappointment, shame, boredom, and tedium). The mean level of negative affect (NA) was calculated by summing the scores for all items measuring negative emotions and dividing it by the number of items (mean score). Similarly, the mean level of positive affect (PA) was calculated by summing the scores for all items measuring positive emotions and dividing it by the number of items (mean score). These indices of mean PA and mean NA were used in subsequent analyses (**Study 3**).

In **Study 1**, only emotion items that matched the emotions incorporated in PNEES were selected for further analyses. Thus, for the mean level of NA, shame, boredom, and tedium were excluded. The mean level of PA was identical to the one used in **Study 3**.

4.2.5 Overeating and binge eating

In the EMA questionnaire, participants were asked whether they had experienced an overeating episode after the last signal, and if so, whether they had also experienced loss of control during this eating episode. When the participant answered 'yes' to the first question, but experienced no loss of control, the eating episode was classified as overeating (OE). When the participant experienced both overeating and loss of control during overeating, the eating episode was classified as binge eating (BE). When no overeating was present, the answers were classified as no OE/BE (**Study 3**).

4.2.6 Situational and social factors

In the EMA questionnaire, participants had to indicate their current whereabouts (subsequently referred to as place; ‘Where are you now?’, response items included at home, at school, at work, on the street, visiting someone, other) and with whom they were with (subsequently referred to as social context; ‘Whom are you with?’; response items included alone, with a friend, with family, with schoolmates, with colleagues).

Both variables were then divided into two broad categories each, reflecting the dimensions most often outlined in the literature. Thus, place was divided into ‘at home’ and ‘away from home’ (latter included instances where the participant was at school, at work, on the street, or visiting someone), and social context was divided into ‘alone’ and ‘with others’ (latter included instances where one was with a friend, with family, with schoolmates, or with colleagues).

4.2.7 Body mass index

Participants’ self-reported height (m) and weight (kg) were used for calculating the body mass index (BMI) (kg/m^2) by using the standard formula: weight (kg)/height (m^2). Commonly accepted BMI ranges are the following: underweight BMI < 18.5; normal weight BMI: 18.5–24.9; overweight BMI: 25–29.9; and obese BMI: >30.

4.3 Methods

4.3.1 Ecological momentary assessment (Studies 1 and 3)

Ecological momentary assessment (EMA) (Hektner, Schmidt, & Csikszentmihalyi, 2007; Stone, Hufford, & Shiffman, 2008), was used to assess eating behaviour and momentary emotional experience in **Study 1** and **Study 3**. In **Study 1**, palmtop computers were used, whereas partly in **Study 3**, a freeware smartphone app PACO (Personal Analytics Companion, www.pacoapp.com) was used to conduct the EMA study. Participants in both studies were prompted 7 times a day for 3 consecutive days (Tuesday-Thursday) at semi-random intervals (from 8:30 a.m. to 23:05 p.m. at **Study 1** for palmtop computers, from 8:00 a.m. to 22:00 p.m. at **Study 3** for smartphone app).

Upon receiving the signal, participants in both studies were asked to fill out a short questionnaire pertaining to their situational whereabouts and social context (‘Where are you now?’, and ‘Whom are you with?’), momentary emotional experience, and eating behaviour (overeating, binge eating).

4.3.2 Regression models (Study 1)

In order to evaluate the predictive validity of PNEES-N and PNEES-P, multiple linear regression models were conducted with the number of OE and BE episodes experienced during the three-day study period as the outcome variable. For PNEES-N, a single linear regression model was also tested on a subsample of women with at least one OE or BE episode during the study period, reflecting a subsample with a more severe level of disordered eating behaviour.

4.3.3 Latent profile analysis (Study 2)

Latent profile analysis (LPA; Gibson, 1959; Vermunt & Magidson, 2002) is a person-centred statistical method that is used to classify individuals into more homogeneous subgroups based on their similarities on a set of variables. In **Study 2**, we used LPA to study the phenotypes of emotional eating. We used BMI, positive EE, negative EE, and EDAS subscale Preoccupation with body image and body weight as the estimator variables in LPA. For validation analyses, we compared the subgroups in regard to EDAS and DERS total and subscale scores.

4.3.4 Mixed-design ANOVA models (Study 3)

In **Study 3**, mixed-effects models for repeated measures ANOVA were conducted with the mean level of PA/NA as the dependent variable, and the type of eating episode (i.e., OE, BE, no OE/BE) as a fixed factor. Subsequently, more complex models with the type of eating episode (i.e., OE, BE, no OE/BE), place (at home, away from home), and social context (alone, with others) as fixed factors, and the mean level of PA/NA as the dependent variable were carried out. All analyses were conducted separately for men and women (4 models in total).

5. RESULTS AND DISCUSSION

5.1 The construct of emotional eating

5.1.1 The construct validity of self-reported emotional eating (Study 1)

The first aim of the dissertation was to assess the construct of EE, while differentiating between eating in response to positive and negative emotions. Therefore, as a first step in **Study 1**, a self-report questionnaire measuring the tendency to eat in response to various positive and negative emotions was constructed. The preliminary questionnaire consisted of 30 items, with 12 items measuring positive EE and 18 items negative EE. Emotions for the scale were chosen based on several factors. Specifically, we aimed to include emotions that had either been incorporated in the Positive-Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), in other EE scales, or that had been reported in the clinical studies of BE and ED.

When subjected to the factor analysis, two primary factors emerged, reflecting the tendency to eat in response to positive emotions (positive EE or PNEES-P; $n = 7$) and the tendency to eat in response to negative emotions (negative EE or PNEES-N; $n = 12$). These two factors explained a significant proportion of the total variance in PNEES scores (63%; PNEES-N accounting for 40.1%, and PNEES-P for 22.9%). Moreover, good internal consistency coefficients were found for both subscales of PNEES ($\alpha = .95$ for PNEES-N, and $\alpha = .91$ for PNEES-P). The negative EE subscale also demonstrated good convergent validity, as moderate to strong correlations were found with EDAS total score ($r = .66, p < .001$) as well as EDAS subscale Binge eating ($r = .81, p < .001$). Taken together, the constructed self-report EE scale demonstrated good psychometric properties and fit the data well.

5.1.2 The predictive validity of self-reported emotional eating (Study 1)

In recent years, the validity of EE construct has been called into question, as several studies demonstrate that self-reported EE fails to reliably predict real-life eating behaviour (Bongers & Jansen, 2016; Domoff et al., 2014). Thus, the second aim of **Study 1** was to assess the predictive validity of the self-reported EE by exploring how positive and negative EE predict the number of OE and BE episodes measured in the natural environment via the use of EMA methodology.

We found that positive EE significantly predicted the number of OE episodes. Curiously, negative EE did not predict the number of OE episodes nor the total number of OE and BE episodes combined. To further explore the association between negative EE and OE/BE, we decided to look into the subsample of women with a potentially more serious level of dysregulated eating (i.e., women who

experienced at least one OE or BE episode during the 3-day study period). Therefore, we omitted women with no OE/BE episodes from the dataset. In this subsample ($n = 31$), negative EE significantly predicted the total number of OE and BE episodes combined, but not the number of OE episodes alone. As no significant correlations were found between OE/BE and positive EE within this subsample, no regression models with positive EE were carried out.

Overall, self-report positive EE and negative EE both appear to be valid instruments as they differentiate between each other and also predict real-life eating behaviour, as demonstrated by significant associations with OE and BE. Given that we used a community-sample of women in **Study 1**, we can conclude that PNEES-P is a reliable instrument to investigate positive EE in non-clinical samples.

However, the relation between PNEES-N and OE/BE seems to be more nuanced, as the association was significant only in a subsample of women with a more serious level of dysregulated eating. Thus, PNEES-N might even be a more suitable instrument for use in clinical samples. This is also in line with the speculation that negative EE might be a more specific phenomenon than is otherwise believed (Bongers & Jansen, 2016).

5.2 Differentiating between positive and negative emotional eating

So far, positive and negative EE are considered to be two different constructs (Macht & Simons, 2000; Van Strien et al., 2013, 2016). All the three studies in this dissertation indicate that positive and negative EE partly overlap but are nonetheless independent constructs. Below, I will argue in favour of both perspectives in more detail.

5.2.1 Overlap/similarities between the two constructs (Studies 1 and 2)

Results from **Study 1** and **Study 2** both offer some insight into the overlap between positive and negative EE. To begin with, In **Study 1**, we found that the two factors of PNEES (PNEES-P and PNEES-N) had a moderate positive correlation ($r = .32, p < .001$). Moreover, both PNEES-N and PNEES-P (**Study 1**) correlated positively with EDAS total score as well as with various EDAS subscales, pointing toward significant associations between eating pathology and both forms of EE – positive and negative. It is of note, however, that the correlation coefficients were lower for positive EE compared to negative EE, suggesting that although there is an association with eating pathology, it is to a lesser degree compared to negative EE.

Building upon the shared overlap between positive and negative EE found in **Study 1**, we then aimed to explore the phenotypes of positive and negative EE in **Study 2**. We expected there to be classes of individuals with EE who would be

characterized by differing levels of positive and negative EE. Moreover, as we witnessed a moderate positive correlation between positive and negative EE in **Study 1**, we expected a class characterized by elevated scores on both positive EE and negative EE to emerge.

Investigating the phenotypes of EE via the use of latent profile analysis (**Study 2**), we found that the models identifying either 4 or 5 classes of individuals with EE fit the data well. The structure of the classes was similar for both 4- and 5-class solutions, except for the additional class of normal weight individuals with positive EE that emerged in the 5-class model. In the end, we decided to report both models. In a model with 4 classes, such classes as normal weight individuals without EE (63%), normal weight individuals with EE (23%), overweight individuals without EE (9%), and obese individuals with EE (5%) emerged. In a 5-class model, roughly half of normal weight individuals without EE and a small proportion of normal weight individuals with EE were grouped together to form a separate class – normal weight individuals with positive EE. This class was characterized by BMI in the normal range, high scores on positive EE, moderate to high scores on negative EE, and moderate levels of pre-occupation with body image and weight.

The partial overlap of positive EE and negative EE seen in **Study 1** is also evident in the formation of the profiles (**Study 2**), as we found no classes in which the levels of positive and negative EE would vastly diverge from each other. In other words, all the classes of individuals with EE were characterized by fairly similar levels of positive and negative EE. Contrary to what we expected, in the 4-class model, we did not find any profiles that would show very high levels of negative EE and very low levels of positive EE, and vice versa. Instead, classes with high levels of EE (i.e., obese and normal weight individuals with EE) demonstrated high scores on negative EE and median to high scores on positive EE, whereas classes characterized by low levels of EE (i.e., normal weight and overweight individuals without EE) exhibited low to median levels of both negative and positive EE. Even when considering the fifth class of normal weight individuals with positive EE who showed the highest levels of positive EE compared to other classes, they still were characterized by median levels of negative EE. In conclusion, the results of **Study 1** and **Study 2** indicate that there is a moderate overlap between positive and negative EE.

5.2.2 Distinctiveness of the two constructs (Studies 1, 2 and 3)

As indicated by **Studies 1 and 2**, positive and negative EE are not completely independent constructs, as they partly overlap. At the same time, all three studies also include strong evidence pointing towards important differences between them.

In **Study 1**, we found a moderate positive correlation ($r = .32, p < .001$) between positive and negative EE. Moreover, the correlations between positive EE and EDAS subscales mirrored the correlations that emerged between negative EE and EDAS subscales, being only weaker in size. Thus, as a next step in

Study 1, we aimed to test whether the relationship between positive EE and EDAS subscale Binge eating was due to the shared variance with negative EE, or due to the independent association between positive EE and BE. By performing a mediation analysis, we found that negative EE partially mediated the relationship between positive EE and EDAS subscale BE (*indirect effect*: $\beta = .25$, $SE = .02$, $p < .001$), as the relationship between positive EE and BE remained significant (*direct effect*: $\beta = .13$, $SE = .03$, $p < .001$), even when negative EE was controlled for. In conclusion, although negative EE mediated some of the magnitude of the association between positive EE and BE, positive EE nonetheless had an independent effect on BE.

More evidence for the distinction of positive and negative EE comes from **Study 2**. Although the levels of positive and negative EE tend to be similar within each class, comparing the phenotypes of EE on ER difficulties and ED psychopathology point towards clear differences between the classes. When comparing the five classes of individuals with EE on ED psychopathology, we found that primarily high levels of negative EE appeared to account for the differences in eating pathology between the classes. Specifically, obese individuals with EE and normal weight individuals with EE showed the highest level of ED psychopathology compared to other classes, including normal weight individuals with positive EE, who showed low levels of eating pathology instead. Therefore, although we found a phenotype of EE characterized by relatively high levels of positive EE, we did not find this class to be similar to other individuals with EE (i.e., obese and normal weight individuals with EE). Instead, normal weight individuals with positive EE resembled normal weight individuals without EE. Thus, the results of **Study 2** suggest that while the presence of negative EE appears to be indicative of ED psychopathology (measured via EDAS), the mere presence of positive EE does not.

Lastly, the results pertaining to EMA data in **Study 1** as well as **Study 3** argue in favour of separating positive and negative EE. In **Study 1**, positive EE significantly predicted the number of OE episodes, whereas negative EE predicted the number of OE and BE episodes combined within a subsample of women with a more severe dysregulated eating.

In addition, the results of **Study 3** also suggest that whereas negative EE appears to be associated with BE and a more severe level of dysregulated eating, positive EE seems to be linked to OE instead. Specifically, one aim of **Study 3** was to explore how the mean levels of PA and NA differ across different types of eating episodes (i.e., no OE/BE, OE, BE) among men and women (sex differences are addressed in more detail in section 5.4.1). Consequently, we found that among women, the mean level of NA was significantly higher before BE compared to OE and no OE/BE, whereas, among men, the mean level of PA was highest prior to OE compared to BE and no OE/BE.

5.3 Clinical relevance of positive and negative emotional eating

The second major aim of this dissertation was to explore how positive and negative EE relate to ED psychopathology and ER difficulties (**Study 2**), and thereby, assess the clinical relevance of both constructs.

5.3.1 Emotion regulation difficulties (Study 2)

In **Study 2**, the phenotypes of EE (both the 4- and 5-class models) were compared on their level of emotion regulation difficulties that were assessed via DERS. When looking at the profiles within the 5-class model, two classes with the highest level of negative EE (e.g., obese and normal weight individuals with EE) had the highest DERS global score. They also scored highest on several DERS subscales, such as Limited access to ER strategies, Lack of emotional clarity, Non-acceptance of emotional responses, and Difficulties engaging in goal-directed behaviour. In contrast, the two classes with low levels of negative EE (i.e., normal and overweight individuals without EE) also showed the lowest level of ER difficulties. These results are consistent with the literature, where negative EE has been linked to emotion dysregulation, particularly to the difficulties with understanding one's emotions (Gianini, White, & Masheb, 2013; Kukk & Akkermann, 2017; Vine & Aldao, 2014; Whiteside et al., 2007), difficulties with accessing more functional ER strategies (Gianini, White, & Masheb, 2013; Kukk & Akkermann, 2017; Whiteside et al., 2007), and to a lower ability to tolerate negative emotions (Racine et al., 2013; Lavender et al., 2015).

Curiously, normal weight individuals with positive EE fell somewhere in the middle in terms of ER difficulties. To specify, compared to normal weight individuals without EE, they exhibited higher impulse control difficulties and higher levels of non-acceptance of emotional responses. Moreover, they also scored higher on such DERS subscales as Lack of emotional clarity and Limited access to ER strategies compared to both normal weight and overweight individuals without EE.

These differences in ER difficulties between the groups indicate that positive EE might also be related to emotion dysregulation, although different facets of ER difficulties might be associated with positive EE. While negative EE might be conceptualized as an attempt to alleviate NA, possibly because other ER strategies are inaccessible or ineffective in regulating strong emotional reactions (Whiteside et al., 2007), positive EE might be less associated with the attempt to regulate emotions, and more with tolerating strong positive emotions. As we found (**Study 2**) that normal weight individuals with positive EE demonstrated slightly elevated scores on DERS subscale Impulse control difficulties, positive urgency could partly underlie positive EE. Thus, it is plausible that difficulties in tolerating strong emotions in general, be it positive or negative, could serve as risk factors for dysregulated eating.

5.3.2 Eating disorder psychopathology (Study 2)

In addition to the emotion regulation difficulties, we also compared the profiles of EE on eating pathology measured via EDAS (**Study 2**). We found that the classes characterized by high levels of EE (i.e., normal weight and obese individuals with EE) exhibited greater ED psychopathology (i.e., higher scores on EDAS subscales Binge Eating, Purging, Restrained eating, and Preoccupation with body image and body weight) compared to the classes with low levels of EE (i.e., normal weight and overweight individuals without EE). Furthermore, normal weight individuals with positive EE resembled the classes without EE the most, as they showed low levels of eating pathology, albeit having moderate to high levels of positive EE. Taken together, the results of **Study 2** further confirm that the presence of negative EE is closely associated with eating pathology, whereas eating in response to PA is not.

5.3.3 BMI (Study 2)

Obesity/overweight, weight gain and BMI have extensively been linked to the presence of emotional eating (particularly negative EE) in various cross-sectional (Konttinen et al., 2010; Van Strien, Donker, & Ouwens, 2016) and longitudinal studies (Koenders & Van Strien, 2011; Laitinen & Sovio, 2002; Van Strien, Herman, & Verheijden, 2012). Hence, due to these widely reported associations between BMI and EE, we included BMI and EDAS subscale Preoccupation with body image and body weight as additional defining variables in the LPA (**Study 2**).

In the 4-class model (**Study 2**), two distinct classes of individuals with overweight were found – obese individuals with EE (mean BMI = 36.4) and overweight individuals without EE (mean BMI = 30.3). Normal weight and obese individuals with EE were characterized by the highest levels of eating pathology and ER difficulties, although the mean BMI scores for these classes were vastly different. However, when comparing the two overweight classes, there were marked differences between them in ED psychopathology and ER difficulties. In other words, overweight individuals without EE resembled normal weight individuals without EE, as they did not differ in their levels of eating pathology and ER difficulties. Hence, the presence of high negative EE seems to be a more important indicator of psychopathology than high BMI itself.

Therefore, although higher body weight and EE often co-occur, the overlap between them varies and is possibly influenced by other factors, such as eating disorder related features or emotion dysregulation. In accord with this view, Leehr et al. (2015) found that NA did not predict OE/BE among obese individuals without BED, but did predict among obese individuals with BED.

5.4 Moderators of emotional eating

As a last step in this dissertation, the moderators of positive and negative EE were investigated (**Study 3**). Specifically, we investigated how the participant's sex and the social and situational factors surrounding the eating episode influence the relation between PA/NA and OE/BE. The results are discussed in detail below.

5.4.1 Sex differences (Study 3)

Although not much research on EE has specifically been conducted among men, a few studies indicate that there might be notable differences between the sexes. For example, it has been found that women are prone to eat more when experiencing negative emotions, whereas men are more likely to endorse eating when experiencing positive emotions (Meule, Reichenberger, & Blechert, 2018; Wouters et al., 2018). Therefore, the first aim of **Study 3** was to explore how momentary PA and NA relate to subsequent dysregulated eating (i.e., OE/BE), and whether these relationships with affect differ between the sexes.

In women, we found that the preceding level of NA was highest before BE, followed by OE, and no OE/BE. This is in accord with numerous studies that have demonstrated the causal relationship between NA and BE (for review, see Haedt-Matt & Keel, 2011), in which it has been shown that NA tends to be higher before BE compared to regular eating (Haedt-Matt & Keel, 2011) or OE (Berg et al., 2015). No statistically significant differences in preceding levels of NA across different types of eating episodes were found in men, although the trend was similar to that of women (see Figure 2).

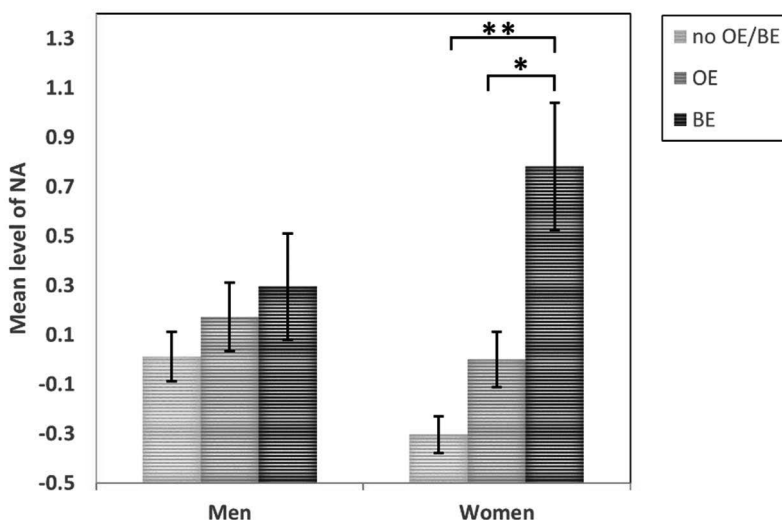


Figure 2. The mean level of NA before no OE/BE, OE, and BE in men and women (**Study 3**). ** $-p < .01$, * $-p < .05$, Bonferroni corrected. Error bars represent standard errors.

When looking at PA, we found that the mean level of PA in men was the highest before OE compared to the other types of eating episodes (i.e., BE and no OE/BE). Curiously, this was only true among men (see Figure 3). Surprisingly, no differences among the types of eating episodes in relation to PA were found in women. Moreover, men and women show vastly different trajectories of PA prior to each type of eating episode (see Figure 3). In men, the mean level of PA is highest prior to OE, and relatively low before BE and no OE/BE. In women, the pattern of PA is different, such that the mean level of PA is lowest before BE, and relatively high before no OE/BE and OE (note that these results among women are on a trend-level).

The fact that the mean level of PA was significantly higher prior to OE compared to BE and no OE/BE among men is in line with studies where the prevalence of positive EE has been shown to be higher among men than women (Meule, Reichenberger, & Blechert, 2018; Wouters et al., 2018). Moreover, the levels of positive urgency – a construct that might partly underlie the relationship between high levels of PA and subsequent OE – tend to be higher among men (Cyders, 2013). Thus, it is plausible that eating in response to PA is simply more pronounced among men and therefore emerged in our study. At the same time, there are many studies in which the relationship between PA and increased food intake among women is also present (Bongers et al., 2013a; Bongers et al., 2013b; Cardi et al., 2015; Evers et al., 2013), therefore posing a question of why this relationship was only found in men. All in all, the exact mechanisms pertaining to these sex differences, especially in relation to positive EE in men, are in need of further research.

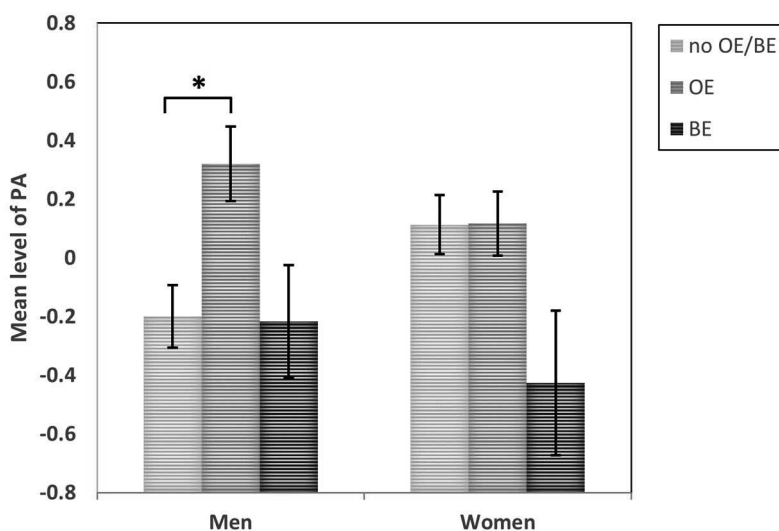


Figure 3. The mean level of PA before no OE/BE, OE, and BE in men and women (Study 3). * – $p < .05$, Bonferroni corrected. Error bars represent standard errors.

5.4.2 Situational and social factors (Study 3)

A few studies have also highlighted the role of situational and social factors on eating behaviour. For instance, BE has been found to occur more often when alone, at home and in secrecy compared to OE (Tanofsky-Kraff et al., 2007), potentially due to the feelings of guilt and shame associated with the BE behaviour. OE, on the other hand, has been associated with social factors, as it has been found that OE tends to be more common in groups and in the company of others (Patel & Schlundt, 2001). Thus, the second aim of **Study 3** was to explore how situational whereabouts (at home, away from home) and social factors (alone, with others) moderate the relationship between momentary PA/NA and OE/BE.

We found that in women, there was a significant interaction effect between the type of eating episode and place, such that the mean level of NA was significantly higher before BE (compared to OE) when one was at home, whereas no differences between the eating episodes were found when away from home. Although no interaction effects were found for the second variable (social context), these results are in line with previous studies showing that BE is more likely when at home and alone compared to OE (Tanofsky-Kraff et al., 2007).

In men, we found that the mean level of PA was significantly higher before OE compared to BE when at home, whereas no differences between OE and BE were found when away from home. No interaction effects were found for the second variable (social context). This result contradicts previous findings where OE has been linked to being in the company of others (Patel & Schlundt, 2001) or being away from home (i.e., at the restaurant) (Tanofsky-Kraff et al., 2007).

Nonetheless, when interpreting the aforementioned effects, it is important to keep in mind that these results are exploratory and thus have a few methodological limitations to them. For instance, indicators of situational and social factors were measured at the previous signal (lag-1), and therefore, one cannot rule out the possibility that the place of the eating episode and/or social factors surrounding the current eating episode could have differed from the ones reported at lag-1. Thus, a more nuanced EMA design (e.g., event-contingent research design in which participants are required to report when a specific behaviour occurs) aimed to test specific hypotheses pertaining to social and situational factors surrounding eating behaviour could be of use in future studies.

6. GENERAL DISCUSSION AND FUTURE DIRECTIONS

In this doctoral dissertation, I aimed to explore the construct of emotional eating, with a particular focus on differentiating between positive EE and negative EE. Based on the three conducted studies, it can be concluded that although positive and negative EE overlap, there still are notable differences between the two constructs, which, in turn, inform future research as well as entail important clinical implications.

6.1 The construct of emotional eating

Based on the findings of this dissertation, the main difference between positive and negative EE is the different relationship with dysregulated eating. Although both facets of EE are associated with dysregulated eating, negative EE seems to be more closely associated with BE, and positive EE with OE.

Therefore, negative EE appears to represent a more severe level of dysregulated eating due to its association with BE, rather than OE, as there is ample evidence in favour of BE constituting a more severe level of dysregulated eating compared to OE. In fact, BE, the core symptom of BN and BED (APA, 2013), is associated with the severity of ED and general psychopathology (Latner et al., 2007) as well as with higher distress related to eating (Goldschmidt et al., 2012). The feeling of loss of control over eating that is characteristic of BE is also considered to be a more important marker of psychopathology than the amount of food eaten (Jenkins et al., 2012; Wolfe et al., 2009). Thus, individuals with negative EE could be at risk for ED psychopathology.

6.2 Emotion regulation difficulties

In this dissertation, we found unequivocal support for the relationship between negative EE and various facets of emotion dysregulation. In line with other studies, we found that higher level of negative EE was associated with difficulties in understanding and making sense of one's emotions (Gianini, White, & Masheb, 2013; Vine & Aldao, 2014; Whiteside et al., 2007), refraining from impulsive behaviour when in a bad mood (Racine et al., 2013; Lavender et al., 2015), as well as difficulties in accessing more functional ER strategies (Gianini, White, & Masheb, 2013; Whiteside et al., 2007). Thus, individuals who experience negative EE would definitely benefit from emotion regulation skills' training that would tackle all aspects of successful ER – understanding one's emotions, tolerating strong emotions and distress, and widening one's knowledge of adaptive ER strategies to use when distressed. Previously, mindfulness-based training has proven to be helpful in increasing emotional awareness and thus reducing EE (Lattimore, 2020). Similarly, emotion regulation skills training (based on

dialectical behaviour therapy) has shown to be effective in reducing EE and also aiding in weight loss (Boutelle et al., 2018).

In addition to negative emotions, the results of **Study 2** also point towards possible associations between positive EE and ER difficulties, albeit the associations appear to be much weaker. Nonetheless, as individuals with positive EE exhibited higher levels of impulse control difficulties and limited access to functional ER strategies, I propose that experiencing strong emotions in general, be it positive or negative, could serve as a risk factor for dysregulated eating, when combined with difficulties in emotion regulation. Previously, negative urgency has been found to be a significant risk factor for BE (Racine et al., 2013). In a similar vein, positive urgency might partly underlie the association between PA and dysregulated eating. The association between both dimensions of impulsivity in relation to dysregulated eating is backed up by a few recent studies. For instance, Smith et al. (2019) found that both dimensions of affectivity (positive and negative) interacted with poor self-regulation in predicting the probability of BE among community-sample of adult women. Likewise, Van Malderen et al. (2019) investigated the unique and joint effects of impaired self-regulation and positive and negative affectivity on BE among adolescent boys and girls. They found that high NA predicted objective BE alone and in combination with poor self-regulation. For PA, however, two types of dysregulated eating profiles were found based on the interactions with self-regulation. Among some individuals, poor self-regulatory skills in combination with very high levels of PA predicted subjective BE, whereas among others, the reverse was true – good self-regulatory skills combined with very low levels of PA predicted subjective EE. When self-regulation was not included in the analyses, PA did not predict subjective BE. Thus, in future studies, the relationship between positive EE and emotion dysregulation, particularly in relation to positive urgency and self-regulation, should be more thoroughly looked into.

Tapping further into the territory of emotion dysregulation, fluctuations in affect, both in positive and negative emotions, should also be looked at, especially in relation to ER difficulties. Fluctuations in affect (also referred to as affect instability) refer to how much the levels of affect fluctuate for a certain individual. Previously, higher fluctuations in NA have been shown to predict more BE episodes in both women and men (Anestis et al., 2010; Kuk & Akkermann, 2017). Moreover, Kuk & Akkermann (2020) found that fluctuations in NA interacted with ER difficulties in predicting BE, such as among women who experienced higher NA instability coupled with higher ER difficulties reported the most BE episodes. Theoretically, then, rapid changes in NA require an individual to regulate their emotions, and if that fails, more NA is generated (Kuk & Akkermann, 2020). There is also some evidence for the association between PA instability and dysregulated eating. Specifically, Egbert et al. (2020) recently found that greater changes in PA were related to greater severity of OE and LOC eating among mid-late pubertal boys and girls, supporting a similar relationship between PA instability and dysregulated eating as in the case for NA instability.

6.3 Possible trajectories of positive emotional eating

As the constructs of positive and negative EE partly overlap, yet share important differences, the subtle nuances of positive EE are in need of further research. Based on the partial overlap and the divergence of the constructs, I propose that multiple trajectories of positive EE exist.

Considering the overlap between positive EE and negative EE that was particularly evident in **Studies 1 and 2**, one trajectory of positive EE might resemble that of negative EE, mirroring the underpinnings of negative EE in its relation to general ER and impulse control difficulties, as described above. However, on the continuum of dysregulated eating (see Figure 4), positive EE would lie closer to OE than BE, as both **Study 1 and Study 3** indicate that positive EE is more associated with OE than BE. Therefore, although positive EE might mirror negative EE in relation to ER difficulties, it probably still represents a milder level of pathology, as loss of control, which is generally associated with ED psychopathology (Jenkins et al., 2012), is not present, or when present, is less pronounced.

However, many researchers argue that positive EE represents a different construct from negative EE (Macht et al., 2002; Van Strien et al., 2013, 2016) that does not necessarily indicate increased risk for eating pathology. The results of this dissertation also partly support the disentangling of the two constructs, as positive EE is clearly related to OE, and negative EE to BE. Therefore, I propose that another trajectory of positive EE relates more to hedonic or external eating, and thus, would be distinguishable from normal eating on the continuum. In terms of severity of dysregulated eating, hedonic or external eating might lie somewhere between normal eating and OE (see Figure 4), and therefore not be particularly pathological. This perspective on hedonic and external eating is also in line with a recent study, in which Racine, Hagan, & Schell (2019) explored the latent structure of several different measures of non-homeostatic eating, and found 7 distinct constructs – EE, external eating, OE, LOC eating, hedonic hunger, food addiction, and distress over eating. Upon investigating these constructs in relation to several clinically relevant variables, they found that hedonic hunger and external eating represented the lowest level of impairment compared to other constructs. Moreover, the authors argue that hedonic hunger and external eating might not be particularly pathological in itself, but alongside other constructs of non-homeostatic eating (e.g., OE or LOC eating), might relate to distress and eating-related impairment.

Nonetheless, this trajectory of positive EE is also in need of further research, as it might increase the risk for overeating and weight gain, particularly under certain conditions, such as when LOC eating or distress over eating is present (Racine et al., 2019), or in the context of frequent exposure to palatable foods in the environment (e.g., social gatherings/parties).

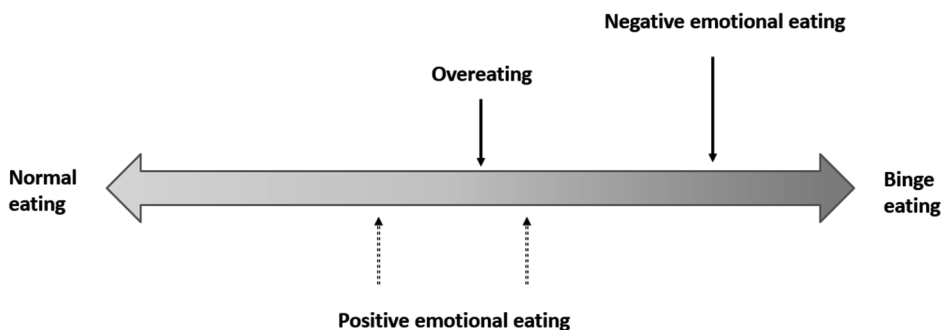


Figure 4. The continuum model of dysregulated eating with positive and negative emotional eating.

6.4 Moving along the continuum of dysregulated eating

Previously, I argued that dysregulated eating behaviours could be placed on a continuum, with normal eating on one end, and BE on the other end of the continuum (Natensohn, 2020). Considering the results of this dissertation, I would also place negative EE, and positive EE on the continuum, with the former indicating almost as severe level of dysregulated eating as BE. The latter would be placed more broadly somewhere around OE, depending on whether impulse control difficulties are also arising (situated after OE on the continuum) or not (situated between normal eating and OE on the continuum).

Based on the results of this dissertation, several factors could be identified that potentially contribute to moving along the continuum towards a more pathological eating behaviour. Specifically, I propose that difficulties with emotion regulation that often co-occur with high levels of negative EE play a pivotal role in moving along the continuum of dysregulated eating towards a more severe level of eating disturbance. In **Study 2**, we found that the classes with the highest level of EE also showed the highest level of ER difficulties, regardless of the BMI. Moreover, increasing difficulties in ER (but not ED psychopathology or BMI) discriminated between normal weight individuals without EE and normal weight individuals with positive EE. Thus, it appears that increasing difficulties in ER possibly contribute to moving along the continuum – from normal eating towards OE and positive EE as well as towards negative EE and BE. Moreover, high levels of ER difficulties could in itself contribute to the development of loss of control, thereby enhancing the movement towards BE and negative EE.

In terms of a more severe level of dysregulated eating, such as BE, it is plausible that the presence or onset of other ED-related symptoms (such as preoccupation with food and body weight, restrained eating, etc) alongside with increasing ER difficulties facilitate moving from OE towards negative EE and BE. It is also important to note that although higher BMI tends to coincide with poorer body image (Schwartz & Brownell, 2004) and higher preoccupation with body weight, it is not sufficient to look at BMI alone when determining the risk

for a more severe level of dysregulated eating. Rather, body weight should be assessed together with dysregulated eating patterns and ED-related features.

To sum up, I propose that difficulties in ER serve as a pivotal factor in the development and maintenance of EE and other forms of dysregulated eating. From there, the presence or onset of general ED psychopathology possibly facilitates the risk for moving onwards on the continuum towards developing a more serious eating pathology.

6.5 Future directions

A few distinct avenues for research exist that have yet not been highlighted in previous sections. First, both dimensions of EE, positive and negative EE, should be more thoroughly researched in men, as there seem to be important differences between the sexes on account of this dissertation as well as other studies. Specifically, the prevalence of both positive EE (compared to negative EE) (Meule, Reichenberger, & Blechert, 2018; Wouters et al., 2018) and OE (compared to BE) (Carey, Saules, & Carr, 2017; Striegel-Moore et al., 2009) tend to be higher among men than women. In addition, there is evidence that the mechanisms of dysregulated eating behaviour might also differ between the sexes, such as that in men, OE and BE might be more strongly associated with impulsivity, rather than the need for emotion regulation. Supporting this, Kukk & Akkermann (2017) found that among men, BE (measured via EMA) was best predicted by a combination of fluctuations in NA, trait impulsivity, and self-reported BE, whereas among women, ER difficulties emerged as an important predictor in addition to other variables (i.e., restrained eating, fluctuations in NA). Moreover, the number of OE and BE episodes in the same study were positively correlated with impulse control difficulties and trait impulsivity in men, but not in women (Kukk & Akkermann, 2017). Taken together, dysregulated eating and its underlying mechanisms in men are in need of further research.

Secondly, it is important to study positive and negative EE more thoroughly in different age groups, particularly among youth, as adolescence is a time characterized by both higher levels of emotional reactivity (Dahl & Gunnar, 2009) as well as the development of BE and related ED psychopathology (Culbert, Sisk, & Klump, 2018). Thus, exploring the relationship between higher levels of PA and self-regulation in youth might help further clarify the mechanisms underlying positive EE. Likewise, EE should be more thoroughly investigated in older age groups, as dysregulated eating patterns are shown to differ by age, especially depending on the changes in the ovarian hormone levels (Baker et al., 2019; Baker, Girdler, & Bulik, 2012).

In addition to studying EE in different subgroups, the proposed continuum model of dysregulated eating that includes positive and negative EE should be investigated to identify the factors that facilitate moving along the continuum. In this dissertation, only a few potential factors were highlighted. Disentangling these factors could help develop more specific prevention targets for dysregulated eating.

Exploring the trajectories of different positive and negative emotions preceding and following dysregulated eating episodes via the use of EMA also constitutes a worthwhile target of research. Regarding the continuum model of dysregulated eating, it could be tested whether frequent positive emotion induced eating (e.g., OE) could consequently lead to the emergence of negative emotions, that, in turn, might predispose one towards developing loss of control over eating and therefore a more severe level of dysregulated eating (i.e., BE).

Lastly, taking into account the proposed hedonic/external eating aspect of positive EE, several moderating factors should be more thoroughly studied. It would be especially useful to investigate social cues and others aspects related to social context in relation to eating behaviour. Specifically, a variety of social cues could become associated with hedonically-driven eating (Lowe & Butryn, 2007), especially in the context of the availability of palatable foods in the environment. This, in turn, might become a risk factor for dysregulated eating.

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SUMMARY IN ESTONIAN

Täpsustades positiivse ja negatiivse emotsionaalse söömise konstrukte

Häirunud söömiskäitumist on võimalik vaadelda kontinuumil, mille ühes otsas on normaalne söömine, teises söömishäirele iseloomulik häirunud söömiskäitumine. Normaalne tavapärane söömine hõlmab endas söömiskäitumist, mis on juhitud füsioloogiliste protsesside – nälja- ja küllastumustunde – poolt. Lisaks on normaalsele söömisele iseloomulik see, et söömine on paindlik ning pigem juhitud füsioloogiliste kui kognitiivsete protsesside poolt (nt söömise piiramine kaalu- langetuse eesmärgil).

Paraku esineb aga osadel inimestel häirunud söömiskäitumist – eelkõige toiduga liialdamist ja kontrollimatut söömist –, mis suurendab riski ülekaalulisuse ja söömishäire tekkeks. Selliseid häirunud söömiskäitumise ilminguid esineb ka tavapopulatsioonis. Liigsöömine, mis on ka *bulimia nervosa* ja liigsöömishäire diagnostiline kriteerium, hõlmab endas lühikese aja jooksul suure koguse toidu tarbimist ning kontrollikadu söömise üle. Ülesöömine hõlmab endas liigset toidu tarbimist, ent mitte kontrollikadu. Kuna kontrollikadu söömise üle on olulisem söömispatoloogia ennustaja kui tarbitud toidu kogus ise, peetakse liigsöömist tõsisemaks häirunud söömise näitajaks võrreldes ülesöömisega. Sellegi poolest on mõttekas ülesöömist uurida, sest teatud tingimustel võib see areneda edasi liigsöömiseks ning seega juba raskemaks häirunud söömiskäitumise vormiks.

Üle- ja liigsöömise kõrval on üheks häirunud söömiskäitumise ilminguks ka emotsionaalne söömine, mis on defineeritud kui tendents süüa vastusena negatiivsetele emotsioonidele, sageli emotsioonide reguleerimise eesmärgil. Uuringutes on leitud, et emotsionaalne söömine sarnaneb oma olemuselt liigsöömisele, mistõttu võib oletada, et emotsionaalne söömine on justkui liigsöömise alalävine vorm. Lisaks negatiivsetele emotsioonidele on hiljutised uuringud näidanud, et ka positiivsed emotsioonid võivad viia ülesöömiseni. Seega on emotsionaalse söömise ja häirunud söömiskäitumise kontekstis oluline rääkida ka positiivsest emotsionaalsest söömisest, kuigi teadlased ei ole kindlad, kas ja kuivõrd seostub see söömispatoloogiaga.

Arvestades seda, et häirunud söömiskäitumise ilminguid esineb ka tavapopulatsioonis, on oluline neid lähemalt uurida, et seeläbi arendada paremaid söömishäirete ennetus- ja sekkumisvõimalusi. Seega oli doktoritöö eesmärk uurida lähemalt emotsionaalse söömise konstrukti, eristades positiivsete ja negatiivsete emotsioonide ajal söömist (**Urimus 1**) ning võrrelda, kuidas need seostuvad üldise söömispatoloogia ning emotsioonide reguleerimise raskustega (**Urimus 2**). Niisamuti uuriti doktoritöö raames, kuidas sugu, kehamassiindeks (KMI) ja söömist ümbritsevad sotsiaalsed ja situatsioonilised tegurid mõjutavad seoseid positiivse ja negatiivse afekti ning üle- ja liigsöömise vahel (**Urimus 3**). Uurimisküsimustele vastamiseks kasutati nii enesekohaste küsimustike andmeid kui ka kogemuse väljavõtte meetodi abil kogutud andmeid üle- ja liigsöömis- hoogude, positiivse ja negatiivse afekti ning sotsiaalsete/situatiivsete tegurite kohta.

Käesolevas doktoritöös selgus, et positiivne ja negatiivne emotsionaalne söömine omavad ühisosa (**Uurimused 1 ja 2**), ent ka selgeid erinevusi (**Uurimused 1, 2, 3**). Ühisosale viitab see, et eneseraporteeritud positiivne ja negatiivne emotsionaalne söömine olid omavahel mõõdukas korrelatsioonis, niisamuti seostusid mõlemad konstruktid söömishäiretele iseloomulike ilmingutega, nagu hõivatus kehakaalust ja välimusest, söömise piiramine ja liigsöömine (**Uurimus 1**). Seejuures olid aga seosed tugevamad negatiivse emotsionaalse söömise puhul võrreldes positiivse emotsionaalse söömisega.

Samas viitavad kõik kolm uurimust samaaegselt ka konstruktide erisusele. **Uurimus 1** näitas, et positiivne emotsionaalne söömine ennustas kogemuse väljavõtte meetodi abil mõõdetud ülesöömisshoogude koguarvu koguvalimis, samal ajal kui negatiivne emotsionaalne söömine ennustas üle- ja liigsöömisshoogude arvu kitsamas alavalimis, mida iseloomustas kõrgem häirunud söömiskäitumise tase. Nende tulemuste põhjal on võimalik järeldada, et negatiivse emotsionaalse söömise olemasolu on selgelt patoloogilisem nähtus kui positiivne emotsionaalne söömine.

Ka **Uurimus 2** tulemused viitavad konstruktide erisusele ning negatiivse emotsionaalse söömise tugevamale seotusele söömispatoloogiaga. Nimelt uuriti Uurimus 2-s positiivsest ja negatiivsest emotsionaalsest söömisest, KMI-st ning kehakaaluga hõivatusel moodustuvaid alagruppe latentsete profiilide analüüsi abil. Sobivaks osutusid nii 4 kui ka 5 profiiliga lahendid. Kui profiile omavahel võrrelda, selgus, et (negatiivne) emotsionaalne söömine seostus enim emotsiooni regulatsiooni raskuste ning söömishäire sümptomitega, sõltumata kehakaalust (st normaalkaalus ja rasvunud emotsionaalsed sööjad ei erinenud teineteisest). Näiteks iseloomustas rasvunud ja normaalkaalus emotsionaalseid sööjaid teiste gruppidega võrreldes vähenenud ligipääs funktsionaalsetele emotsiooniregulatsiooni strateegiatele, väiksem teadlikkus ja arusaam oma emotsioonidest ning raskused pikaajaliste eesmärkide täitmisel tugevate negatiivsete emotsioonide kogemisel.

Huvitaval kombel sarnanesid normaalkaalus positiivsete emotsioonide ajal sööjad normaalkaalus mitte-emotsionaalsete sööjatega, omades samavõrra madalaid näitajaid söömispatoloogia osas. Samas aga iseloomustasid normaalkaalus positiivseid emotsionaalseid sööjaid mõnevõrra kõrgemad skoorid emotsiooni regulatsiooni raskuste osas võrreldes mitte-emotsionaalsete sööjatega. Need tulemused viitavad sellele, et ka positiivne emotsionaalne söömine võib sarnaselt negatiivsele emotsionaalsele söömisele olla seotud emotsioonide regulatsiooni raskustega – võimalik aga, et positiivse emotsionaalse söömise puhul on oluliseks teised emotsioonide reguleerimise aspektid kui negatiivse emotsionaalse söömise puhul. Üheks selliseks aspektiks võib olla positiivne kärsitus, mis viitab tendentsile käituda impulsiivselt või mõtlematult, tundes tugevaid positiivsed emotsioone. Seega võib ebaõnnestunud tugevate tunnetega toimetulek – olenemata sellest, kas tegu on positiivsete või negatiivsete tunnetega – olla riskifaktor häirunud söömiskäitumise tekkes.

Viimase etapina (**Uurimus 3**) uuriti doktoritöös meeste-naiste vahelisi erinevusi selles, kuidas afekt seostub üle- ja liigsöömisshoogudega. Tulemused näitasid,

et naistel oli negatiivsete emotsioonide tase kõige kõrgem enne liigsöömishoogu, sellest madalam enne ülesöömishoogu ning kõige madalam enne tavalist söömist. Need tulemused on kooskõlas teaduskirjandusega, kus on leitud, et kõrgeenud NA eelneb tihti liigsöömishoole või on selle vallandajaks. Lisaks kinnitasid Uurimus 3 tulemused ka seda, et NA on sarnaselt liigsöömisega seotud ka ülesöömishoogudega.

Meeste tulemused olid aga erinevad naiste omadest (**Uurimus 3**). Ilmnes, et meestel oli positiivsete emotsioonide tase kõige kõrgem enne ülesöömishoogu, madalam aga enne liigsöömishoogu ja tavalist söömist. Kuigi uuringud on näidanud, et positiivsed emotsioonid võivad kutsuda esile söömist ka naiste seas, võib spekulatsioon selle üle, et ehk ilmnes antud efekt vaid meeste seas just seetõttu, et meestel esineb võrreldes naistega rohkem nii ülesöömist (võrreldes liigsöömisega) kui ka positiivset emotsionaalset söömist (võrreldes negatiivse emotsionaalse söömisega). Niisamuti on võimalik, et ka siinkohal on üheks positiivse emotsionaalse söömise all olevaks mõjuteguriks positiivne kärsitus – kuna meeste häirunud söömiskäitumist on seostatud rohkem impulsiivsuse ning vähem vajadusega emotsioone reguleerida, on see tõlgendus eriti tõenäoline.

Kokkuvõttes aitas käesolev doktoritöö täpsemalt defineerida ja eristada positiivse ja negatiivse emotsionaalse söömise konstrukte, kinnitades veelgi, et negatiivse emotsionaalse söömise olemasolu on selgelt seotud söömispatoloogia ja raskustega emotsioonide reguleerimisel. Seega võiks inimesi, kes kipuvad oma emotsioone söömise abil reguleerima, aidata see, kui neid harida funktsionaalsete emotsioonide reguleerimise võtete osas ning õpetada oma emotsioone ära tundma ja eristama ning paremini ebamugavaid tundeid taluma.

Kuigi positiivsete emotsioonide ajal söömine näib olevat vähem seotud söömispatoloogiaga, on oluline seda siiski edasi uurida. Ühelt poolt näib, et positiivne emotsionaalne söömine on vähem patoloogiline, sest seostub rohkem ülesöömisega. Sellegi poolest võivad inimesed, keda iseloomustab näiteks kõrge positiivne kärsitus ja madal eneseregulatsiooni võime, olla riskis ülekaalu või liigsöömise tekkeks. Teisalt on tõsi, et positiivne emotsionaalne söömine ei ole tingimata patoloogiline, vaid võib olla ka osa normaalsest söömisest, mis on rohkem seotud hedoonilise söömise ja toidunautimisega. Ent ka siin on oht, et koosmõjus teiste faktoritega (nt ülesöömine) võib see toidunautimine areneda edasi tõsisemaks häirunud söömiskäitumise vormiks.

Viimase etapina pakun doktoritöös oma tulemuste põhjal välja faktorid, mis võiksid mõjutada liikumist häirunud söömiskäitumise kontinuumil. Näib, et emotsiooniregulatsiooni raskused on üheks teguriks, mis võivad suunata inimest häirunud söömiskäitumise suunas, sealjuures olles riskifaktoriks nii ülesöömise kui liigsöömise puhul. Positiivne emotsionaalne söömine võiks kontinuumil paikneda ülesöömise läheduses, olles üksinda vähepatoloogiline. Kui mõelda aga, mis suunab inimest ülesöömisest liigsöömise poole, võib spekulatsioon, et ehk on nendeks faktoriteks üldised söömishäire riskifaktorid – nt kehakaalu ja välimuse ülemäärane väärtustamine, kõhnuseihalus, söömise piiramine jpm.

Kokkuvõttes täpsustati antud doktoritöös positiivse ja negatiivse emotsionaalse söömise olemust ning pakuti mõned sissevaated allolevatesse mehhanismidesse. Viimaseid tasuks edasi uurida, kaasates uuringutesse mehi ja erinevaid vanusegrupe. Eriliselt tasuks tähelepanu pöörata noorukitele, sest noorukiiga iseloomustab kõrge emotsionaalne reaktiivsus ning just sel ajal areneb tavaliselt välja häirunud söömiskäitumine. Edasi võiks uurida ka emotsioonide kõikumist (nii positiivsete kui negatiivsete) ning selle mõju häirunud söömiskäitumisele, eriti noorukite puhul. Täpsustamist vajaksid ka söömisega seonduvad situatsioonilised ja sotsiaalsed tegurid, mida antud doktoritöö raames uuriti eksploraatiivselt – kasuks tuleks spetsiifilisema uuringudisaini rakendamine, mis oleks loodud just konkreetsete hüpoteeside testimiseks.

PUBLICATIONS

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Publikatsioonid:

Sultson, H., van Meer, F., Sanders N., van Elburg, A.A., Danner, U.N., Hoek, H.W., Adan, R.A.H., & Smeets, P.A.M. (2016). Associations between neural correlates of visual stimulus processing and set-shifting in ill and recovered women with anorexia nervosa. *Psychiatry Research: Neuroimaging*, 255, 35–42.
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