

Emotional eating in youngsters: the role of rejection and emotion regulation

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So long as you have food in your mouth,
you have solved all questions for the time being.

Franz Kafka

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Chapter 1

Emotional eating in youngsters: an overview

In this chapter, an overview of the literature on emotional eating is presented. First, the definition, prevalence, prognoses and assessment of emotional eating, in both adults and youngsters, are discussed. Next, an overview of the prominent etiological theories on emotional eating in obese and normal weight individuals are presented. Regarding youngsters, special attention is paid to the influence of parents. In addition, the existing emotional eating interventions are reviewed. Finally, an overview of the research questions and empirical studies in this dissertation is provided.

Emotional Eating; Definition, Prevalence, Prognoses and Assessment

Emotional eating is defined as ‘the tendency to overeat in response to negative emotions such as anxiety or irritability’ (van Strien et al., 2007, p. 106). Analyzing the definition, ‘overeating’ can imply eating beyond satiation (not stopping although no longer hungry) as well as eating in the absence of hunger (starting although not hungry). The negative emotions mentioned in the definition refer to low- to moderate intense negative emotions, like irritability. In contrast, high intense emotions, for example mortal fear, generally decrease food intake (Robbins & Fray, 1980). Next to emotional eating, a close-related concept is stress-induced eating (Greeno & Wing, 1994). Especially chronic stress seems to be related to an increase in appetite and food intake (Dallman et al., 2003; Dallman, Pecoraro, & la Fleur, 2005). Comparable to intense negative emotions, acute stress, like threat to personal safety, results in suppression of appetite and food intake (Charmandari, Tsigos, & Chrousos, 2005). Emotional eating and stress-induced eating can be hard to distinguish from each other, as stress and negative emotions often coexist.

Not all humans experience emotional eating. Studies examining the prevalence of emotional eating in a comprehensive way are lacking. This is partly because emotional eating is mostly viewed as a continuum from low to high levels, and not as a well-delineated category. Macht (2008) concluded in his review that, on average, surveys report that about 30% of participants declare to increase appetite or intake in response to emotional stress. Further, studies in adults generally show higher levels of emotional eating in women compared to men (Tanofsky, Wilfley, Spurrell, Welch, & Brownell, 1997; van Strien, Frijters, Bergers, & Defares, 1986). With regard to children and adolescent, studies indicate that emotional eating is already present (e.g. Blissett, Haycraft, & Farrow, 2010; Carper, Fisher, &

Birch, 2000; Nguyen-Michel, Unger, & Spruijt-Metz, 2007). A study of Shapiro et al. (2007) showed that 63% of a sample of 55 children, aged 5 until 13 years, answered affirmative when they were asked “Do you ever eat because you feel bad, sad, bored or any other mood”. However, other research suggests that the prevalence of emotional eating is rather low in children, but increases in adolescence (Carper et al., 2000; van Strien & Oosterveld, 2008; Wardle, Guthrie, Sanderson, & Rapoport, 2001).

Various studies in adults and youngsters have reported that the prevalence of emotional eating is higher in overweight and obese individuals (e.g. Braet et al., 2008; Dressler & Smith, 2013; Turker et al., 2012). Since emotional eating occurs in the absence of hunger or fosters eating beyond the saturation point, it may increase calorie intake. Furthermore, emotional eating is characterized by eating ‘comfort food’. Comfort food is highly palatable food rich in sugar and fat, like desserts and fast food (Gibson, 2012). This way, emotional eating might contribute to an unhealthy lifestyle and cause overweight or obesity over time.

Furthermore, the longitudinal study of Stice, Presnell, and Spangler (2002) demonstrated that emotional eating is an important antecedent of binge eating in adolescent girls. Binge eating is defined as eating large amounts of food in short periods of time, while loss of control over eating is experienced. Binge eating is a key symptom of the mental disorders Binge Eating Disorder (BED) and Bulimia Nervosa (BN; American Psychiatric Association, 2013). In addition, research in patients with BED showed that, on average, the onset of binge eating occurs in adolescence, suggesting that adolescence is a critical period in the development of binge eating (Spurrell, Wilfley, Tanofsky, & Brownell, 1997).

Typically, an emotional eating style in adults and youngsters is assessed by emotional eating scales, like the Dutch Eating Behaviour Questionnaire (DEBQ; van Strien et al., 1986), the Emotional Eating Scale

(EES; Tanofsky-Kraff et al., 2007) and Eating in the Absence of Hunger Questionnaire (EAH-C; Tanofsky-Kraff et al., 2008). However, recent research suggests that people are generally rather poor at recalling their emotions, their eating behaviour and the associations between the two (Bongers, Jansen, Houben, & Roefs, 2013). This was endorsed by some studies not finding a relation between self-reported emotional eating and actual food intake following mood induction (e.g. Adriaanse, de Ridder, & Evers, 2011; Evers, de Ridder, & Adriaanse, 2009). Therefore, a new assessment method was developed; an implicit association test, using food- and emotion-related words, next to neutral words (The Single Target Implicit Association Test; Bongers et al., 2013). But results on the validity of this method are scarce and rather inconclusive. A third, perhaps better possibility, is the use of a diary to register food intake and current emotions on a regular bases, to avoid recall bias (Olbrisch et al., 2006).

Etiology of Emotional Eating

There are multiple theories on the etiology of emotional eating. The theories highlight a variety of risk factors and can be viewed as complementary, rather than contradicting. Theories originally stem from the literature on obesity, but more recent theories aim to explain emotional eating in normal weight population as well (e.g. Canetti, Bachar, & Berry, 2002; Evers, Stok, & de Ridder, 2010). In what follows, an overview of the prominent theories on emotional eating is presented.

Psychosomatic Theories of Obesity

Kaplan and Kaplan (1957) proposed that emotional eating in obese individuals is a learned behaviour which reduces anxiety. This learned behaviour is based on early associations of pleasurable, non-anxious situations with eating. Furthermore, Kaplan and Kaplan (1957) hypothesized that the anxiety-reducing effect of eating is the result of the physiological incompatibility between the act of eating and experiencing

intense fear. Because obese individuals learnt to eat in response to hunger as well as in response to anxiety, the authors suggested that they are unable to distinguish hunger from anxiety. Next, Bruch (1973) suggested that the psychological experience of hunger is not innate, but is rather based on early learning experiences in the child-mother interaction. Bruch (1973) suggested that inappropriate responses from the mother, like using food to pacify the child or withholding food as punishment, would result in a lack of hunger awareness in the child, making it hard to differentiate hunger from other signals of discomfort, like emotional distress. Obese individuals would not recognize hunger or satiation and interpret sensations of discomfort as the urge to eat. Thus, both theories suggest that obese individuals are unable to distinguish hunger from emotions, either because they never learned to distinguish them (Bruch, 1973) or because they learned to associate them at young age (Kaplan & Kaplan, 1957).

Restrained Theory of Herman and Polivy (1980)

The restrained theory discusses the influence of dieting on the relation between emotion and food intake. According to this theory, restraining food intake or dieting requires cognitive control of the individual. Strong emotions make demands on the individual's cognitive capacity and therefore may temporarily disinhibit the cognitive effort to resist from food. Restrained eaters would not only increase food intake in response to negative emotions, but also to other cognitive demands (Wallis & Hetherington, 2004), including positive emotions (Cools, Schotte, & McNally, 1992). Thus, this theory encompasses more than emotional eating defined as 'the tendency to overeat in response to negative emotions such as anxiety or irritability' (van Strien et al., 2007, p. 106).

Affect Regulation Models

In concordance with Kaplan and Kaplan (1957), more recently, other researchers have suggested that emotional eating is a learned way of

dealing with negative emotions. Their research is founded on earlier affect regulation models of binge eating (e.g. Hawkins II & Clement, 1984; McCarthy, 1990; Telch, 1997). The concept of affect or emotion regulation (ER) is defined as the efforts people undertake to influence the experience or expression of their emotions (Gross, 1999). A distinction can be made between adaptive or functional ER strategies, which restore the emotional balance, and maladaptive or dysfunctional ER strategies, which are related to psychopathological symptoms in the short or long term (Aldao, Nolen-Hoeksema, & Schweizer, 2010). According to Telch (1997), the use maladaptive ER strategies to deal with negative affect is related to a deficit or absence of adaptive ER skills.

Affect regulation models conceptualize disordered eating as a learned maladaptive ER strategy designed to reduce unpleasant affect. This behaviour is maintained by the reinforcing experience of temporary negative affect reduction. Research suggests that the affect regulation model not only explains binge eating but is also applicable to explain the manifestation of emotional eating. Research in adults has found associations between emotion regulation difficulties and emotional eating (e.g. Evers et al., 2010; Spoor, Bekker, van Strien, & van Heck, 2007; Taube-Schiff et al., 2015). Evers et al. (2010) demonstrated that randomly manipulating the emotion regulation strategies (adaptive versus maladaptive) of females in a negative affect induction experiment, had a significant effect on the amount of comfort food eaten afterwards. The results of this study suggests that the use of ‘primary’ maladaptive ER strategies to deal with negative emotions, like emotional suppression, may subsequently lead to the use of ‘secondary’ ER strategies, in this case emotional eating, which offers temporary relief. This assumption was also supported by the study of Spoor et al. (2007), who found that the use ‘primary’ maladaptive ER strategies was related to emotional eating in

eating-disordered women and healthy women, while controlling for levels of negative affect, suggesting that emotional eating is a result of maladaptive ER. However, other researchers have suggested that negative affect may directly elicit emotional eating as ER strategy (e.g. van Strien, Engels, Van Leeuwe, & Snoek, 2005; van Strien, van der Zwaluw, & Engels, 2010). This could suggest that emotional eating can also become an ingrained strategy for dealing with negative affect.

Next to the research in adults, research in children and adolescents on the association between ER and emotional eating is rather scarce. One study of Harrist, Hubbs-Tait, Topham, Shriver, and Page (2013) showed an association between maladaptive ER strategies and the emotional eating of children aged between 7 and 9 years old. Although research on the association between ER and emotional eating in children and adolescents is limited, several researchers posit that the deficit in ER is already formed in early childhood (e.g. Baker & Hoerger, 2012; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Rohner, 2004). According to the Interpersonal Acceptance-Rejection Theory (IPARTheory; Rohner, 1975; Rohner, 1980, 1986), all children have a biologically based emotional need for comfort, support and care from primary caregivers. If this need is not met, by a lack of parental warmth and/or the presence of parental rejection (e.g. disliking or being indifferent towards the child), the child is predisposed to develop emotional instability. This emotional instability may be understood in terms of an ER deficit. According to Barrett and Campos (1987), young children learn ER skills through the caregiver-child interactions. Eisenberg, Cumberland, and Spinrad (1998) hypothesized that supportive and/or sensitive responses from primary caregivers, like recognizing and labeling the emotion of the child or comforting the child, enhances the internalization of the effective ER strategies. In contrast, when supportive responses are lacking, this internalizing process is impeded, leading to ER

deficits or lack of adaptive ER strategies. This may incite the child to use maladaptive ER strategies when experiencing negative emotions. Furthermore, Eisenberg et al. (1998) suggested that unsupportive reactions to the child's emotions, like criticism or rejection, will increase the distress of the child and incite the child to suppress emotions (Eisenberg et al., 1998). This could suggest that parental rejection not only has its effect on the general ER of the child, but can also function as a momentary trigger of distress, which may consequently evoke the momentary use of maladaptive ER strategies, like emotional suppression, to deal with this distress. The relationship between parental rejection and the use of maladaptive ER strategies has been confirmed in adolescents, cross-sectional as well as longitudinal (e.g. Meesters & Muris, 2004; Saritas, Grusec, & Gencoz, 2013; Wagner, Cohen, & Brook, 1996).

Treatment of Emotional Eating

Interventions focusing solely on the treatment of emotional eating are limited. On the other hand, therapeutic techniques to treat emotional eating are increasingly incorporated in obesity treatments (Staniford, Breckon, & Copeland, 2011). These emotional eating interventions are generally extrapolated from treatment protocols for BED and focus on the previously mentioned risk factors restraint eating and/or ER deficits (e.g. Roosen, Safer, Adler, Cebolla, & van Strien, 2012).

Therapeutic techniques to improve the ER of the patient are derived from various psychotherapy schools. Research in obese and normal-weight adults has shown promising results for cognitive behavioural methods like psycho-education, identifying and monitoring 'critical situations', developing alternate ER strategies, repeated and structured in vivo exposure to 'problem foods' while under stress and subsequent response prevention, and relapse prevention (Annesi & Marenco, 2015; Armitage, 2015; Corsica, Hood, Katterman, Kleinman, & Ivan, 2014). In addition,

research in obese and normal-weight adults has demonstrated that mindfulness techniques like yoga, mindfulness meditation and enhancing body awareness through body scanning, can decrease emotional reactivity and as such decrease emotional eating (for review see Katterman, Kleinman, Hood, Nackers, & Corsica, 2014). The same goes for relaxation training using imaginative exercises or virtual reality (Manzoni et al., 2009; Riva, Manzoni, Villani, Gaggioli, & Molinari, 2008). Moreover, Corsica et al. (2014) found that an intervention combining cognitive behavioural and mindfulness techniques resulted in greater reduction of emotional eating in overweight adults, compared to the interventions including only one of both. The importance of combining both techniques is also reflected in the effectiveness of dialectical behaviour therapy in reducing emotional eating in obese adults (Glisenti & Strod, 2012; Roosen et al., 2012). The focus of dialectical behaviour therapy is to teach the patients adaptive ER skills through the use of different techniques. This contains both acceptance and mindfulness, as well as cognitive behavioural techniques. Results from a pilot study of Roosen et al. (2012) in obese emotional eaters showed a significant reduction in emotional eating at the end of treatment and 6 months after treatment. A case study of Glisenti and Strod (2012) in obese adults suggests that dialectical behaviour therapy is more effective in the treatment of emotional eating and obesity than cognitive behavioural therapy.

With regard to restraint eating, studies on diet and/or exercise interventions in obese adults demonstrate that decreases in restraint eating can lead to decreases in emotional eating. The idea is that prescriptive meal plans and exercises leads to weight-loss and helps to promote self-control skills regarding food intake. This leads to decreases in restraint eating and cognitive load, which in turn leads to decreases in emotional

eating (Ho et al., 2013; Meekums, Vaverniece, Majore-Dusele, & Rasnacs, 2012).

Finally, there are some studies on obesity treatment that do not intent to treat emotional eating or related risk factors, but do show indirect effects on emotional eating. Some studies on bariatric surgery in adults show a decrease in emotional eating at follow-up (Canetti, Berry, & Elizur, 2009; Genco et al., 2013). The surgery decreases physical hunger and reduces the physical capacity for food, leading to a decrease in emotional eating. However, it should be noted that bariatric surgery only has its effect on the portion size and does not eliminate emotional eating per se. Research suggests that after surgery, patients with disturbed eating behaviour often shift from bingeing to grazing (eating smaller amounts of food continuously throughout the day or eating large amounts of food over a longer period of time) (Saunders, 2001).

All studies mentioned above only included adults. Studies investigating emotional eating treatment in children and adolescents are almost non-existent and so little is known about effective emotional eating interventions in children and adolescents. For example, dialectical behaviour therapy has shown to be effective in the treatment of various disorders in adolescents (e.g. eating disorders), however, the effectiveness on emotional eating in adolescents has not yet been investigated. A few studies did investigate the effect of a multidisciplinary non-diet weight loss treatment, which incorporated cognitive behavioural techniques to treat emotional eating. More specific, Braet and colleagues found in two studies that the emotional eating style of the patients (10-17 years) had not changed after a 10-month inpatient treatment (Braet, Tanghe, De Bode, Franckx, & Van Winckel, 2003; Braet, Tanghe, Decaluwe, Moens, & Rosseel, 2004). In addition, the results of Halberstadt et al. (2015) showed that only the emotional eating style of boys, and not girls (8-19 years), had

decreased after an one-year treatment. Why these treatment programs fail to diminish emotional eating is yet unclear. Since research suggests that children learn ER strategies in interaction with primary caregivers and that caregivers' responses affect the ER of children (Eisenberg et al., 1998; Meesters & Muris, 2004), it might be imperative to include parents in the treatment of emotional eating in youngsters. Recently, Knatz, Braden, and Boutelle (2015) proposed a parent-focused intervention, which teaches parents to appropriately respond to their children's emotion dysregulation and become their child's 'emotion coach'. This emotion-focused family therapy (EFFT) has shown promising results in children and adolescents with eating disorders, but still has to be tested for the treatment of emotional eating (e.g. Robinson, Dolhanty, & Greenberg, 2015).

Conclusion and Research Questions

To conclude, emotional eating is a common phenomenon in the general population and already exists in children and adolescents (e.g. Shapiro et al., 2007). Emotional eating is not without consequences, as it can contribute to an unhealthy lifestyle and cause obesity and/or evolve into binge eating disorder over time (Braet et al., 2008; Stice et al., 2002). As adolescence is a critical period in the development of obesity and binge eating, emotional eating prevention and intervention during early adolescence is essential (Levitan & Davis, 2010; Stice, Killen, Hayward, & Taylor, 1998). Therefore, this doctoral dissertation focusses on risk factors in the development and maintenance of emotional eating in youngsters from the community as well as in obese youngsters seeking treatment. More recent studies in adult clinical and community samples suggest the influence of ER deficits in the development of emotional eating (e.g. Evers et al., 2010). Studies on this relationship in children and adolescents are scarce. One study showed an association between maladaptive ER strategies and the emotional eating of children aged

between 7 and 9 years old (Harrist et al., 2013). In addition, research suggests that ER deficits are formed in interaction with primary caregivers and that rejecting behaviours of parents may elicit maladaptive ER strategies in youngsters (Eisenberg et al., 1998; Meesters & Muris, 2004). As research indicates that parental rejection is related to the ER of youngsters and that ER is related to emotional eating in youngsters, it could be hypothesized that parental rejection is related to emotional eating of youngsters. This may imply that including parents into the treatment of emotional eating in youngsters is imperative and perhaps may explain why weight-loss treatment programs only incorporating cognitive behavioural techniques fail to decrease emotional eating in obese youngsters (e.g. Braet et al., 2004). Based on the previous mentioned studies, the doctoral dissertation investigates three main research questions.

Firstly, the doctoral dissertation investigates parental rejection as a risk factor in the development and maintenance of emotional eating in youngsters from the community, as well as in obese youngsters seeking treatment. By using various research designs (cross-sectional, longitudinal, experimental, diary), we pay attention to the multiple ways parental rejection may influence the emotional eating of youngsters; as momentary trigger of distress or as general pattern affecting the emotional socialization process. Furthermore, because previous research failed to differentiate between the influence of mother and father, our research includes both maternal and paternal rejection, providing insight into the unique role of each parent. In addition, by conducting an experimental study, we are able to include actual food intake after mood induction as variable, next to self-reported emotional eating. This way, we take into account the research of Bongers et al. (2013), who suggested that people are generally rather poor at recalling their emotions, their eating behaviour and the associations between the two. Secondly, the doctoral dissertation

investigates the role of ER in the relationship between maternal and paternal rejection and emotional eating in youngsters from the community, as well as in obese youngsters seeking treatment. Specifically, we examine if maladaptive ER is a mediator in the relationship between maternal and paternal rejection and emotional eating. Lastly, the doctoral dissertation investigates if the presence of maternal and paternal rejection can explain the persistency of emotional eating after treatment. By investigating these three research questions, we try to fill the existing gap in the literature on the etiology and maintenance of emotional eating in youngsters. This is important as previous research claims adolescence to be a critical period in the development of obesity and binge eating. By filling this gap, this doctoral dissertation also tries to offer evidence on how emotional eating prevention and intervention could be improved.

The doctoral dissertation consist of seven chapters, including a general introduction, five empirical studies and a general discussion. In total, 292 youngsters, aged between 10 and 17 years old, participated across the five studies, of whom 110 were obese youngsters seeking treatment. In the following, an overview of the five studies is presented.

Study 1

This first study (chapter 2) investigates the relationship between maternal and paternal rejection and emotional eating in youngsters between the ages of 10 and 16 years. Additionally, this study examines if ER is a mediator in this relationship. Because obese youngsters are known to display more emotional eating than non-obese youngsters, the sample is composed of obese youngsters who were referred to a Belgian treatment centre for obesity. Youngsters filled out questionnaires to assess the study variables.

Study 2

Comparable to the first study, the second study (chapter 3) investigates the relationship between maternal and paternal rejection, ER and emotional eating of youngsters between the ages of 10 and 16 years old, using questionnaires filled in by the youngsters. Considering that a clinical sample of obese youngsters is a select subgroup with increased psychiatric comorbidity, ER difficulties and disturbed eating, and that research has shown that emotional eating is also present in youngsters from the community, this study investigates this relation in a community sample of youngsters (Blissett et al., 2010; Messerli-Burgy, Pjanic, Jaggi, Fresa, & Znoj, 2012; Vannucci et al., 2013; Zimetkin, Zoon, Klein, & Munson, 2004). Furthermore, this study includes two waves, making it possible to use latent change models (LCM), which includes both level (first wave) and change (between the two waves). Firstly, we investigate if the level of the study variables maternal rejection, paternal rejection, maladaptive ER and emotional eating of the youngsters are related. Secondly, we examine if the relation between the level of parental rejection (maternal and paternal) and the level of emotional eating is mediated by the level of maladaptive ER. Regarding the change in the variables, we investigate if changes in study variables are related. Lastly, we examine if the relation between the change in parental rejection (maternal and paternal) and the change in emotional eating is mediated by the change in maladaptive ER.

Study 3

Recent research indicates that self-reported emotional eating does not capture the tendency to eat when experiencing negative emotions, but rather reflects the person's belief about the relation between emotion and eating (e.g. Adriaanse et al., 2011). Taking these findings into account, the relationship between parental rejection and actual food intake, preceded by

negative emotions, should be investigated. The laboratory is a valid setting to examine this relationship, as it enables induction of mood and direct observation of the eating behaviour after the mood induction. The third study (chapter 4) utilizes a laboratory paradigm with a negative mood condition versus neutral mood condition, and a subsequent multi-item snack buffet. The aim of the study is to examine if there is an interaction-effect between parental rejection (maternal and paternal) and condition, on the subsequent energy intake of the youngsters.

Study 4

To provide further insight into the relationship between parental rejection, as momentary trigger of distress, and emotional eating in youngsters, the fourth study (chapter 5) investigates this relationship on a day-to-day level, using a 7-day diary. As research suggests that next to parental rejection, peer rejection may also be a momentary trigger of distress that has an influence on the eating behaviour of youngsters, the aim of the study is to examine the day-to-day within-person effects of parental and peer rejection on the emotional eating behaviour of youngsters over 7 days (e.g. Schutz & Paxton, 2007).

Study 5

Research suggests that the emotional eating style of youngsters with obesity may be a stable feature, even when youngsters receive weight loss treatment which incorporates cognitive behavioural techniques to treat emotional eating (Braet et al., 2003; Braet et al., 2004; Halberstadt et al., 2015). Why these treatment programmes fail to diminish emotional eating is yet unclear. In the fifth study (chapter 6), we extend the results of the first study, by conducting a follow-up when the youngsters are back in their home environment, after inpatient multidisciplinary weight loss treatment. We examine if the variables maternal and paternal rejection and maladaptive ER can explain the stability of emotional eating. First, we

explore if there are changes in maternal and paternal rejection, maladaptive ER strategies, emotional eating and weight of the youngsters between pretest and follow-up. Next, the main objective of this study is to test if maladaptive ER strategies mediates the relation between maternal and paternal rejection and the emotional eating of the youngsters at follow-up. As research suggests that emotional eating is related to weight gain after weight loss treatment (e.g. Canetti et al., 2009), we also examine if the possible weight gain youngsters experience after treatment is related to the level of emotional eating of the youngsters at follow-up. Youngsters filled out questionnaires to assess the study variables.

References

- Adriaanse, M. A., de Ridder, D. T. D., & Evers, C. (2011). Emotional eating: Eating when emotional or emotional about eating? *Psychology & Health, 26*, 23-39. doi: 10.1080/08870440903207627
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*, 217-237. doi: 10.1016/j.cpr.2009.11.004
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington DC: American Psychiatric Association.
- Annesi, J. J., & Marenco, N. (2015). Indirect effects of exercise on emotional eating through psychological predictors of weight loss in women. *Appetite, 95*, 219-227. doi: 10.1016/j.appet.2015.07.012
- Armitage, C. J. (2015). Randomized test of a brief psychological intervention to reduce and prevent emotional eating in a community sample. *Journal of Public Health, 37*, 438-444. doi: 10.1093/pubmed/fdv054
- Baker, C. N., & Hoerger, M. (2012). Parental child-rearing strategies influence self-regulation, socio-emotional adjustment, and psychopathology in early adulthood: Evidence from a retrospective cohort study. *Personality and Individual Differences, 52*, 800-805. doi: 10.1016/j.paid.2011.12.034
- Blissett, J., Haycraft, E., & Farrow, C. (2010). Inducing preschool children's emotional eating: relations with parental feeding practices. *American Journal of Clinical Nutrition, 92*, 359-365. doi: 10.3945/ajcn.2010.29375

-
- Bongers, P., Jansen, A., Houben, K., & Roefs, A. (2013). Happy eating: The Single Target Implicit Association Test predicts overeating after positive emotions. *Eating Behaviors, 14*, 348-355. doi: 10.1016/j.eatbeh.2013.06.007
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology, 13*, 733-743. doi: 10.1177/1359105308093850
- Braet, C., Tanghe, A., De Bode, P., Franckx, H., & Van Winckel, M. (2003). Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. *European Journal of Pediatrics, 162*, 391-396. doi: 10.1007/s00431-003-1155-5
- Braet, C., Tanghe, A., Decaluwe, V., Moens, E., & Rosseel, Y. (2004). Inpatient treatment for children with obesity: Weight loss, psychological well-being, and eating behavior. *Journal of Pediatric Psychology, 29*, 519-529. doi: 10.1093/jpepsy/jsh054
- Bruch, H. (1973). *Eating disorders: obesity, anorexia nervosa and the person within*. New York: Basis Books.
- Canetti, L., Bachar, E., & Berry, E. M. (2002). Food and emotion. *Behavioural Processes, 60*, 157-164. doi: 10.1016/s0376-6357(02)00082-7
- Canetti, L., Berry, E. M., & Elizur, Y. (2009). Psychosocial Predictors of Weight Loss and Psychological Adjustment Following Bariatric Surgery and A Weight-Loss Program: The Mediating Role of Emotional Eating. *International Journal of Eating Disorders, 42*, 109-117. doi: 10.1002/eat.20592
- Carper, J. L., Fisher, J. O., & Birch, L. L. (2000). Young girls' emerging dietary restraint and disinhibition are related to parental control in child feeding. *Appetite, 35*, 121-129. doi: 10.1006/appe.2000.0343

-
- Charmandari, E., Tsigos, C., & Chrousos, G. (2005). Endocrinology of the stress response. *Annual Review of Physiology*, *67*, 259-284. doi: 10.1146/annurev.physiol.67.040403.120816
- Cools, J., Schotte, D. E., & McNally, R. J. (1992). Emotional arousal and overeating in restrained eaters. *Journal of Abnormal Psychology*, *101*, 348-351. doi: 10.1037/0021-843x.101.2.348
- Corsica, J., Hood, M. M., Katterman, S., Kleinman, B., & Ivan, I. (2014). Development of a novel mindfulness and cognitive behavioral intervention for stress-eating: A comparative pilot study. *Eating Behaviors*, *15*, 694-699. doi: 10.1016/j.eatbeh.2014.08.002
- Dallman, M. F., Pecoraro, N., Akana, S. F., la Fleur, S. E., Gomez, F., Houshyar, H., . . . Manalo, S. (2003). Chronic stress and obesity: A new view of "comfort food". *Proceedings of the National Academy of Sciences of the United States of America*, *100*, 11696-11701. doi: 10.1073/pnas.1934666100
- Dallman, M. F., Pecoraro, N. C., & la Fleur, S. E. (2005). Chronic stress and comfort foods: Self-medication and abdominal obesity. *Brain Behavior and Immunity*, *19*, 275-280. doi:10.1016/j.bbi.2004.11.004
- Dressler, H., & Smith, C. (2013). Food choice, eating behavior, and food liking differs between lean/normal and overweight/obese, low-income women. *Appetite*, *65*, 145-152. doi: 10.1016/j.appet.2013.01.013
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, *9*, 241-273. doi: 10.1207/s15327965pli0904_1
- Evers, C., de Ridder, D., & Adriaanse, M. (2009). Assessing yourself as an emotional eater: Mission impossible? *Psychology & Health*, *24*, 166-166.

-
- Evers, C., Stok, F. M., & de Ridder, D. T. D. (2010). Feeding Your Feelings: Emotion Regulation Strategies and Emotional Eating. *Personality and Social Psychology Bulletin, 36*, 792-804. doi: 10.1177/0146167210371383
- Genco, A., Maselli, R., Frangella, F., Cipriano, M., Paone, E., Meuti, V., . . . Adriano, R. (2013). Effect of Consecutive Intragastic Balloon (BIBA (R)) Plus Diet Versus Single BIBA (R) Plus Diet on Eating Disorders Not Otherwise Specified (EDNOS) in Obese Patients. *Obesity Surgery, 23*, 2075-2079. doi: 10.1007/s11695-013-1028-6
- Gibson, E. L. (2012). The psychobiology of comfort eating: implications for neuropharmacological interventions. *Behavioural Pharmacology, 23*, 442-460. doi: 10.1097/FBP.0b013e328357bd4e
- Glisenti, K., & Strodl, E. (2012). Cognitive Behavior Therapy and Dialectical Behavior Therapy for Treating Obese Emotional Eaters. *Clinical Case Studies, 11*, 71-88. doi: 10.1177/1534650112441701
- Greeno, C. G., & Wing, R. R. (1994). Stress-induced eating. *Psychological Bulletin, 115*, 444-464. doi: 10.1037/0033-2909.115.3.444
- Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition & Emotion, 13*, 551-573. doi: 10.1080/026999399379186
- Halberstadt, J., van Strien, T., de Vet, E., Eekhout, I., Braet, C., & Seidell, J. C. (2015). The association of eating styles with weight change after an intensive combined lifestyle intervention for children and adolescents with severe obesity. *Appetite, 99*, 82-90. doi: 10.1016/j.appet.2015.12.032
- Harrist, A. W., Hubbs-Tait, L., Topham, G. L., Shriver, L. H., & Page, M. C. (2013). Emotion Regulation is Related to Children's Emotional and External Eating. *Journal of Developmental and Behavioral Pediatrics, 34*, 557-565. doi: 10.1097/DBP.0b013e3182a5095f

-
- Hawkins II, R. C., & Clement, P. F. (1984). Binge eating: Measurement problems and a conceptual model. In R. C. Hawkins, W. J. Fremouw & P. F. Clement (Eds.), *The binge purge syndrome: Diagnosis, treatment, and research* (pp. 229-251). New York: Springer.
- Herman, C. P., & Polivy, J. (1980). Restrained eating. In A. J. Stunkard (Ed.), *Obesity* (pp. 208-225). Philadelphia, London, Toronto: Saunders.
- Ho, M., Gow, M., Halim, J., Chisholm, K., Baur, L. A., Noakes, M., . . . Garnett, S. P. (2013). Effect of a prescriptive dietary intervention on psychological dimensions of eating behavior in obese adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, *10*. doi: 10.1186/1479-5868-10-119
- Kaplan, H. I., & Kaplan, H. S. (1957). The psychosomatic concept of obesity. *Journal of Nervous and Mental Disease*, *125*, 181-201.
- Katterman, S. N., Kleinman, B. M., Hood, M. M., Nackers, L. M., & Corsica, J. A. (2014). Mindfulness meditation as an intervention for binge eating, emotional eating, and weight loss: A systematic review. *Eating Behaviors*, *15*, 197-204. doi: 10.1016/j.eatbeh.2014.01.005
- Knatz, S., Braden, A., & Boutelle, K. N. (2015). Parent Coaching Model for Adolescents With Emotional Eating. *Eating Disorders*, *23*, 377-386. doi: 10.1080/10640266.2015.1044352
- Levitan, R. D., & Davis, C. (2010). Emotions and Eating Behaviour: Implications for the Current Obesity Epidemic. *University of Toronto Quarterly*, *79*, 783-799. doi: 10.3138/utq.79.2.783
- Macht, M. (2008). How emotions affect eating: A five-way model. *Appetite*, *50*, 1-11. doi: 10.1016/j.appet.2007.07.002

-
- Macht, M., & Simons, G. (2000). Emotions and eating in everyday life. *Appetite, 35*, 65-71. doi: 10.1006/appe.2000.0325
- Manzoni, G. M., Pagnini, F., Gorini, A., Preziosa, A., Castelnuovo, G., Molinari, E., & Riva, G. (2009). Can Relaxation Training Reduce Emotional Eating in Women with Obesity? An Exploratory Study with 3 Months of Follow-Up. *Journal of the American Dietetic Association, 109*, 1427-1432. doi: 10.1016/j.jada.2009.05.004
- McCarthy, M. (1990). The thin ideal, depression and eating disorders in women. *Behaviour Research and Therapy, 28*, 205-215. doi: 10.1016/0005-7967(90)90003-2
- Meekums, B., Vaverniece, I., Majore-Dusele, I., & Rasnacs, O. (2012). Dance movement therapy for obese women with emotional eating: A controlled pilot study. *Arts in Psychotherapy, 39*, 126-133. doi: 10.1016/j.aip.2012.02.004
- Meesters, C., & Muris, P. (2004). Perceived parental rearing behaviours and coping in young adolescents. *Personality and Individual Differences, 37*, 513-522. doi: 10.1016/j.paid.2003.09.022
- Messerli-Burgy, N., Pjanic, I., Jaggi, V., Fresa, R. O., & Znoj, H. (2012). Differences in emotion regulation and positive affect between obese patients and normal weight volunteers. *Psychology & Health, 27*, 90-91. doi: 10.1080/08870446.2012.707817
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*, 361-388. doi: 10.1111/j.1467-9507.2007.00389.x
- Newman, E., O'Connor, D. B., & Conner, M. (2007). Daily hassles and eating behaviour: The role of cortisol reactivity status. *Psychoneuroendocrinology, 32*, 125-132. doi: 10.1016/j.psyneuen.2006.11.006

-
- Nguyen-Michel, S. T., Unger, J. B., & Spruijt-Metz, D. (2007). Dietary correlates of emotional eating in adolescence. *Appetite*, *49*, 494-499. doi: 10.1016/j.appet.2007.03.005
- Nguyen-Rodriguez, S. T., Chou, C.-P., Unger, J. B., & Spruijt-Metz, D. (2008). BMI as a Moderator of Perceived Stress and Emotional Eating in Adolescents. *Eating Behaviors*, *9*, 238-246. doi: 10.1016/j.eatbeh.2007.09.001
- Olbrisch, M. E., Starkey, J., Ascari, J., Kaplan, E., Meador, J., & Maher, J. W. (2006). Two-Day Food Diaries as Tools for Assessment of Disordered Eating Behavior in Candidates for Bariatric Surgery. *Bariatric Nursing and Surgical Patient Care*, *1*, 123-134. doi: 10.1089/bar.2006.1.123
- Riva, G., Manzoni, M., Villani, D., Gaggioli, A., & Molinari, E. (2008). Why You Really Eat? Virtual Reality in the Treatment of Obese Emotional Eaters. *Medicine Meets Virtual Reality* *16*, *132*, 417-419.
- Robbins, T. W., & Fray, P. J. (1980). Stress-induced eating – Fact, fiction, or misunderstanding. *Appetite*, *1*, 103-133.
- Robinson, A. L., Dolhanty, J., & Greenberg, L. (2015). Emotion-Focused Family Therapy for Eating Disorders in Children and Adolescents. *Clinical Psychology & Psychotherapy*, *22*, 75-82. doi: 10.1002/cpp.1861
- Rohner, R. P. (1975). *They love me, they love me not: A worldwide study of the effects of parental acceptance and rejection*. New Haven, CT: Human Relations Area Files.
- Rohner, R. P. (1980). Worldwide tests of parental acceptance-rejection theory – An overview. *Behavior Science Research*, *15*, 1-21.
- Rohner, R. P. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory*. Newbury Park, CA: Sage.

- Rohner, R. P. (2004). The parental "acceptance-rejection syndrome": Universal correlates of perceived rejection. *American Psychologist*, *59*, 830-840. doi: 10.1037/0003-066x.59.8.830
- Roosen, M. A., Safer, D., Adler, S., Cebolla, A., & van Strien, T. (2012). Group dialectical behavior therapy adapted for obese emotional eaters; a pilot study. *Nutricion Hospitalaria*, *27*, 1141-1147. doi: DOI 10.3305/nh.2012.27.4.5843
- Saritas, D., Grusec, J. E., & Gencoz, T. (2013). Warm and harsh parenting as mediators of the relation between maternal and adolescent emotion regulation. *Journal of Adolescence*, *36*, 1093-1101. doi: 10.1016/j.adolescence.2013.08.015
- Saunders, R. (2001). Compulsive eating and gastric bypass surgery: What does hunger have to do with it? *Obesity Surgery*, *11*, 757-761. doi: 10.1381/09608920160558731
- Schutz, H. K., & Paxton, S. J. (2007). Friendship quality, body dissatisfaction, dieting and disordered eating in adolescent girls. *British Journal of Clinical Psychology*, *46*, 67-83. doi: 10.1348/014466506x115993
- Shapiro, J. R., Woolson, S. L., Hamer, R. M., Kalarchian, M. A., Marcus, M. D., & Bulik, C. M. (2007). Evaluating binge eating disorder in children: Development of the Children's Binge Eating Disorder Scale (C-BEDS). *International Journal of Eating Disorders*, *40*, 82-89. doi: 10.1002/eat.20318
- Spoor, S. T. P., Bekker, M. H., Van Strien, T., & van Heck, G. L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite*, *48*, 368-376. doi: 10.1016/j.appet.2006.10.005
- Staniford, L. J., Breckon, J. D., & Copeland, R. J. (2011). Treatment of Childhood Obesity: A Systematic Review. *Journal of Child and Family Studies*, *21*, 545-564. doi: 10.1007/s10826-011-9507-7

-
- Stice, E., Killen, J. D., Hayward, C., & Taylor, C. B. (1998). Age of onset for binge eating and purging during late adolescence: A 4-year survival analysis. *Journal of Abnormal Psychology, 107*, 671-675. doi: 10.1037/0021-843x.107.4.671
- Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology, 21*, 131-138. doi: 10.1037//0278-6133.21.2.131
- Tanofsky-Kraff, M., Ranzenhofer, L. M., Yanovski, S. Z., Schvey, N. A., Faith, M., Gustafson, J., & Yanovski, J. A. (2008). Psychometric properties of a new questionnaire to assess eating in the absence of hunger in children and adolescents. *Appetite, 51*, 148-155. doi: 10.1016/j.appet.2008.01.001
- Tanofsky-Kraff, M., Theim, K. R., Yanovski, S. Z., Bassett, A. M., Burns, N. P., Ranzenhofer, L. M., . . . Yanovski, J. A. (2007). Validation of the Emotional Eating Scale adapted for use in children and adolescents (EES-C). *International Journal of Eating Disorders, 40*, 232-240. doi: 10.1002/eat.20362
- Tanofsky, M. B., Wilfley, D. E., Spurrell, E. B., Welch, R., & Brownell, K. D. (1997). Comparison of men and women with binge eating disorder. *International Journal of Eating Disorders, 21*, 49-54. doi: 10.1002/(sici)1098-108x(199701)21:1<49::aid-eat6>3.0.co;2-3
- Taube-Schiff, M., Van Exan, J., Tanaka, R., Wnuk, S., Hawa, R., & Sockalingam, S. (2015). Attachment style and emotional eating in bariatric surgery candidates: The mediating role of difficulties in emotion regulation. *Eating Behaviors, 18*, 36-40. doi: 10.1016/j.eatbeh.2015.03.011
- Telch, C. F. (1997). Skills training treatment for adaptive affect regulation in a woman with binge-eating disorder. *International Journal of*

- Eating Disorders*, 22, 77-81. doi: 10.1002/(sici)1098-108x(199707)22:1<77::aid-eat10>3.0.co;2-f
- Turker, P. F., Saka, M., Koseler, E., Metin, S., Yilmaz, B., & Bas, M. (2012). Body mass index in Turkish female adolescents: The role of emotional eating, restrained eating, external eating and depression. *Healthmed*, 6, 1367-1374.
- van Strien, T., Engels, R., Van Leeuwe, J., & Snoek, H. A. (2005). The Stice model of overeating: Tests in clinical and non-clinical samples. *Appetite*, 45, 205-213. doi: 10.1016/j.appet.2005.08.004
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, 5, 295-315. doi: 10.1002/1098-108x(198602)5:2<295::aid-eat2260050209>3.0.co;2-t
- van Strien, T., & Oosterveld, P. (2008). The children's DEBQ for assessment of restrained, emotional, and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders*, 41, 72-81. doi: 10.1002/eat.20424
- van Strien, T., van de Laar, F. A., van Leeuwe, J. F. J., Lucassen, P., van den Hoogen, H. J. M., Rutten, G., & van Weel, C. (2007). The dieting dilemma in patients with newly diagnosed type 2 diabetes: Does dietary restraint predict weight gain 4 years after diagnosis? *Health Psychology*, 26, 105-112. doi: 10.1037/0278-6133.26.1.105
- van Strien, T., van der Zwaluw, C. S., & Engels, R. (2010). Emotional eating in adolescents A gene (SLC6A4/5-HTT) - Depressive feelings interaction analysis. *Journal of Psychiatric Research*, 44, 1035-1042. doi: 10.1016/j.jpsychires.2010.03.012
- Vannucci, A., Tanofsky-Kraff, M., Crosby, R. D., Ranzenhofer, L. M., Shomaker, L. B., Field, S. E., . . . Yanovski, J. A. (2013). Latent

-
- Profile Analysis to Determine the Typology of Disinhibited Eating Behaviors in Children and Adolescents. *Journal of Consulting and Clinical Psychology, 81*, 494-507. doi: 10.1037/a0031209
- Wagner, B. M., Cohen, P., & Brook, J. S. (1996). Parent/adolescent relationships: Moderators of the effects of stressful life events. *Journal of Adolescent Research, 11*, 347-374. doi: 10.1177/0743554896113005
- Wallis, D. J., & Hetherington, M. M. (2004). Stress and eating: the effects of ego-threat and cognitive demand on food intake in restrained and emotional eaters. *Appetite, 43*, 39-46. doi: 10.1016/j.appet.2004.02.001
- Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. (2001). Development of the children's eating behaviour questionnaire. *Journal of Child Psychology and Psychiatry, 42*, 963-970. doi: 10.1111/1469-7610.00792
- Zametkin, A. J., Zoon, C. K., Klein, H. W., & Munson, S. (2004). Psychiatric aspects of child and adolescent obesity: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*, 134-150. doi: 10.1097/01.chi.0000100427.25002.06

Chapter 2

Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation¹

Abstract

The present study examined the role of emotion regulation in the relation between parental rejection and emotional eating of obese youngsters. Participants were 110 obese youngsters between the ages of 10 and 16 years who were referred to a Belgian treatment centre for obesity. Participants completed questionnaires assessing maternal and paternal rejection, emotion regulation strategies and emotional eating during their intake at the treatment centre. Bootstrapping procedure was used to test if emotion regulation mediated the relationship between maternal and paternal rejection on the one hand and emotional eating of the youngster on the other hand. Results revealed that the use of maladaptive emotion regulation strategies mediated the relation between maternal rejection and emotional eating. Paternal rejection was neither associated with the emotion regulation nor with the emotional eating of the youngster. The findings highlight the importance of assessing the emotional bond between mother and child and the emotion regulation of the youngster in the treatment of pediatric obesity.

¹ Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation. *International Journal of Obesity*, 1-6. doi:10.1038/ijo.2013.233.

Introduction

Emotional eating, defined as ‘eating in response to emotions’ (van Strien & Oosterveld, 2008, p. 72) has been explained by Kaplan and Kaplan (1957) as a coping mechanism during moments of stress, whereby people try to ‘eat their troubles away’ with comfort foods. Comfort food can be described as highly palatable food, rich in sugar and fat (De Vriendt, Moreno, & De Henauw, 2009). This model has been confirmed in experimental studies, in which induction of negative mood led to more consumption of comfort food afterwards than in the neutral mood condition (e.g. Loxton, Dawe, & Cahill, 2011; Michael Macht & Mueller, 2007). Further, the model has been confirmed in diary studies, in which ratings of daily hassles, urge to eat and food intake were positively related (e.g. Macht & Simons, 2000; O'Connor, Jones, Conner, McMillan, & Ferguson, 2008). And finally, the psychological model of Kaplan and Kaplan (1957) has also been supported by neuroendocrine research, which sheds light on the biological mechanism of emotional eating. It was found that comfort food indeed decreases the effects of stress and improves the mood through an increase of dopamine neurotransmissions in the brain, which is recognized as a ‘feel-good’ chemical (Gibson, 2006).

Emotionally eating of comfort foods can occur in the absence of hunger and can foster eating beyond the satiation point, also known as disinhibited eating. As such, emotional eating increases the calorie intake and in turn may lead to overweight over time. It is indeed found that disinhibited eating is positively related to Body Mass Index (BMI) (Bryant, King, & Blundell, 2008) and higher scores on disinhibited eating have been reported by overweight and obese individuals in comparison with normal weight individuals (Boschi, Iorio, Margiotta, D'Orsi, & Falconi, 2001; Provencher, Drapeau, Tremblay, Despres, & Lemieux, 2003). Furthermore, emotional eating can evolve into an eating disorder,

such as binge eating disorder, which is characterized by eating a large amount of food in a short period of time while loss of control over eating is experienced (American Psychiatric Association, 2000; Stice, Presnell, & Spangler, 2002). These negative consequences emphasize the importance of obtaining further insight into emotional eating.

Research on the determinants of emotional eating has suggested the influence of individual traits such as sensitivity to food as reward (Davis, Strachan, & Berkson, 2004) and deficits in emotion regulation (Puder & Munsch, 2010; Rommel et al., 2012). It has been found that the use of emotional eating as coping mechanism is related to a general use of inadequate emotion regulation strategies such as emotional suppression and self-preoccupation (e.g. Evers, Stok, & de Ridder, 2010; Spoor, Bekker, van Strien, & van Heck, 2007; Zijlstra et al., 2012). Researchers hypothesize that individuals having difficulty regulating their emotions often turn to substances such as alcohol or food (e.g. Polivy & Herman, 2002; Sher & Grekin, 2007). As these substances elevate the person's dopamine level, they temporally help to escape from negative emotions (Gibson, 2006; Grace, 2000). The research on emotion regulation offers an interesting perspective on the problem of emotional eating. However, the question remains how this deficit in emotion regulation arises.

Research stresses the importance of the social context, particularly the family, in the development of children's emotion regulation (Morris, Silk, Steinberg, Myers, & Robinson, 2007). The acceptance-rejection theory (PARTheory; Rohner, 1975, 1980, 1986) emphasizes the importance of the warmth dimension of parenting in shaping children's psychological adjustment (Rohner, 2004). This warmth dimension of parenting is a continuum with parental warmth on one end of the continuum and parental rejection (lack of warmth, presence of physically and psychologically hurtful behaviours) on the other end. All humans can

be placed on this continuum as everyone has experienced more or less positive interactions with caregivers. According to the PARTheory, children have developed a biologically based emotional need to be comforted, supported and cared for by attachment figures. As the child becomes an adult, this need shifts to wanting positive regard from significant others. Children and adults who experience(d) their relationship with their parents as being rejecting are predisposed to respond in specific ways. As stated by the PARTheory, this includes problems with the management of hostility and aggression, being more dependent or defensively independent, having an impaired self-esteem or self-adequacy, being emotional unresponsive or instable and having a negative worldview (Rohner, 2004). Some of these consequences, such as aggression and emotional instability, may be viewed in the context of emotion regulation deficits. Research in young adolescents indeed showed that perceived rejection by mother or father is related to the use of less adequate emotion regulation strategies like avoidance (Meesters & Muris, 2004).

Considering that both maternal and paternal rejection have been linked with the use of maladaptive emotion regulation strategies of the child (Meesters & Muris, 2004) and that maladaptive emotion regulation of the child has been linked to emotional eating (Evers, Stok, & de Ridder, 2010), raises the question whether there is a relationship between the maternal and paternal rejection and emotional eating of the child, mediated by the emotion regulation of the child. Some evidence can be found in the research of Schuetzmann, Richter-Appelt, Schulte-Markwort, and Schimmelman (2008), as they found a relationship between parental rejection and emotional eating of four-grade children. Considering this study did not differentiate between maternal and paternal rejection, the question remains whether there is a difference in influence between mother and father on the emotional eating of the child. Furthermore, it

remains unclear whether emotion regulation mediates the relationship between the maternal and paternal rejection and emotional eating of the child. If emotion regulation should mediate this relationship, then this would have important implications on the treatment of obese youngsters who experience emotional eating.

Aim of the Present Study

To our knowledge, no studies have examined the mediating role of emotion regulation to explain the relationship between maternal and paternal rejection and emotional eating. As emotional eating is already present during childhood and even more during adolescence, we want to examine the relationship between current experienced maternal and paternal rejection, emotion regulation and emotional eating of youngsters (Snoek, van Strien, Janssens, & Engels, 2007). The study adjusted for the effect of possible confounding factors, based on evidence from previous research. Research suggests that emotion regulation may be dependent on age and socioeconomic status (SES) (Eisenberg et al., 2003; Murphy, Eisenberg, Fabes, Shepard, & Guthrie, 1999). Furthermore, research has found associations between gender, age and weight status of the child on the one hand and emotional eating on the other hand (Caroline Braet et al., 2008). Because obese youngsters are known to display more emotional eating than non-obese youngsters, we are especially interested in the possible impact of maternal and paternal rejection and emotion regulation on emotional eating in obese youngsters.

Method

Participants

Participants were 110 obese children and adolescents (42.7% boys and 57.3% girls) between the ages of 10 and 16 years old ($M = 13.59$ years, $SD = 1.64$). All subjects were referred to a Belgian treatment center for obesity and were asked to participate in the study during their intake at

the treatment center. Informed consent was obtained from both the children and their parents. Participants were then asked to fill in an online survey at the treatment center. Children not meeting the age criteria, mentally retarded children and children not understanding Dutch were excluded from this study. The response rate was 86%. The youngsters were measured and weighed by the physician at the treatment center during the intake. The BMI was calculated as weight (in kg)/height (in m)². We used the adjusted BMI [(actual BMI/percentile 50 of BMI for age and gender) × 100]. This method allows us to compare the BMI of children of different ages and gender. The 50th percentiles of the BMI for age and gender are based on normative data in a Flemish sample (Roelants & Hauspie, 2004). The participants had a mean adjusted BMI of 186.85% (*SD* = 27.50) with a range of 132-290%. To compare the BMI scores of the present sample with data from the United States, BMI z-scores were calculated based on the growth charts provided by Centers for Disease Control and Prevention (CDC; Kuczmarski et al., 2000). BMI z-scores ranged from 1.35 to 2.87, with a mean of 2.33 (*SD* = 0.31).

The familial socioeconomic situation (SES) was calculated using the Hollingshead Index of Social Position (ISP). The caregivers of the child were asked to fill in their education and occupation, which was then used to classify the families in one of five social position indexes (Hollingshead, 1975). We recoded the five social position indexes into three social classes (high = upper and upper-middle, middle and low = lower-middle and lower). Parents were also asked to fill-in the domestic situation of the child. (see Table 1 for ISP and domestic situation of the child). The study was approved by the Institutional Ethical Committee.

Measures

Maternal and paternal rejection. Maternal and paternal rejection were assessed by means of the EMBU-A (Egna Minnen Beträffande

Uppfostran: My memories of child upbringing - Adolescent version; Gerlsma, Arrindell, Vanderveen, & Emmelkamp, 1991), a Dutch adolescent version of the original EMBU (Perris, Jacobsson, Lindstrom, Knorring, & Perris, 1980). The original EMBU is a self-report measure, intended to assess adults' recollections of their parents' child-rearing behaviour. In designing the EMBU-A, the items of the original adult EMBU were adapted for use with young adolescents. This adaptation creates the opportunity to obtain current perceptions of parenting while living at home. The EMBU-A consists of 56 items assessing four domains of parental behaviour: emotional warmth, rejection, overprotection, and favouring subject. To limit the load on the participants only the subscale rejection was assessed in the present study. All of the items are behaviour-oriented in their formulation, as such excluding an attributional evaluation. Items were to be answered for mother and father separately, on four-point Likert-scale from 1 = No, never to 4 = Yes, most of the time. Analyses of Gerlsma et al. (1991) showed a good internal consistency reliability and construct validity for the subscale rejection. In this study, the Cronbach α were .92 and .93 for maternal rejection and paternal rejection respectively.

Emotion regulation of the child. The emotion regulation of the child was assessed by means of the FEEL-KJ (Fragenbogen zur Erhebung der Emotionregulation: bei Kindern und Jugendlichen; Questionnaire to Assess Children's and Adolescents' Emotion Regulation Strategies; Grob & Smolenski, 2005; Theuwis & Braet, unpublished). The FEEL-KJ is a 90-item self-report measure used to assess 15 emotion regulation strategies in response to three emotions; anxiety, sadness, and anger. In this study, only emotion regulation strategies in response to sadness and anger were included in order to limit the load on the participants. The emotions sadness and anger were chosen considering that sadness has been numerously associated with emotional eating (e.g. Goldschmidt,

Tanofsky-Kraff, & Wilfley, 2011; Macht & Mueller, 2007) and that hostility and aggression have been associated with paternal rejection (Rohner, 2004). The FEEL-KJ measures primary strategies and two secondary scales revealed by factor analysis: an adaptive strategies scale (seven strategies; problem-oriented action, cognitive problem solving, acceptance, neglect, distraction, revaluation, and put into good humor) and a maladaptive strategies scale (five strategies; giving up, withdrawal, aggressive action, self-devaluation, and perseveration). The two secondary scales, both entailing the emotions sadness and anger, were used in this study. Analyses showed good internal consistency, with Cronbach α between .69 and .91 for the emotion regulation strategies. In this study the Cronbach α for the adaptive scale was .93 and .85 for the maladaptive scale.

Emotional eating of the child. The Dutch Eating Behaviour Questionnaire - child version (DEBQ; Braet et al., 2008; van Strien, Frijters, Bergers, & Defares, 1986) was used to assess the emotional eating of the youngsters. The DEBQ contains 33 items, assessing the presence of three types of disturbed eating behaviour: restrained eating, external eating, and emotional eating. Only the subscale emotional eating was assessed in the current study. Items are formulated as specific eating behaviours and are to be rated on their frequency of occurrence on a five-point Likert scale from 1 = never to 5 = very often. Studies have indicated the usefulness of the Dutch version of the DEBQ in children and adolescents between the age of 7 and 17 years (Braet, Tanghe, De Bode, Franckx, & Van Winckel, 2003; Braet, Tanghe, Decaluwe, Moens, & Rosseel, 2004). Research showed a stable factor structure, satisfying internal consistency reliability and good test-retest reliability (Caroline Braet et al., 2008). Further research showed a good external validity for

the DEBQ in children (Ricciardelli & McCabe, 2001). In the present study, the coefficient α for the subscale emotional eating was .94.

Analytic Plan

Correlation between the study variables were first examined to reveal possible confounding variables and to check if mediation analyses were useful. Considering preliminary analyses revealed that score distribution of maternal and paternal rejection, adaptive and maladaptive strategies and emotional eating were not normal, Spearman's correlation coefficient was used. Next, two mediation analyses were executed. As some youngsters in our sample did not have a father figure ($n = 16$) or mother figure ($n = 3$) in their life (biological parent, stepparent or foster parent) at the moment of assessment, mediation analyses were executed separately for independent variables maternal rejection and paternal rejection. This way, youngsters living with a single parent could still be included in one of the mediation analyses. The bootstrapping procedure was used to test the mediation model, considering this procedure imposes no distributional assumptions (Preacher & Hayes, 2008). Furthermore, this procedure takes into account the correlations between the mediators and the effect of control variables. For mediation to occur, the independent variable (maternal or paternal rejection) should significantly correlate with the dependent variable (emotional eating) (c-path). Secondly, the independent variable (maternal or paternal rejection) should significantly correlate with the supposed mediator (adaptive or maladaptive strategies) (a-path) and the mediator should significantly correlate with the dependent variable (emotional eating), after controlling for the independent variable (maternal or paternal rejection) (b-path). Finally, the indirect path between the independent variable (maternal or paternal rejection) and the dependent variable (emotional eating) through the mediator (adaptive or maladaptive strategies) should be significant (ab-path). When adding this

indirect effect to the model, the direct effect of the independent variable (maternal or paternal rejection) on the dependent variable (emotional eating) should no longer be significant or be lower than before the indirect effect was added (c'-path). The SPSS Macro provided by Preacher and Hayes (2004) was used to perform the bias-corrected bootstrap procedure, with 5000 re-samples to derive the 95% confidence interval for the indirect effect. Data were analyzed using the SPSS version 19.0. *P*-values less than .05 were considered statistically significant.

Results

Bivariate Correlations

As shown in Table 2, of the supposed confounding variables only adjusted BMI was correlated with maladaptive strategies. Age and socioeconomic status were not correlated with other variables. As a result, we only controlled for adjusted BMI and gender in the mediation analysis. Regarding the independent variables, paternal rejection was not related to the supposed mediators adaptive and maladaptive strategies nor to the dependent variable emotional eating. The mediation analysis with paternal rejection as independent variable was therefore not executed.

Mediation Analysis

Regarding the association between maternal rejection and the mediators maladaptive strategies and adaptive strategies (a-path), results confirm a significant association between maternal rejection and maladaptive strategies ($\beta = .20$, $t = 2.14$, $p = .04$), but not between maternal rejection and adaptive strategies ($\beta = -.12$, $t = -1.18$, $p = .24$). Secondly, maladaptive strategies, but not adaptive strategies, are significantly associated with emotional eating (b-path; $\beta = .34$, $t = 3.51$, $p < .001$ and $\beta = -.14$, $t = -1.48$, $p = .14$ respectively). Further, the indirect effect of maternal rejection on emotional eating through the mediators maladaptive strategies and adaptive strategies (ab-path) is estimated to lie,

respectively, between 0.01 and 0.19 and -0.01 and 0.08, with 95% confidence interval. As zero is not included in the 95% confidence interval of the indirect effect through mediator maladaptive strategies, we conclude that this indirect effect is significantly different from zero. The direct effect of maternal rejection on emotional eating (c-path) is significant ($\beta = .22, t = 2.18, p = .03$), but when adding the indirect effect, the direct effect (c'-path) is no longer significant ($\beta = .13, t = 1.35, p = .18$), indicating that full mediation has occurred. The model explains 16% of the variance in emotional eating (see Figure 1).

Discussion

This study aimed to test if the use of adaptive and maladaptive emotion regulation strategies mediates the relationship between maternal and paternal rejection and emotional eating of the child. Our sample included obese youngsters, considering emotional eating is already prevalent at this age and because obese youngsters are considered to display more emotional eating than normal weight youngsters. Regarding our mediation hypotheses, we found that maladaptive strategies mediate the relationship between maternal rejection and emotional eating of the youngster. This offers support for the PARTheory, which emphasizes the importance of the parental warmth dimension 'acceptance-rejection' in shaping children's psychological adjustment (Rohner, 2004). In particular, this study offers evidence that maternal rejection is related to the use of maladaptive emotion regulation strategies of the youngster. In addition, this study confirms the assumption that individuals having difficulty regulating their emotions often turn to food as comfort (Polivy & Herman, 2002), as maladaptive strategies is related to emotional eating. We did not find a relation between adaptive strategies and emotional eating. These results correspond with the associations found between maladaptive strategies, but not adaptive strategies, and emotional eating in adults

(Evers et al., 2010; Spoor, Bekker, Van Strien, & van Heck, 2007). These results suggest that a lack of adaptive strategies is not necessarily linked to emotional eating, but rather to the use of maladaptive strategies. As these maladaptive strategies fail to diminish the negative affect, the youngster may consequently turn to food as comfort. Further, our results support the research of Schuetzmann, Richter-Appelt, Schulte-Markwort, and Schimmelmann (2008) who found that parental rejection is related to emotional eating in four-grade children. In addition, this study offers further insight in this relationship, as we found that this relationship is mediated through maladaptive emotion regulation. Considering Schuetzmann et al. (2008) did not make the distinction between maternal and paternal rejection, our study also provides new insight on the individual role of mother and father. Bivariate analysis showed that paternal rejection was not related to the emotion regulation nor the emotional eating of the youngster and was therefore not included in the mediation analyses. These results suggest that maternal rejection is more strongly related to the emotion regulation and emotional eating of the youngster than paternal rejection. Research has indeed found that mothers have more influence on the emotion regulation socialization than fathers (Kliewer, Fearnow, & Miller, 1996). However, Khaleque and Rohner (2012) conclude in their review that paternal rejection seems to have more influence on the psychological adjustment of the child than maternal rejection. Regarding the relation between parental rejection and emotional eating, research suggests that feeding is an integral part of the mother-child relationship and therefore mother may have more influence on the eating behaviour of the child (Winnicott, 1957). On the contrary, Dominy, Johnson, and Koch (2000) reported that paternal rejection has more influence on binge eating in obese adult women than maternal rejection. Considering this study focused on adult women, we must bear in mind that

the influence of maternal and paternal rejection may be different on children versus adults (Rohner, 2004). Furthermore, while the PARTheory emphasizes the importance of the warmth dimension of parenting, other theories on parenting have suggested the importance of a second dimension, parental control. Although Snoek, Engels, Janssens, and van Strien (2007) only found a borderline significant association between paternal psychological control and emotional eating of young adolescents, van Strien, Snoek, van der Zwaluw, and Engels (2010) found a significant association between both variables when accounting for the genetic vulnerability of adolescents. In this longitudinal study, father's psychological control was related to an increase in emotional eating over a period of 4 years, but only when the adolescents carried at least one gene accountable for the receptivity to food as a reward. These results imply that paternal influence on emotional eating may be situated in the control dimension of parenting, rather than the warmth dimension. Therefore, future research should take father's controlling behaviour into consideration when investigating the paternal influence on emotional eating. In addition, genetic vulnerability may be a crucial element when investigating this relationship.

There are some limitations that must be considered. When talking about mediation, causality is suggested. The cross-sectional nature of our study does not allow us to determine the causal order among the variables. Therefore, further research should investigate the causal relation between the variables. Secondly, although youngsters are regarded as the most important informant regarding perceptions of parenting and own emotions, the exclusive reliance on self-report measures may be problematic (Muris, Meesters, Schouten, & Hoge, 2004). The youngster's perceptions may be influenced by the individual's ability to assess their own behaviour (Tull, Barrett, McMillan, & Roemer, 2007). Nonetheless, Rohner (2004) stresses

the importance of perception; a child may feel unloved and this in turn may affect the child's mental health, even if outside observers fail to detect parental rejection. In addition, further research should try to replicate these results in a community sample, considering that a clinical sample of obese youngsters is a select subgroup with increased psychiatric comorbidity, emotion regulation difficulties and disturbed eating (Messerli-Burgy, Pjanic, Jaggi, Fresa, & Znoj, 2012; Zametkin, Zoon, Klein, & Munson, 2004).

The results suggest that parental rejection, in specific maternal rejection, and emotion regulation offer an interesting perspective to understand emotional eating. When treating pediatric obesity, previous research has shown the importance of Family-Based Therapy, which consist of informing parents about healthful habits and encouraging the parents to promote a healthy lifestyle (e.g. Ritchie, Welk, Styne, Gerstein, & Crawford, 2005). The results of our study suggests that clinicians should look beyond the promotion of a healthy lifestyle and assess the emotional bond between parent and youngster. Introducing psychological interventions like Attachment-Based Family Therapy, which focuses on strengthening the bond between parent and youngster, may facilitate the treatment of the obese youngsters who experience parental rejection. This treatment was found to be effective amongst depressive adolescents (Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002). On the individual level, therapy should focus on improving the emotion regulation of the youngsters suffering from emotional eating, paying specific attention to the reduction of maladaptive strategies. Training in emotion regulation was already found to be effective amongst women with binge eating disorder (Clyne & Blampied, 2004). In addition, group therapy focusing on improving emotion regulation skills, such as Dialectical Behaviour Therapy, has shown to be effective in reducing emotional eating and

maintaining or even reducing body weight among obese adults (Roosen, Safer, Adler, Cebolla, & van Strien, 2012).

References

- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders, Text Revision, 4th ed.* Washington D.C.: American Psychiatric Association.
- Boschi, V., Iorio, D., Margiotta, N., D'Orsi, P., & Falconi, C. (2001). The three-factor eating questionnaire in the evaluation of eating behaviour in subjects seeking participation in a dietotherapy programme. *Annals of Nutrition and Metabolism*, *45*, 72-77. doi: 10.1159/000046709
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology*, *13*, 733-743. doi: 10.1177/1359105308093850
- Braet, C., Tanghe, A., De Bode, P., Franckx, H., & Van Winckel, M. (2003). Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. *European Journal of Pediatrics*, *162*, 391-396. doi: 10.1007/s00431-003-1155-5
- Braet, C., Tanghe, A., Decaluwe, V., Moens, E., & Rosseel, Y. (2004). Inpatient treatment for children with obesity: Weight loss, psychological well-being, and eating behavior. *Journal of Pediatric Psychology*, *29*, 519-529. doi: 10.1093/jpepsy/jsh054
- Bryant, E. J., King, N. A., & Blundell, J. E. (2008). Disinhibition: its effects on appetite and weight regulation. *Obesity Reviews*, *9*, 409-419. doi: 10.1111/j.1467-789X.2007.00426.x
- Centers for Disease Control and Prevention (2000) Retrieved 18th March, 2013, from <http://www.cdc.gov/growthcharts/>
- Clyne, C., & Blampied, N. M. (2004). Training in emotion regulation as a treatment for binge eating: A preliminary study. *Behaviour Change*, *21*, 269-281. doi: 10.1375/bech.21.4.269.66105

- Davis, C., Strachan, S., & Berkson, M. (2004). Sensitivity to reward: implications for overeating and overweight. *Appetite*, *42*, 131-138. doi: 10.1016/j.appet.2003.07.004
- De Vriendt, T., Moreno, L. A., & De Henauw, S. (2009). Chronic stress and obesity in adolescents: Scientific evidence and methodological issues for epidemiological research. *Nutrition Metabolism and Cardiovascular Diseases*, *19*, 511-519. doi: 10.1016/j.numecd.2009.02.009
- Diamond, G. S., Reis, B. F., Diamond, G. M., Siqueland, L., & Isaacs, L. (2002). Attachment-based family therapy for depressed adolescents: A treatment development study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*, 1190-1196. doi: 10.1097/01.chi.0000024836.94814.08
- Dominy, N. L., Johnson, W. B., & Koch, C. (2000). Perception of parental acceptance in women with binge eating disorder. *Journal of Psychology*, *134*, 23-36. doi: 10.1080/00223980009600846
- Eisenberg, N., Valiente, C., Morris, A. S., Fabes, R. A., Cumberland, A., Reiser, M., . . . Losoya, S. (2003). Longitudinal relations among parental emotional expressivity, children's regulation, and quality of socioemotional functioning. *Developmental Psychology*, *39*, 3-19. doi: 10.1037//0012-1649.39.1.3
- Evers, C., Stok, F. M., & de Ridder, D. T. D. (2010). Feeding Your Feelings: Emotion Regulation Strategies and Emotional Eating. *Personality and Social Psychology Bulletin*, *36*, 792-804. doi: 10.1177/0146167210371383
- Gerlsma, C., Arrindell, W. A., Vanderveen, N., & Emmelkamp, P. M. G. (1991). A parental rearing style questionnaire for use with adolescents – Psychometric evaluation of the EMBU-A. *Personality*

- and Individual Differences, 12*, 1245-1253. doi: 10.1016/0191-8869(91)90196-i
- Gibson, E. L. (2006). Emotional influences on food choice: Sensory, physiological and psychological pathways. *Physiology & Behavior, 89*, 53-61. doi: 10.1016/j.physbeh.2006.01.024
- Grace, A. A. (2000). The tonic/phasic model of dopamine system regulation and its implications for understanding alcohol and psychostimulant craving. *Addiction, 95*, S119-S128.
- Grob, A., & Smolenski, C. (2005). *Fragebogen zur Erhebung der Emotionsregulation bei Kindern und Jugendlichen (FEEL-KJ)*. Bern: Huber Verlag.
- Hollingshead, A. B. (1975). *Four factor index of social status*. New Haven, CT: Yale University.
- Kaplan, H. I., & Kaplan, H. S. (1957). The psychomatic concept of obesity. *Journal of Nervous and Mental Disease, 125*, 181-201.
- Khaleque, A., & Rohner, R. P. (2012). Pancultural Associations Between Perceived Parental Acceptance and Psychological Adjustment of Children and Adults: A Meta-Analytic Review of Worldwide Research. *Journal of Cross-Cultural Psychology, 43*, 784-800. doi: 10.1177/0022022111406120
- Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development, 67*, 2339-2357. doi: 10.1111/j.1467-8624.1996.tb01861.x
- Loxton, N. J., Dawe, S., & Cahill, A. (2011). Does negative mood drive the urge to eat? The contribution of negative mood, exposure to food cues and eating style. *Appetite, 56*, 368-374. doi: 10.1016/j.appet.2011.01.011

-
- Macht, M., & Mueller, J. (2007). Immediate effects of chocolate on experimentally induced mood states. *Appetite, 49*, 667-674. doi: 10.1016/j.appet.2007.05.004
- Macht, M., & Simons, G. (2000). Emotions and eating in everyday life. *Appetite, 35*, 65-71. doi: 10.1006/appe.2000.0325
- Meesters, C., & Muris, P. (2004). Perceived parental rearing behaviours and coping in young adolescents. *Personality and Individual Differences, 37*, 513-522. doi: 10.1016/j.paid.2003.09.022
- Messerli-Burgy, N., Pjanic, I., Jaggi, V., Fresa, R. O., & Znoj, H. (2012). Differences in emotion regulation and positive affect between obese patients and normal weight volunteers. *Psychology & Health, 27*, 90-91.
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*, 361-388. doi: 10.1111/j.1467-9507.2007.00389.x
- Muris, P., Meesters, C., Schouten, E., & Hoge, E. (2004). Effects of perceived control on the relationship between perceived parental rearing behaviors and symptoms of anxiety and depression in nonclinical preadolescents. *Journal of Youth and Adolescence, 33*, 51-58. doi: 10.1023/a:1027334314021
- Murphy, B. C., Eisenberg, N., Fabes, R. A., Shepard, S., & Guthrie, I. K. (1999). Consistency and change in children's emotionality and regulation: A longitudinal study. *Merrill-Palmer Quarterly-Journal of Developmental Psychology, 45*, 413-444.
- O'Connor, D. B., Jones, F., Conner, M., McMillan, B., & Ferguson, E. (2008). Effects of daily hassles and eating style on eating behavior. *Health Psychology, 27*, S20-S31. doi: 10.1037/0278-6133.27.1.s20

-
- Perris, C., Jacobsson, L., Lindstrom, H., Knorrning, L. V., & Perris, H. (1980). Development of a new inventory for assessing memories of parental rearing behavior. *Acta Psychiatrica Scandinavica*, *61*, 265-274. doi: 10.1111/j.1600-0447.1980.tb00581.x
- Polivy, J., & Herman, C. P. (2002). Causes of eating disorders. *Annual Review of Psychology*, *53*, 187-213. doi: 10.1146/annurev.psych.53.100901.135103
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*, 717-731. doi: 10.3758/BF03206553
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879-891. doi: 10.3758/BRM.40.3.879
- Provencher, V., Drapeau, V., Tremblay, A., Despres, J. P., & Lemieux, S. (2003). Eating behaviors and indexes of body composition in men and women from the Quebec family study. *Obesity Research*, *11*, 783-792. doi: 10.1038/oby.2003.109
- Puder, J. J., & Munsch, S. (2010). Psychological correlates of childhood obesity. *International Journal of Obesity*, *34*, S37-S43. doi: 10.1038/ijo.2010.238
- Ricciardelli, L. A., & McCabe, M. P. (2001). Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review*, *21*, 325-344. doi: 10.1016/s0272-7358(99)00051-3
- Ritchie, L. D., Welk, G., Styne, D., Gerstein, D. E., & Crawford, P. B. (2005). Family environment and pediatric overweight: What is a

- parent to do? *Journal of the American Dietetic Association*, *105*, S70-S79. doi: 10.1016/j.jada.2005.02.017
- Roelants, M., & Hauspie, R. (2004). Flemish Growth Charts 2-20 years. Retrieved June, 6th, 2011, from <http://www.vub.ac.be/groecurven/english.html>
- Rohner, R. P. (1975). *They love me, they love me not: A worldwide study of the effects of parental acceptance and rejection*. New Haven, CT: Human Relations Area Files.
- Rohner, R. P. (1980). Worldwide tests of parental acceptance-rejection theory. *Behavior Science Research*, *15*, 1-21.
- Rohner, R. P. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory*. Newbury Park, CA: Sage.
- Rohner, R. P. (2004). The parental "acceptance-rejection syndrome": Universal correlates of perceived rejection. *American Psychologist*, *59*, 830-840. doi: 10.1037/0003-066x.59.8.830
- Roosen, M. A., Safer, D., Adler, S., Cebolla, A., van Strien, T. (2012). Group dialectical behavior therapy adapted for obese emotional eaters: a pilot study. *Nutricion Hospitalaria*, *27*, 1141–1147. doi: 10.3305/nh.2012.27.4.5843
- Schuetzmann, M., Richter-Appelt, H., Schulte-Markwort, M., & Schimmelmann, B. G. (2008). Associations among the perceived parent-child relationship, eating behavior, and body weight in preadolescents: Results from a community-based sample. *Journal of Pediatric Psychology*, *33*, 772-782. doi: 10.1093/jpepsy/jsn002
- Sher, K. J., & Grekin, E. R. (2007). Alcohol and affect regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 560-580). New York, NY: Guilford Press.

- Snoek, H. M., Engels, R., Janssens, J., van Strien, T. (2007). Parental behaviour and adolescents' emotional eating. *Appetite*, 49, 223–230. doi: 10.1016/j.appet.2007.02.004
- Snoek, H. M., Van Strien, T., Janssens, J., & Engels, R. (2007). Emotional, external, restrained eating and overweight in Dutch adolescents. *Scandinavian Journal of Psychology*, 48, 23-32. doi: 10.1111/j.1467-9450.2006.00568.x
- Spoor, S. T. P., Bekker, M. H., Van Strien, T., & van Heck, G. L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite*, 48, 368-376. doi: 10.1016/j.appet.2006.10.005
- Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology*, 21, 131-138. doi: 10.1037//0278-6133.21.2.131
- Tull, M. T., Barrett, H. M., McMillan, E. S., & Roemer, L. (2007). A preliminary investigation of the relationship between emotion regulation difficulties and posttraumatic stress symptoms. *Behavior Therapy*, 38, 303-313. doi: 10.1016/j.beth.2006.10.001
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, 5, 295-315. doi: 10.1002/1098-108x(198602)5:2<295::aid-eat2260050209>3.0.co;2-t
- van Strien, T., & Oosterveld, P. (2008). The children's DEBQ for assessment of restrained, emotional, and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders*, 41, 72-81. doi: 10.1002/eat.20424
- van Strien, T., Snoek, H. M., van der Zwaluw, C. S., & Engels, R. C. M. E (2010). Parental control and the dopamine D2 receptor gene

(DRD2) interaction on emotional eating in adolescence. *Appetite*, 54, 255–261. doi: 10.1016/j.appet.2009.11.006

Winnicott, D. (1957). *Mother and child: A primer of first relationships*. New York: Basic Books.

Zametkin, A. J., Zoon, C. K., Klein, H. W., & Munson, S. (2004). Psychiatric aspects of child and adolescent obesity: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 134-150. doi: 10.1097/01.chi.0000100427.25002.06

Table 1

Sample description

Variable	%
Socioeconomic status ¹	
High	9.3
Middle	47.7
Low	43.0
Domestic situation youngsters ²	
Living with both parents (intact family or co-parenting)	59.9
Living with parent and stepparent	10.8
Living with single mother	26.5
Living with single father	2.9

Note. ¹ Percentages are valid percent, 21.8% of parents did not provide this information. ² Percentages are valid percent, 7.3% of parents did not provide this information

Table 2
Bivariate Correlations between Study Variables

	Maternal rejection	Paternal rejection	Adaptive strategies	Maladaptive strategies	Emotional eating	Age	Socio-economic status	Adjusted BMI
Maternal rejection		.59**	-.10	.23*	.25**	-.16	-.16	-.17
Paternal rejection			-.02	.19	.09	-.15	-.13	-.15
Adaptive strategies				-.05	-.14	.01	.05	.07
Maladaptive strategies					.39**	.11	.12	-.27**
Emotional eating						.11	-.04	-.07
Age							.12	-.01
Socioeconomic status								.20
Adjusted BMI								

Note. BMI, body mass index. * $p < .05$, ** $p < .01$

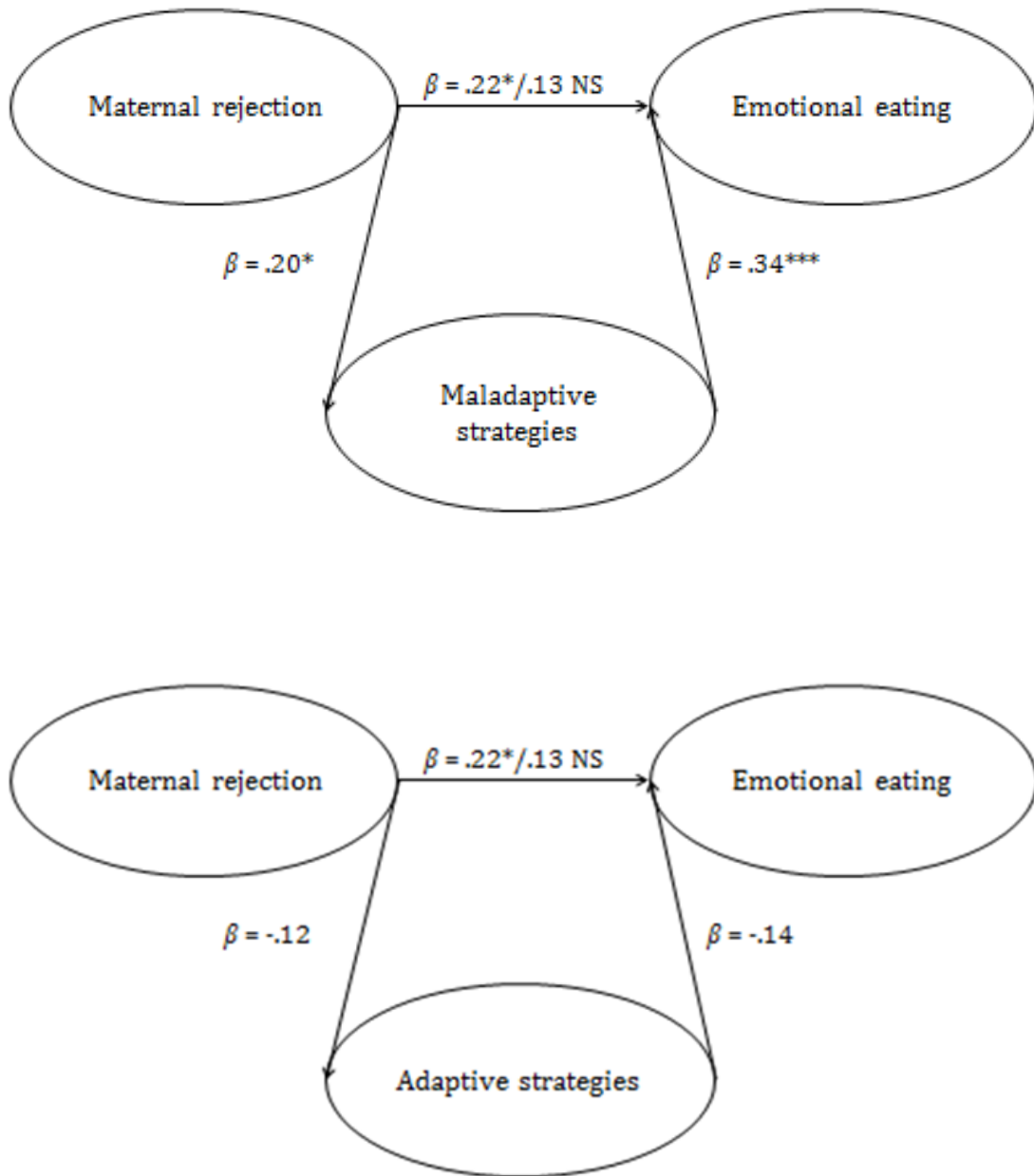


Figure 1. Mediation model with maladaptive and adaptive strategies as mediators between maternal rejection and emotional eating

Chapter 3

Can we link emotional eating with the emotion regulation skills of adolescents?¹

Abstract

A recent cross-sectional study showed that maternal rejection is associated with emotional eating of obese youngsters seeking treatment, and that this relation is mediated by maladaptive emotion regulation (ER) of the youngsters. We wanted to build on this study and investigate the relation between parental rejection, maladaptive ER and emotional eating in a community sample using longitudinal data. Participants were 81 youngsters between the ages of 10 and 16 years. Participants completed questionnaires assessing maternal and paternal rejection, ER strategies and emotional eating, at two time moments ($M = 71$ days between time moments). Latent change models were used to estimate level and change of each variable. Results showed that the levels of maternal rejection, maladaptive ER and emotional eating were related. The indirect effect of the level of maternal rejection on the level of emotional eating through the level of maladaptive ER was marginally significant. On average, maternal rejection showed no change over time, whereas the other variables decreased. The changes in the variables were not related. The findings

¹ Vandewalle, J., Moens, E., Beyers, W., & Braet, C. (2016). Can we link emotional eating with the emotion regulation skills of adolescents? *Psychology and Health*. doi: 10.1080/08870446.2016.1149586

highlight the importance of assessing the emotional bond between mother and youngster and the ER of youngsters with an emotional eating style.

Introduction

When confronted with severe distress, humans generally react with a ‘fight or flight’ response. This response implies a series of physiological reactions helping the person to deal with the threat, including the suppression of appetite (Charmandari, Tsigos, & Chrousos, 2005). However, research has found that experiencing less intense emotions, like being exposed to more chronic psychological stressors or to ordinary daily hassles, may lead to seeking out and consuming highly palatable food, such as food rich in sugar and/or fat (Macht, 2008; Macht & Simons, 2000; O’Connor, Jones, Conner, McMillan, & Ferguson, 2008; Oliver & Wardle, 1999). This eating behaviour has been defined as ‘emotional eating’ (van Strien & Oosterveld, 2008; p. 72) and is explained as a coping mechanism during moments of stress, when people try to ‘eat their troubles away’ with palatable food (Kaplan & Kaplan, 1957). Research has shown that eating palatable food can increase positive mood and reduce stress through sensory pleasure (Gibson, 2006), confirming the theory of Kaplan and Kaplan (1957). Unfortunately this increase in positive mood is only temporary and is mostly followed by negative feelings like shame (Gibson, 2006). Moreover, emotional eating may evolve into an eating disorder, such as binge eating disorder (BED), as the longitudinal survey study of Stice, Presnell, and Spangler (2002) showed that emotional eating is an important antecedent of binge eating. This disorder is characterized by eating large amounts of food in short periods of time while loss of control overeating is experienced (American Psychiatric Association, 2013).

Furthermore, as emotional eating can occur in the absence of hunger or can foster eating beyond the saturation point, it can lead to an increase in the calorie intake and in turn may lead to become overweight over time. However, research is inconsistent about the relation between emotional

eating and body mass index (BMI). Regarding self-reported emotional eating, researchers have found positive association with BMI (e.g. Bryant, King, & Blundell, 2008), while others have not found an association between both variables (e.g. Snoek, Engels, van Strien, & Otten, 2013). Studies measuring actual food intake in response to negative emotions generally show no relation with BMI (e.g. Blissett, Haycraft, & Farrow, 2010; Wallis & Hetherington, 2009). This may be due to the fact that the BMI is determined by numerous factors next to energy intake, such as physical activity and the metabolism of the individual (Sharma & Padwal, 2010). Furthermore, researchers suggest that emotional eating may be associated with other individual characteristics which diminish the risk of obesity, like attempting to restrict eating behaviour (Gibson, 2012; Greeno & Wing, 1994).

Although emotional eating has mostly been studied in adults, research indicates that emotional eating, self-reported as well as actual emotional eating behaviour, is already present in children and adolescents (e.g. Blissett et al., 2010; Braet, Beyers, Goossens, Verbeken, & Moens, 2012; Carper, Fisher, & Birch, 2000; Nguyen-Michel, Unger, & Spruijt-Metz, 2007). In addition, adolescence is a typical period of significant stress and also a crucial time for the development of weight gain (Levitan & Davis, 2010). As such, adolescence seems to be an important period for the prevention and intervention of emotional eating. Therefore researchers have investigated which antecedents may have an impact on this eating style in children and adolescents.

Firstly, affect regulation models postulate that experiencing emotional distress will increase the likelihood of emotional eating, especially in individuals demonstrating deficits in emotion regulation (ER) (Grilo & Shiffman, 1994). ER refers to understanding and managing emotions, which includes the use of strategies for dealing with

uncomfortable emotions (Harrist, Hubbs-Tait, Topham, Shriver, & Page, 2013). Survey studies indeed show associations between children's poor ER on the one hand and emotional eating and binge eating on the other hand (Czaja, Rief, & Hilbert, 2009; Harrist et al., 2013). Secondly, a recent survey study of Vandewalle, Moens, and Braet (2014) showed that parental rejection is associated with emotional eating of obese youngsters and that this relation is mediated by the maladaptive ER of the youngsters. The impact of parental rejection on shaping children's psychological adjustment had already been suggested by Rohner (1975) in his interpersonal acceptance-rejection theory (IPARTheory; formerly known as PARTheory). According to the IPARTheory, children have developed a biologically based emotional need to be comforted, supported and cared for by attachment figures. If this emotional need is not met, in other words, if children experience their relationship with attachment figures as rejecting, then they will show overwhelming emotions and receive little support from attachment figures to regulate them, leading to more ER deficits (Meesters & Muris, 2004). This in turn may affect the individuals' eating style, as emotional eating is defined as a form of coping with emotional distress (van Strien, Frijters, Bergers, & Defares, 1986). Vandewalle et al. (2014) specifically found that only maternal rejection and not paternal rejection has an influence on the ER and in turn on the emotional eating of the obese youngster. The authors hypothesised that this may be because both feeding and ER socialisation are, especially in Western societies, an integral part of the mother-child relationship (Kliewer, Fearnow, & Miller, 1996; Winnicot, 1957).

Aim of the Present Study

In the present study, we wanted to build on the former work of Vandewalle et al. (2014). In this study, a clinical sample of obese youngsters was included, which is a select subgroup with increased

psychiatric comorbidity, ER difficulties and disturbed eating (Messerli-Burgy, Pjanic, Jaggi, Fresa, & Znoj, 2012; Zametkin, Zoon, Klein, & Munson, 2004). As research has shown that self-reported emotional eating as well as actual emotional eating behaviour is also present in children and adolescent from the community (Blissett et al., 2010; Vannucci et al., 2013), we wanted to investigate if the relation between parental rejection, maladaptive ER and emotional eating is also present in a community sample of youngsters. Therefore we conducted a longitudinal survey study with two waves, using latent change models (LCM). These models make it possible to look at both the level (at the first wave) and the change (between the two waves) of the variables. We hypothesise that: (1) regarding the level of the variables, higher levels of maternal rejection, and not paternal rejection, will be related to higher levels of maladaptive ER and higher levels of emotional eating of the youngster. Higher levels of maladaptive ER will be related to higher levels of emotional eating. (2) The relation between the level of maternal rejection and the level of emotional eating will be mediated by the level of maladaptive ER. (3) Regarding the change in the variables, changes in maternal rejection, and not paternal rejection, will be positively related to changes in maladaptive ER and changes in emotional eating of the youngster over time. Changes in maladaptive ER will be positively related to changes in emotional eating. (4) The relation between the change in maternal rejection and the change in emotional eating will be mediated by the change in maladaptive ER.

Method

Participants and Procedure

The sample comprised 81 youngsters (44.4% boys and 55.6% girls) between the ages of 10 and 16 years ($M = 12.86$ years, $SD = 1.65$), who participated in a larger longitudinal study investigating the relation

between parental behaviour and youngsters' eating behaviour. Only mothers with at least two children between the ages of 10 and 16 years old were eligible to participate in this larger study. The participation of both mother and two children meeting the age range (10–16 years) was an inclusion criteria in the larger study. Concerning the present study, we randomly selected one youngster out of every participating family to avoid correlation between outcomes of siblings. Participants were recruited via two procedures. Twenty-nine youngsters (48.3% boys and 51.7% girls) were recruited via schools. Approximately 1300 flyers were spread in schools with different educational levels, containing information about the study and containing informed consents for both the youngster and their parents. In total 459 families responded to the flyer, of which 68 families consented to participate. Families who declined participation were mostly families not meeting the inclusion criteria (two children in the age range of 10–16 years). After receiving informed consent from parent and youngster, participants were asked via email to fill in an online survey at home. Of the 68 families 39 families were excluded from the study due to non-response at the first wave. Four months after the first email, participants were once again contacted via email to fill in the online survey a second time ($M = 112$ days between study moments). Of the 29 remaining families, 17 families participated a second time (dropout 41.38%).

Due to the high non-response at the first wave, we decided to enlarge the sample, using a different procedure. Concerning this second procedure, 52 youngsters (42.3% boys and 57.7% girls) were recruited by trained psychology students and were asked to fill in questionnaires at home during two home visits. During this home visits, the trained psychology students obtained informed consent from both the youngster and the parent and were at the youngsters' disposal in case of questions

regarding the questionnaires. A second home visit took place after one month ($M = 30$ days between study moments). Of the 52 families, only 2 families did not participate a second time (dropout 3.85%).

There were no significant baseline differences between participants recruited by one or the other procedure (controlled for gender, age, adjusted BMI, maternal and paternal rejection, maladaptive ER and emotional eating). There were however baseline differences between participants who did or did not participate a second time, with both baseline maladaptive ER ($t(78) = -2.34, p = .02$) and emotional eating ($t(79) = -2.06, p = .04$) being significantly higher in the participating group. Other variables measured at baseline (gender, age, adjusted BMI and maternal and paternal rejection) were not different between both groups. The study was approved by the Institutional Ethical Committee.

Measures

Anthropometric and demographic measures. The youngsters recruited via the first procedure were asked at baseline to report their weight and length online. The youngsters recruited via the second procedure were measured and weighed by the trained psychology student during the first home visit. The BMI was calculated as weight (kg)/height (m)². We used the adjusted BMI ((actual BMI/percentile 50 of BMI for age and gender) \times 100). This method allows us to compare the BMI of children of different ages and gender. Adjusted BMI below 85% is classified as underweight, above 120% is classified as overweight and above 140% is classified as obese (Van Winckel & van Mil, 2001). The 50th percentiles of the BMI for age and gender are based on normative data in a Flemish sample (Roelants & Hauspie, 2004). The participants had a mean adjusted BMI of 101.98% ($SD = 16.09$) with a range of 71.92–154.95% (9.88% missing). To examine possible relations between the

adjusted BMI and the study variables, Pearson correlations were computed, however none of the relations were significant.

The familial socio-economic situation was calculated using the Hollingshead Index of Social Position (ISP). The mother of the youngster was asked to fill in the education and occupation of herself and her partner at baseline, which was then used to classify the families in one of five social position indexes, taking the domestic situation of the youngster into account (Hollingshead, 1975). We recoded the five social position indexes into three social classes (high = upper and upper middle; middle; low = lower middle and lower). The lower class holds 10.7% of the families, the middle class 57.3% of the families and the upper class 32% (percentages are valid, 7.4% of mothers did not provide this information). To check for possible relations between the familial ISP-score and the study variables, Pearson correlations were computed. There were no significant correlations.

Maternal and paternal rejection. Maternal and paternal rejection were assessed by means of the EMBU-A (Egna Minnen Beträffande Uppfostran: My memories of child upbringing – Adolescent version; Gerlsma, Arrindell, Vanderveen, & Emmelkamp, 1991), a Dutch adolescent version of the original EMBU (Perris, Jacobsson, Lindstrom, Knorrning, & Perris, 1980). The original EMBU is a self-report measure, intended to assess adults' recollections of their parents' child-rearing behaviour. In designing the EMBU-A, the items of the original adult EMBU were adapted for use with young adolescents. This adaptation creates the opportunity to obtain current perceptions of parenting while living at home. The EMBU-A consists of 56 items assessing four domains of parental behaviour: emotional warmth, rejection, overprotection and favouring subject. To limit the load on the participants only the subscale rejection (19 items concerning mother and 19 items concerning father, e.g.

‘Is your mother/father ever harsh and unfriendly to you?’) was assessed in the present study. All of the items are behaviour-oriented in their formulation, as such excluding an attributional evaluation. Items were to be answered for mother and father separately, on four-point Likert scale from 1 = No, never to 4 = Yes, most of the time. Analyses of Gerlsma et al. (1991) showed a good internal consistency reliability and construct validity for the subscale rejection. In this study, the Cronbach α for maternal rejection and paternal rejection were .92 and .94 at time 1 (T1) and .91 and .94 at time 2 (T2), respectively.

Emotion regulation of the child. The ER of the child was assessed by means of the FEEL-KJ (Fragenbogen zur Erhebung der Emotionregulation: bei Kindern und Jugendlichen; Questionnaire to Assess Children’s and Adolescents’ ER Strategies; Braet, Cracco, & Theuwis, 2013; Grob & Smolenski, 2005). The FEEL-KJ is a 90-item self-report measure used to assess 15 ER strategies in response to three emotions; anxiety, sadness and anger. In this study, only ER strategies in response to sadness and anger were included in order to limit the load on the participants. The emotions sadness and anger were chosen considering that sadness has been numerously associated with emotional eating (e.g. Goldschmidt, Tanofsky-Kraff, & Wilfley, 2011; Macht & Mueller, 2007) and that hostility and aggression have been associated with paternal rejection (Rohner, 2004). The FEEL-KJ measures primary strategies and two secondary scales revealed by factor analysis: an adaptive strategies scale (seven strategies; problem-oriented action, cognitive problem-solving, acceptance, neglect, distraction, revaluation and put into good humor) and a maladaptive strategies scale (five strategies: giving up, withdrawal, aggressive action, self-devaluation and perseveration). Three additional strategies (social support, expression and control over emotion) are not part of the secondary scales, but considered separately. The

maladaptive scale, entailing the emotions sadness and anger (20 items; e.g. ‘When I’m sad/angry, I don’t want to see anyone’), was used in this study. Items were to be answered on five-point Likert scale from 1 = Almost never to 5 = Almost always. Analyses showed good internal consistency, with Cronbach α between .69 and .91 for the ER strategies. In this study, the Cronbach α for the maladaptive ER scale was .87 at time 1 (T1) and .88 at time 2 (T2).

Emotional eating of the child. The Dutch Eating Behaviour Questionnaire – child version (DEBQ; Braet et al., 2008; van Strien et al., 1986) was used to assess the emotional eating of the youngsters. The DEBQ contains 33 items, assessing the presence of three types of disturbed eating behaviour: restrained eating, external eating and emotional eating. Only the subscale emotional eating (13 items; e. g. ‘Do you have a desire to eat when you are emotionally upset?’) was assessed in the current study. Items are formulated as specific eating behaviours and are to be rated on their frequency of occurrence on a five-point Likert scale from 1 = never to 5 = very often. Studies have indicated the usefulness of the Dutch version of the DEBQ in children and adolescents between the age of 7 and 17 years. Research showed a stable factor structure, satisfying internal consistency reliability and good test–retest reliability (Braet et al., 2008). Further, research showed a good external validity for the DEBQ in children (Ricciardelli & McCabe, 2001). In the present study, the coefficient α for the subscale emotional eating was .94 at both time moments.

Analytic Plan

Missing data analysis was conducted as there was dropout during the study (6.8% missing data points). The Little (1988) MCAR test was not significant [$\chi^2(326) = 162.40, p = 1.00$], indicating that the missing data can be considered as being completely at random. The missing values

were estimated using maximum likelihood estimation. First, descriptive statistics were calculated for the study variables measured at baseline. Next, for each construct three-item parcels were created using Confirmatory Factor Analysis. Multiple indicators of each construct are necessary to reliably estimate level and change of each construct.

Subsequently, level and change of maternal and paternal rejection, maladaptive ER strategies and emotional eating were estimated using LCMs (see Figure 1 for example; model of maternal rejection) (LCMs; Hertzog & Nesselroade, 2003; McArdle & Nesselroade, 1994). The estimated change of the constructs is the absolute change over the two measurements in the latent variables. In this way, the problem of measurement error with simple difference scores is avoided (Rogosa, Brandt, & Zimowski, 1982). In the case of maternal rejection, for instance (see Figure 1), corresponding factor loadings of the three measures of maternal rejection are set equal across time and the corresponding residual errors of the three measures are allowed to co-vary across time, which reflects stability in systematic errors over time. The fixed 1 regression coefficients involving the latent variables implicitly define the maternal rejection Level latent variable as equal to maternal rejection at Wave 1 (maternal rejection T1) and the maternal rejection Change latent variable as the difference between maternal rejection at the two waves (maternal rejection T2- maternal rejection T1). The LCM also allows to estimate the mean and variance of the latent level factor and change factor. These variances indicate interindividual differences in level and change. In that way, it is possible to examine how the Level and Change latent variables of the constructs are related via Pearson's product moment correlations. Furthermore, bootstrapping was used in structural equation modeling (SEM) to analyse the mediation effects (Muthén & Muthén, 1998–2012). The 95% confidence intervals around the estimates were examined.

Confidence intervals not including zero indicate significant indirect effects (MacKinnon, Lockwood, & Williams, 2004). Data were analysed using the SPSS version 22 and Mplus version 7.3 (Muthén & Muthén, 1998–2012). P-values < .05 were considered statistically significant.

Results

Descriptive Statistics for Study Variables

Descriptive statistics were calculated for the study variables measured at baseline. Regarding maternal and paternal rejection, the mean scores were 1.38 ($SD = .40$) and 1.42 ($SD = .51$), respectively. These scores are comparable with unpublished normative data of 1153 Flemish youngsters ($t(80) = .39, p = .70$; $t(80) = 1.18, p = .24$). Respectively 9.9 and 16% of our sample reported to never have experienced maternal or paternal rejection (mean score = 1). In addition, 17.3 and 16% of our sample had a high score ($> M + 1SD$) on the maternal and paternal rejection subscales, in comparison with the normative data.

With regard to the maladaptive ER scale, the mean score was 2.60 ($SD = .61$). All participants in our sample reported using maladaptive ER strategies to some extent (mean score > 1). Concerning emotional eating, the mean score was 1.85 ($SD = .70$) which corresponds with results found in a similar community study ($t(80) = -.87, p = .39$) as well as with normative data ($t(80) = -.61, p = .54$) (Michels et al., 2012; van Strien & Oosterveld, 2008). In our sample, 14.8% of the youngsters reported to have never experienced emotional eating (mean score = 1), while the same percentage (14.8%) of the youngsters scored above the 80th percentile of the normative data, which classifies them as ‘emotional eaters’ (van Strien & Oosterveld, 2008).

Preliminary Analyses

Univariate LCMs were estimated for each construct. Table 1 offers a summary of the fit indices and parameter estimates of the models. For the

constructs maternal rejection, paternal rejection and maladaptive ER strategies the LCMs fitted the data adequately. For the construct emotional eating, the model fit was less adequate according to the root mean square error of approximation (RMSEA). When looking at the mean change, paternal rejection showed a significant decrease over time, while maternal rejection did not change. Further, maladaptive ER strategies and emotional eating showed significant decreases over time, averaged across all participants. Next to the mean change, results showed a significant variance for all the constructs regarding to initial levels and for all constructs, except for paternal rejection, regarding the change. This indicates significant interindividual differences in initial level and change over time for these variables. Concerning the variance of change, individual estimates of true change for all variables ranged from negative values (declines) to positive values (increases).

Correlations among Study Variables

A Pearson correlation matrix was constructed containing the level and change latent variables of the constructs (see Table 2). Regarding the level of the variables, results showed that the level of maternal rejection was positively related to the level of maladaptive ER strategies and emotional eating. In addition, the level of maladaptive ER strategies was positively related to the level of emotional eating. The level of paternal rejection was not related to the level of maladaptive ER strategies nor to the level of emotional eating.

Concerning the change in the variables, results showed that the change in maternal rejection was neither related to the change in maladaptive ER strategies nor to the change in emotional eating. Like maternal rejection, the change in paternal rejection was not related to the change in maladaptive ER strategies nor to the change in emotional eating.

Furthermore, the change in maladaptive ER strategies was not related to the change in emotional eating.

Mediation Analysis

Based on the significant Pearson correlations between the study variables, the indirect effect of the level of maternal rejection on the level of emotional eating through the level of maladaptive ER strategies was examined. The model provided a good fit to the data, $\chi^2(1) = 1.56, p = .21$, RMSEA = .08, CFI = .97. The indirect effect was marginally significant ($b = .19, p = .07$; 95% CI [-.018, .400]).

Discussion

This study aimed to test the relation between parental rejection, maladaptive ER and emotional eating in a community sample of youngsters. Therefore, we conducted a longitudinal study with two waves and estimated level and absolute changes in these variables using LCMs. Via Pearson's product moment correlations the relations between the variables were investigated. In addition, indirect effects were examined via SEM with bootstrapping. When looking at the level of the variables, results show that higher levels of maternal rejection are related to higher levels of maladaptive ER strategies and to higher levels of emotional eating. The level of paternal rejection, however, is not related to the level of maladaptive ER strategies, nor to the level of emotional eating. Furthermore, higher levels of maladaptive ER strategies are related to higher levels of emotional eating. The indirect effect of the level of maternal rejection on the level of emotional eating through the level of maladaptive ER strategies is marginally significant. The results approximate the results of Vandewalle et al. (2014) in a referred sample of obese youngsters. This suggest that also in the general population, youngsters reporting higher maternal rejection use more maladaptive ER strategies and show more emotional eating.

Concerning the change in the variables, results show that the change in maternal rejection is not related to the change in maladaptive ER strategies, nor to the change in emotional eating. This may be due to the lack of change in maternal rejection in our sample. However, even though maternal rejection did not change over time, maladaptive ER strategies and emotional eating did change significantly, which suggest the additional influence of other predictors. The influence of parents may diminish when children grow older and instead the influence of important others may perhaps increase. The emotional socialisation by parents, such as helping the child to learn how to deal with troublesome situations, already starts in the infancy (Kopp, 1989). As children grow older they rely less on parents and more often rely on other socialisation agents such as peers (Eisenberg & Morris, 2002; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Silk, Steinberg, & Morris, 2003). Research does confirm that peer rejection in adolescence is related to the use of maladaptive ER strategies of the rejected adolescents (Scholte & Van Aken, 2006). In addition, a diary study has shown that fluctuations in daily interpersonal hassles are associated with fluctuations in snacking. Therefore, it might be interesting to investigate the relation between parental and peer rejection and emotional eating in a diary study, looking at day-to-day within-person fluctuations (O'Connor et al., 2008).

Further, the results show that the change in paternal rejection is not related to the change in maladaptive ER strategies nor to the change in emotional eating. This is in line with our hypothesis. However, this might also be explained by the low variance in the change of paternal rejection in our sample.

In addition, the change in maladaptive ER strategies is not related to the change in emotional eating. This may possibly be explained by the fact that not all individuals having difficulty regulating their emotions turn to

food as comfort. Other strategies may be used to cope with negative emotions, like aggression or alcohol abuse (Röll, Koglin, & Petermann, 2012; Sher & Grekin, 2007). As such, a change in maladaptive ER strategies in some individuals may not be related to a change in emotional eating, as emotional eating is non-existent in these individuals.

This study has some limitations. Although the study is longitudinal, introducing a third study moment would have been optimal. In this way, it would have been possible to measure each variable at a different study moment and to test a longitudinal mediation model using Latent Growth Curve Models (LGCM; Duncan & Duncan, 2004; McArdle & Nesselroade, 2002; von Soest & Hagtvet, 2011; Willett & Sayer, 1994). Moreover, as parental rejection may possibly have more influence on the ER of young children, it would be interesting to measure parental rejection and ER at a younger age and investigate if this has an enduring effect on emotional eating in the adolescence. In addition, it may be interesting to also look at the other side of the continuum, by including parental warmth next to parental rejection. Results from previous research suggest that parental warmth may enhance the emotional self-regulation capacities of the child (Baker & Hoerger, 2012).

Further, the exclusive reliance on self-report measures in this study may be problematic, especially regarding the assessment of ER and emotional eating of the youngsters. Concerning parental rejection however, Rohner (2004) stresses the importance of the youngster's perception in comparison with parents' perception or objective observations; a child may feel unloved and this in turn may affect the child's mental health, even if outside observers fail to detect parental rejection. But regarding ER and emotional eating, some researchers have argued that the youngster's perceptions may be influenced by the individual's ability to assess their own behaviour (e.g. Evers, de Ridder, &

Adriaanse, 2009; Tull, Barrett, McMillan, & Roemer, 2007). Concerning emotional eating, Bongers, Jansen, Houben, and Roefs (2013) state that people are generally rather poor at recalling their emotions, their eating behaviour and the associations between the two. As previously suggested, it therefore may be interesting to investigate the relation between these variables in a diary study, assessing current emotions and actual food intake. Finally, this study suffered from a low response rate and a high dropout rate, mainly due to the strict inclusion criteria of the larger study.

When looking at current childhood obesity prevention programmes, the focus on parents is often limited to educating parents about healthy eating patterns and reducing sedentary lifestyle of their children (Flodmark, Lissau, Moreno, Pietrobelli, & Widhalm, 2004). Considering the link between the level of maternal rejection and the level of emotional eating, prevention and intervention programmes might focus on assessing and improving the emotional bond between parent and youngster. Furthermore, prevention and intervention programmes might also focus on improving ER considering the link between the level of maladaptive ER strategies and the level of emotional eating. Training in ER was already found to be effective in improving coping and reducing binge eating amongst women with BED (Clyne & Blampied, 2004). Furthermore, Groves, Backer, van den Bosch, and Miller (2012) conducted a review on the effectiveness of dialectical behaviour therapy (DBT) for adolescents, of which ER training is a substantial part. They reviewed the literature on the use of DBT for adolescents with various psychological disorders and behaviours. They conclude that the overall results seem promising, but also note that there is need for further randomised controlled trials. Studies on the effectiveness of ER training in adolescents with an emotional eating style is lacking.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC: Author.
- Baker, C. N., & Hoerger, M. (2012). Parental child-rearing strategies influence self-regulation, socio-emotional adjustment, and psychopathology in early adulthood: Evidence from a retrospective cohort study. *Personality and Individual Differences, 52*, 800–805. doi:10.1016/j.paid.2011.12.034
- Blissett, J., Haycraft, E., & Farrow, C. (2010). Inducing preschool children's emotional eating: Relations with parental feeding practices. *American Journal of Clinical Nutrition, 92*, 359–365. doi:10.3945/ajcn.2010.29375
- Bongers, P., Jansen, A., Houben, K., & Roefs, A. (2013). Happy eating: The single target implicit association test predicts overeating after positive emotions. *Eating Behaviors, 14*, 348–355. doi:10.1016/j.eatbeh.2013.06.007
- Braet, C., Beyers, W., Goossens, L., Verbeken, S., & Moens, E. (2012). Subtyping children and adolescents who are overweight based on eating pathology and psychopathology. *European Eating Disorders Review, 20*, 279–286. doi:10.1002/erv.1151
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology, 13*, 733–743. doi:10.1177/1359105308093850
- Braet, C., Cracco, E., & Theuwis, L. (2013). *FEEL-KJ: Vragenlijst voor emotieregulatie bij kinderen en jongeren* [Questionnaire for emotion regulation in children and adolescents]. Amsterdam: Hogrefe.

- Bryant, E. J., King, N. A., & Blundell, J. E. (2008). Disinhibition: Its effects on appetite and weight regulation. *Obesity Reviews*, *9*, 409–419. doi:10.1111/j.1467-789X.2007.00426.x
- Carper, J. L., Fisher, J. O., & Birch, L. L. (2000). Young girls' emerging dietary restraint and disinhibition are related to parental control in child feeding. *Appetite*, *35*, 121–129. doi:10.1006/appe.2000.0343
- Charmandari, E., Tsigos, C., & Chrousos, G. (2005). Endocrinology of the stress response. *Annual Review of Physiology*, *67*, 259–284. doi:10.1146/annurev.physiol.67.040403.120816
- Clyne, C., & Blampied, N. M. (2004). Training in emotion regulation as a treatment for binge eating: A preliminary study. *Behaviour Change*, *21*, 269–281. doi:10.1375/bech.21.4.269.66105
- Czaja, J., Rief, W., & Hilbert, A. (2009). Emotion regulation and binge eating in children. *International Journal of Eating Disorders*, *42*, 356–362. doi:10.1002/eat.20630
- Duncan, T. E., & Duncan, S. C. (2004). An introduction to latent growth curve modelling. *Behavior Therapy*, *35*, 333. doi:10.1016/S0005-7894(04)80042-X
- Eisenberg, N., & Morris, A. S. (2002). Children's emotion-related regulation. In H. Reese & R. Kail (Eds.), *Advances in child development and behavior* (Vol. 30, pp. 189–229). San Diego, CA: Academic Press.
- Evers, C., de Ridder, D. T. D., & Adriaanse, M. A. (2009). Assessing yourself as an emotional eater: Mission impossible? *Health Psychology*, *28*, 717–725. doi:10.1037/a0016700
- Flodmark, C. E., Lissau, I., Moreno, L. A., Pietrobelli, A., & Widhalm, K. (2004). New insights into the field of children and adolescents' obesity: The European perspective. *International Journal of Obesity*, *28*, 1189–1196. doi:10.1038/sj.ijo.0802825

- Gerlsma, C., Arrindell, W. A., Vanderveen, N., & Emmelkamp, P. M. G. (1991). A parental rearing style questionnaire for use with adolescents: Psychometric evaluation of the EMB-A. *Personality and Individual Differences, 12*, 1245–1253. doi:10.1016/0191-8869(91)90196-i
- Gibson, E. L. (2006). Emotional influences on food choice: Sensory, physiological and psychological pathways. *Physiology & Behavior, 89*, 53–61. doi:10.1016/j.physbeh.2006.01.024
- Gibson, E. L. (2012). The psychobiology of comfort eating: Implications for neuropharmacological interventions. *Behavioural Pharmacology, 23*, 442–460. doi:10.1097/FBP.0b013e328357bd4e
- Goldschmidt, A. B., Tanofsky-Kraff, M., & Wilfley, D. E. (2011). A laboratory-based study of mood and binge eating behavior in overweight children. *Eating Behaviors, 12*, 37–43. doi:10.1016/j.eatbeh.2010.11.001
- Greeno, C. G., & Wing, R. R. (1994). Stress-induced eating. *Psychological Bulletin, 115*, 444–464. doi:10.1037/0033-2909.115.3.444
- Grilo, C. M., & Shiffman, S. (1994). Longitudinal investigation of the abstinence violation effect in binge eaters. *Journal of Consulting and Clinical Psychology, 62*, 611–619. doi:10.1037//0022-006x.62.3.611
- Grob, A., & Smolenski, C. (2005). *Fragebogen zur erhebung der emotionsregulation bei kindern und jugendlichen (FEEL-KJ)* [Questionnaire to measure emotion regulation in children and adolescents]. Bern:Huber Verlag.
- Groves, S., Backer, H. S., van den Bosch, W., & Miller, A. (2012). Dialectical behaviour therapy with adolescents. *Child and*

- Adolescent *Mental Health*, 17, 65–75. doi:10.1111/j.1475-3588.2011.00611.x
- Harrist, A. W., Hubbs-Tait, L., Topham, G. L., Shriver, L. H., & Page, M. C. (2013). Emotion regulation is related to children's emotional and external eating. *Journal of Developmental and Behavioral Pediatrics*, 34, 557–565. doi:10.1097/DBP.0b013e3182a5095f
- Hertzog, C., & Nesselroade, J. R. (2003). Assessing psychological change in adulthood: An overview of methodological issues. *Psychology and Aging*, 18, 639–657. doi:10.1037/0882-7974.18.4.639
- Hollingshead, A. B. (1975). *Four factor index of social status*. New Haven, CT: Yale University.
- Kaplan, H. I., & Kaplan, H. S. (1957). The psychosomatic concept of obesity. *Journal of Nervous and Mental Disease*, 125, 181–201.
- Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development*, 67, 2339–2357. doi:10.1111/j.1467-8624.1996.tb01861.x
- Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental view. *Developmental Psychology*, 25, 343–354. doi:10.1037//0012-1649.25.3.343
- Levitan, R. D., & Davis, C. (2010). Emotions and eating behaviour: Implications for the current obesity epidemic. *University of Toronto Quarterly*, 79, 783–799. doi:10.3138/utq.79.2.783
- Little, R. J. A. (1988). Missing-data adjustments in large surveys. *Journal of Business & Economic Statistics*, 6, 287–296. doi:10.2307/1391878
- Macht, M. (2008). How emotions affect eating: A five-way model. *Appetite*, 50, 1–11. doi:10.1016/j.appet.2007.07.002

- Macht, M., & Mueller, J. (2007). Immediate effects of chocolate on experimentally induced mood states. *Appetite*, *49*, 667–674. doi:10.1016/j.appet.2007.05.004
- Macht, M., & Simons, G. (2000). Emotions and eating in everyday life. *Appetite*, *35*, 65–71. doi:10.1006/appe.2000.0325
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*, 99–128. doi:10.1207/s15327906mbr3901_4
- McArdle, J. J., & Nesselroade, J. R. (1994). Structuring data to study development and change. In S. H. Cohen & H. W. Reese (Eds.), *Life-span developmental psychology: Methodological innovations* (pp. 223–268). Hillsdale, NJ: Erlbaum.
- McArdle, J. J., & Nesselroade, J. R. (2002). Growth curve analysis in contemporary psychological research. In J. Schinka & W. Velicer (Eds.), *Comprehensive handbook of psychology* (Vol. 2): Research methods in psychology (pp. 447–480). New York, NY: Wiley.
- Meesters, C., & Muris, P. (2004). Perceived parental rearing behaviours and coping in young adolescents. *Personality and Individual Differences*, *37*, 513–522. doi:10.1016/j.paid.2003.09.022
- Messerli-Burgy, N., Pjanic, I., Jaggi, V., Fresa, R. O., & Znoj, H. (2012). Differences in emotion regulation and positive affect between obese patients and normal weight volunteers. *Psychology & Health*, *27*, 90–91. doi:10.1080/08870446.2012.707817
- Michels, N., Sioen, I., Braet, C., Eiben, G., Hebestreit, A., Huybrechts, I., & De Henauw, S. (2012). Stress, emotional eating behaviour and dietary patterns in children. *Appetite*, *59*, 762–769. doi:10.1016/j.appet.2012.08.010

- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*, 361–388. doi:10.1111/j.1467-9507.2007.00389.x
- Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus user's guide (7th ed.)*. Los Angeles, CA: Author.
- Nguyen-Michel, S. T., Unger, J. B., & Spruijt-Metz, D. (2007). Dietary correlates of emotional eating in adolescence. *Appetite, 49*, 494–499. doi:10.1016/j.appet.2007.03.005
- O'Connor, D. B., Jones, F., Conner, M., McMillan, B., & Ferguson, E. (2008). Effects of daily hassles and eating style on eating behavior. *Health Psychology, 27*, S20–S31. doi:10.1037/0278-6133.27.1.s20
- Oliver, G., & Wardle, J. (1999). Perceived effects of stress on food choice. *Physiology & Behavior, 66*, 511–515. doi:10.1016/s0031-9384(98)00322-9
- Perris, C., Jacobsson, L., Lindstrom, H., Knorrning, L. V., & Perris, H. (1980). Development of a new inventory for assessing memories of parental rearing behavior. *Acta Psychiatrica Scandinavica, 61*, 265–274. doi:10.1111/j.1600-0447.1980.tb00581.x
- Ricciardelli, L. A., & McCabe, M. P. (2001). Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review, 21*, 325–344. doi:10.1016/s0272-7358(99)00051-3
- Roelants, M., & Hauspie, R. (2004). Flemish growth charts 2–20 years. Retrieved June 6, 2011, from <http://www.vub.ac.be/groeicurven/english.html>
- Rogosa, D., Brandt, D., & Zimowski, M. (1982). A growth curve approach to the measurement of change. *Psychological Bulletin, 114*, 726–748. doi:10.1037/0033-2909.92.3.726

- Rohner, R. P. (1975). *They love me, they love me not: A worldwide study of the effects of parental acceptance and rejection*. New Haven, CT: Human Relations Area Files.
- Rohner, R. P. (2004). The parental “acceptance-rejection syndrome”: Universal correlates of perceived rejection. *American Psychologist*, *59*, 830–840. doi:10.1037/0003-066X.59.8.830
- Röll, J., Koglin, U., & Petermann, F. (2012). Emotion regulation and childhood aggression: Longitudinal associations. *Child Psychiatry & Human Development*, *43*, 909–923. doi:10.1007/s10578-012-0303-4
- Scholte, H. G., & Van Aken, M. A. G. (2006). Peer relations in adolescent. In S. Jackson & L. Goossens (Eds.), *Handbook of adolescent development* (pp. 175–199). Hove: Psychology Press.
- Sharma, A. M., & Padwal, R. (2010). Obesity is a sign – Over-eating is a symptom: An aetiological framework for the assessment and management of obesity. *Obesity Reviews*, *11*, 362–370. doi:10.1111/j.1467-789X.2009.00689.x
- Sher, K. J., & Grekin, E. R. (2007). Alcohol and affect regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 560–580). New York, NY: Guilford Press.
- Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents’ emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development*, *74*, 1869–1880. doi:10.1046/j.1467-8624.2003.00643.x
- Snoek, H. M., Engels, R., van Strien, T., & Otten, R. (2013). Emotional, external and restrained eating behaviour and BMI trajectories in adolescence. *Appetite*, *67*, 81–87. doi:10.1016/j.appet. 2013.03.014

- Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology, 21*, 131–138. doi:10.1037//0278-6133.21.2.131
- Tull, M. T., Barrett, H. M., McMillan, E. S., & Roemer, L. (2007). A preliminary investigation of the relationship between emotion regulation difficulties and posttraumatic stress symptoms. *Behavior Therapy, 38*, 303–313. doi:10.1016/j.beth.2006.10.001
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders, 5*, 295–315. doi:10.1002/1098-108x(198602)5:2<295:aid-eat2260050209>3.0.co;2-t
- van Strien, T., & Oosterveld, P. (2008). The children's DEBQ for assessment of restrained, emotional, and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders, 41*, 72–81. doi:10.1002/eat.20424
- Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: The role of parental rejection and emotion regulation. *International Journal of Obesity, 38*, 525–530. doi:10.1038/ijo.2013.233
- Vannucci, A., Tanofsky-Kraff, M., Crosby, R. D., Ranzenhofer, L. M., Shomaker, L. B., Field, S. E., & Yanovski, J. A. (2013). Latent profile analysis to determine the typology of disinhibited eating behaviors in children and adolescents. *Journal of Consulting and Clinical Psychology, 81*, 494–507. doi:10.1037/a0031209
- von Soest, T., & Hagtvet, K. A. (2011). Mediation analysis in a latent growth curve modeling framework. *Structural Equation Modeling: A Multidisciplinary Journal, 18*, 289–314. doi:10.1080/10705511.2011.557344

-
- Van Winckel, M., & van Mil, E. (2001). Wanneer is dik té dik? [When is fat too fat?]. In C. Braet & M. Van Winckel (Eds.), *Behandelingsstrategieën bij kinderen met overgewicht* [Treatment strategies for overweight children] (pp.11–26). Houten/Diegem: Bohn Stafleu Van Loghum.
- Wallis, D. J., & Hetherington, M. M. (2009). Emotions and eating. Self-reported and experimentally induced changes in food intake under stress. *Appetite*, *52*, 355–362. doi:10.1016/j.appet.2008.11.007
- Willett, J. B., & Sayer, A. G. (1994). Using covariance structure analysis to detect correlates and predictors of individual change over time. *Psychological Bulletin*, *116*, 363–381. doi:10.1037/0033-2909.116.2.363
- Winnicott, D. (1957). *Mother and child: A primer of first relationships*. New York, NY: Basic Books.
- Zametkin, A. J., Zoon, C. K., Klein, H. W., & Munson, S. (2004). Psychiatric aspects of child and adolescent obesity: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*, 134–150. doi:10.1097/01.chi.0000100427.250

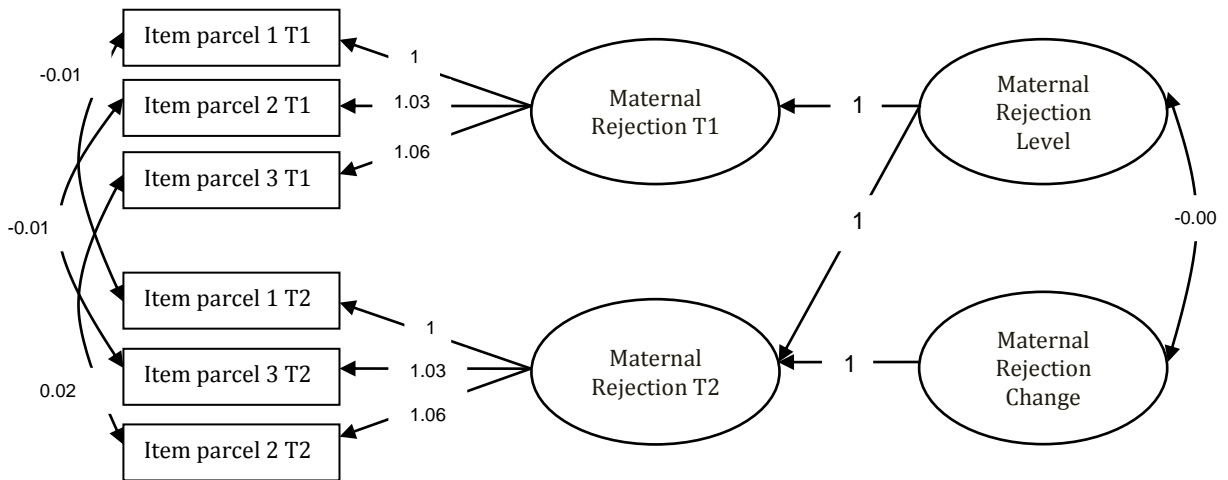


Figure 1. Unstandardized Latent Change Model (LCM) of maternal rejection measured at Waves 1 and 2.

Table 1
Fit Indices and Parameter Estimates of Univariate Latent Change Models of Constructs

	Parameter estimates									
	Fit indices					Change				
	<i>df</i>	SBS- χ^2	RMSEA	CFI	<i>M</i>	Level	<i>M</i>	<i>s</i> ²	<i>s</i> ²	Range
Maternal rejection	11	11.85	.03	.99	1.33***	.14**	-.02	.02*		-0.21 – 0.19
Paternal rejection	11	12.81	.05	.99	1.36***	.22***	-.06*	.03		-0.55 – 0.23
Maladaptive ER strategies	11	11.24	.02	.99	2.62***	.31***	-.15*	.10**		-0.65 – 0.26
Emotional eating	11	33.54***	.16	.93	1.89***	.47***	-.25**	.29***		-1.38 – 1.29

Note. SBS- χ^2 = Satorra Bentler scaled chi-square; RMSEA = Root mean square error of approximation;

CFI = Comparative fit index. ER = emotion regulation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2
Pearson Correlations between Level and Change Latent Variables

	Maternal rejection		Paternal rejection		Maladaptive ER strategies		Emotional eating	
	Level	Change	Level	Change	Level	Change	Level	Change
Maternal rejection								
Level	--	.06	.54***	-.64***	.39***	.03	.23*	-.01
Change			-.09	.25*	.10	-.01	-.06	-.11
Paternal rejection								
Level				-.64***	.20	-.03	.01	.07
Change					-.17	-.11	.08	-.06
Maladaptive ER strategies								
Level						.07	.27*	-.12
Change							-.11	.18
Emotional eating								
Level								-.44***
Change								--

Note. ER = emotion regulation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Chapter 4

The effect of parental rejection on the emotional eating behaviour of youngsters: a laboratory-based study¹

Abstract

Results from survey studies demonstrate a relationship between parental rejection and self-reported emotional eating of youngsters. The aim of the current study was to build on this research by examining the relationship between parental rejection and actual emotional eating, using an experimental laboratory paradigm. Participants were 46 youngsters between the ages of 10 and 17 years old. Participants first completed online questionnaires at home, measuring parental rejection and emotional eating style. At the laboratory, participants were randomly assigned to a neutral condition or negative mood condition, followed by a multi-item snack buffet. The interaction effect maternal rejection x condition on energy intake from savoury food was significant. More maternal rejection predicted more energy intake from savoury food in the negative mood condition, but not in the neutral condition. The results highlight the importance of assessing, and if mandatory, improving the emotional bond between parent and child in the prevention and intervention of emotional eating.

¹ Vandewalle, J., Moens, E., Bosmans, G. & Braet, C. (in press). The effect of parental rejection on the emotional eating behaviour of youngsters: a laboratory-based study. *Appetite*.

Introduction

Emotional eating, defined as ‘eating in response to emotions’ (van Strien & Oosterveld, 2008; p. 72), can be explained as an inadequate affect regulation strategy (e.g. Hawkins & Clement, 1984; Kaplan & Kaplan, 1957; Spoor, Bekker, van Strien, & van Heck, 2007). Comfort food, highly palatable food rich in sugar and fat, is used to ‘eat troubles away’. This behaviour is reinforced as eating comfort food induces sensory pleasure, leading to a temporary reduction in arousal and increase in positive mood (Gibson, 2006). Emotional eating can occur in the absence of hunger as well as foster eating beyond satiation. As such, it may lead to increased energy intake and weight gain over time, which has been shown in adults through longitudinal research (Koenders & van Strien, 2011). Emotional eating already occurs in children and adolescents as well and is also positively correlated with their Body Mass Index (BMI) *z*-scores (Gallant et al., 2010; Turker et al., 2012; Webber, Hill, Saxton, Van Jaarsveld, & Wardle, 2009). A study of Shapiro et al. (2007) showed that 63% of children aged 5 until 13 years reported to have experienced emotional eating at least once.

Recent research indicates the influence of parental rejection on the emotional eating style of children and adolescents (Schuetzmann, Richter-Appelt, Schulte-Markwort, & Schimmelmann, 2008; Vandewalle, Moens, Beyers, & Braet, 2016; Vandewalle, Moens, & Braet, 2014). Parental rejection can be described as a lack of parental warmth and/or the presence of physically and psychologically hurtful behaviours towards the child (Khaleque & Rohner, 2012). The relationship between parental rejection and emotional eating can be understood in terms of affect/emotion regulation. During early childhood, emotion regulation skills are learned in interaction with primary caregivers (Barrett & Campos, 1987). Supportive warm caregivers help the child to regulate their emotions by

acknowledging the emotion, modelling emotion regulation strategies and teaching the child emotion regulation strategies (e.g., encouraging analysis of problem) (Power, 2004). Through this emotional socialization process, children are able to internalize effective emotion regulation strategies and use them later in life (Eisenberg, Cumberland, & Spinrad, 1998). In contrast, this process is impeded in unresponsive rejecting caregivers, which may lead to a lack in effective or adaptive emotion regulation strategies in children. Furthermore, research suggests that rejecting behaviour of the caregivers increases the distress of the child and incites the child to use maladaptive emotion regulation strategies (Eisenberg et al., 1998). Thus, the child may turn to emotional eating as alternative emotion regulation strategy, when dealing with negative emotions or stress.

To date, the relationship between parental rejection and emotional eating of children and adolescents has been confirmed in a clinical survey study in obese youngsters (Vandewalle et al., 2014) as well as in community-based survey studies (Schuetzmann et al., 2008; Vandewalle et al., 2016). The study of Schuetzmann et al. (2008) showed that deviant eating behaviour, including emotional eating, was present in 65.2% of children feeling rejected by their parents. In contrast to Schuetzmann et al. (2008), Vandewalle et al. (2014; 2016) made the distinction between maternal and paternal rejection, and found that only maternal rejection was related to emotional eating in a clinical sample of obese youngsters as well as in a community sample. The results from these survey studies offer evidence of the relationship between parental rejection and emotional eating of youngsters. Moreover, the results suggest that maternal rejection is more clearly linked to youngsters' emotional eating than paternal rejection. However, the exclusive reliance on self-reported measures of emotional eating might be a limitation in these studies.

Bongers, Jansen, Houben, and Roefs (2013) reported that people are generally rather poor at recalling their emotions, their eating behaviour and the associations between the two. Adriaanse, de Ridder, and Evers (2011) compared self-reported emotional eating and actual snacking episodes preceded by negative emotions in normal weight females using a 7-day diary. They concluded that self-reported emotional eating did not capture the tendency to eat when experiencing negative emotions, but rather reflected the person's belief about the relationship between emotions and eating. Taking these findings into account, more research is needed to unravel the relationship between parental rejection and emotional eating. In particular, the relationship between parental rejection and actual food intake, preceded by negative emotions, should be investigated.

The laboratory is a valid setting to examine this relationship, as it enables induction of mood and direct observation of the eating behaviour after the mood induction. Results of laboratory studies in adults and children using mood induction to incite emotional eating are promising (e.g., Blissett, Haycraft, & Farrow, 2010; Goldschmidt, Tanofsky-Kraff, & Wilfley, 2011; Yeomans & Coughlan, 2009). For example, the laboratory study of Goldschmidt et al. (2011) demonstrated that overweight girls with binge eating symptoms (aged 6-12 years) consumed more energy from fat in a sad mood condition as compared to a neutral mood condition. The study used video clips as mood induction and afterwards children were presented with a multi-item food buffet. Based on this laboratory study, the current study utilized an experimental laboratory paradigm with a negative mood condition versus neutral mood condition, and a subsequent multi-item snack buffet. In both conditions video clips were used as mood induction.

The aim of the study was to examine if there was an interaction effect between parental rejection (subdivided into maternal and paternal rejection) and condition, on the subsequent energy intake of the youngsters. It was expected that there would be a significant interaction effect maternal rejection x condition on the energy intake of the youngsters. More specifically, we expected to find a significant positive relation between maternal rejection and the energy intake of the youngsters in the negative mood condition, but not in the neutral condition. Considering Vandewalle et al. (2014; 2016) did not find a significant relation between paternal rejection and emotional eating, we did not expect to find a significant interaction effect paternal rejection x condition on the energy intake of the youngsters.

Method

Participants

The participants were 46 youngsters (43.5% boys and 56.5% girls) between the ages of 10 and 17 years old ($M = 13.17$, $SD = 1.81$). Individuals were eligible for the study if they were between the ages of 10 and 17 years. Participants were recruited via distribution of flyers in local schools. The participants were blind to the purpose of the study to reduce the impact of expectancy effects. In line with the procedure of Meyer and Waller (2000), Waller and Mijatovich (1998) and Waller and Barter (2005), the study was described as research investigating the influence of mild states of hunger on the visual sensitivity in youngsters. Therefore, the participants were asked to abstain from eating for about 2 hours before arrival. That way, participants were more likely to experience the same amount of hunger during the experiment. After receiving a more elaborate description of the study during a telephone call, participants and one of their parents provided written informed consent. The study was approved by the Institutional Ethical Committee.

Measures

Demographic measures. The BMI was calculated as weight (in kg)/height (in m)². Participants were measured and weighed without shoes by the researcher after the experiment. We used the adjusted BMI ((actual BMI/percentile 50 of BMI for age and sex) x 100). This method allows us to compare the BMI of children of different ages and sexes. The 50th percentiles of the BMI for age and sex are based on normative data in a Flemish sample (Roelants, Hauspie, & Hoppenbrouwers, 2009). Adjusted BMI below 85% is classified as underweight, above 120% is classified as overweight and above 140% is classified as obese (Van Winckel & van Mil, 2001). The adjusted BMI of the youngsters ranged from 81.14% to 151.71%, with a mean adjusted BMI of 105.24% ($SD = 16.23$).

The familial socioeconomic situation was calculated using the Hollingshead Index of Social Position. The youngsters were asked to report about their domestic situation and the education and occupation of their caregivers, which was then used to classify the families in one of five social position indexes. We recoded the five social position indexes into three social classes (high = upper and upper-middle, middle, and low = lower-middle and lower). Most participants (48.8%) were from middle class families, 18.6% of the families were classified as high class and 32.6% as low class.

Baseline measures. Participants completed online questionnaires at home, before their visit at the laboratory. The first questionnaire, EMBU-A (Egna Minnen Beträffande Uppfostran: My memories of child upbringing - Adolescent version; Gerlsma, Arrindell, Vanderveen, & Emmelkamp, 1991), a Dutch adolescent version of the original EMBU (Perris, Jacobsson, Lindstrom, Knorrning, & Perris, 1980) was used to assess maternal and paternal rejection. Nineteen items concerning mother and 19 items concerning father, (e.g., 'Is your mother/father ever harsh

and unfriendly to you?') have to be rated on a 4-point Likert-scale from 1 = No, never to 4 = Yes, most of the time. Analyses of Gerlsma et al. (1991) showed a good internal consistency reliability and construct validity. In this study, the Cronbach α 's were .92 for both maternal rejection and paternal rejection.

Secondly, the emotional eating style of participants was assessed by the Dutch Eating Behaviour Questionnaire - child version (DEBQ; Braet et al., 2008; van Strien, Frijters, Bergers, & Defares, 1986). Thirteen items are formulated as specific eating behaviours (e.g., 'If you're sad, do you feel like eating something?') and have to be rated on their frequency of occurrence on a 5-point Likert scale from 1 = never to 5 = very often. Research showed a stable factor structure, satisfying internal consistency reliability and good test-retest reliability (Braet et al., 2008). In the present study, the coefficient α for the subscale emotional eating was .94.

Measures in experiment. *Hunger* and *desire to eat* were measured before the mood induction using a 10-point visual analog scale (ranging from 0 = 'none' to 10 = 'very much'). *Mood* was assessed before and after the induction using an amended version of the Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999). To reduce the time between mood induction and the presentation of the snack buffet, the number of items that had to be rated was limited by selecting five items from both the Negative Affect Scale (sad, nervous, guilty, scared, lonely) and the Positive Affect Scale (happy, energetic, cheerful, joyful, calm). Participants had to rate to what extent their current affect matched the items, using a 5-point Likert scale (ranging from 1 = 'not at all' to 5 = 'extremely'). The coefficient α for the negative affect scale before mood induction was .15 in the neutral condition and .43 in the negative mood condition. After mood induction, the coefficient α was .35 in the neutral condition and .69 in the negative mood condition. Due to the low internal

consistency of the items, the negative affect scale was not used in analysis². The reliability of the positive affect scale was good before mood induction ($\alpha = .79$ in the neutral condition and $.86$ in the negative mood condition) and acceptable after mood induction ($\alpha = .69$ in the neutral condition and $.82$ in the negative mood condition). *Energy intake* after the mood induction was calculated for each food item, by subtracting the remaining weight of the food item after the experiment from the initial weight and then converting from grams to kilocalories.

Mood induction

Video clips were used as induction method considering they have been shown to reliably evoke a specific mood in children and present few ethical concerns (Brenner, 2000; Goldschmidt et al., 2011). In addition, Westermann, Spies, Stahl, and Hesse (1996) suggest that the effectiveness of video clips increases if subjects can identify with the film's protagonist (for example, same age group). In the negative mood condition, a segment from the documentary 'The trouble with Evan' (1994) was shown about the life of a 11-year old boy who is verbally abused by his stepfather and mother. In the neutral condition, participants were shown a segment from the nature documentary 'Winged Migration' (2003).

Procedure

Participants completed online questionnaires at home before their visit to the laboratory (range 0-29 days before visit, $M = 5.97$, $SD = 7.86$). The time of the visit varied depending on the participant's personal schedule and feasibility of abstaining from eating for two hours prior to the visit. During their visit, participants were first randomly assigned to one of two conditions by order of arrival; neutral condition ($n = 23$) or negative mood condition ($n = 23$). In both conditions, participants were

² Principal component analysis on the items of the Negative Affect Scale measured before mood induction showed that only two ('lonely' and 'sad') out of the five items were significantly correlated.

told that they were going to view a brief video clip (2 min 30 s) and afterwards would have to answer questions about the clip. Participants were then told that they had to fill in some general questions first. *Hunger*, *desire to eat* and *mood* were assessed before the induction. Furthermore, to verify if participants obeyed the order to abstain from eating for 2 hours, participants were asked when they last had eaten. The mood induction was then administered. Next to *mood* ratings, participants were asked to answer some simple multiple choice questions about the video clip they had just seen, to conceal the real aim of the study. Finally, participants were asked to report their feelings about the video clip, to retain the evoked mood. Then, participants were told that there would be a break while the researcher completed the necessary work. They were informed that the part of the study that had required them to abstain from food was now completed. Therefore, the researcher offered them the possibility to eat a snack. In line with the recommendations of Kirschenbaum and Tomarken (1982), participants were offered a single buffet with small bites of sweet food (90 grams mini chocolate chip cookies and 150 grams M&M's) and savoury food (25 grams paprika crisps and 25 grams salted crisps). The researcher left the room and returned after 10 minutes. Lastly, participants' height and weight were measured, followed by a debriefing session. Participants were first asked about the aim of the study. None of the participants suspected the real aim of the study. Participants were then informed about the real aim and received an information letter for the parents, together with a small voucher to cover their transportation expenses. The remaining food was weighed after the participants had departed, to measure *energy intake*.

Analytic Plan

Initially, the data was checked for outliers. In each condition two participants were excluded from analyses due to outliers for parental

rejection or energy intake (mean +/- 3 *SD*). Missing data analysis was conducted for each condition as there was some data missing for the baseline measures parental rejection and emotional eating style (7.9% or 5 out of 63 data points were missing in the neutral condition and 12.7% or 8 out of 63 data points were missing in the negative mood condition). To estimate missing data, the assumption that data is 'missing completely at random' (MCAR) should be met. The chi-square statistic for testing whether values are MCAR is referred to as 'The Little (1988) MCAR test'. The Little MCAR test, testing MCAR versus MAR, was not significant for the neutral condition [$\chi^2(14) = 14.98, p = .38$] nor for the negative mood condition [$\chi^2(14) = 16.99, p = .26$], indicating that the missing data can be considered as being completely at random (i.e., no identifiable pattern exists in the missing data). Missing values were estimated using maximum likelihood estimation. The results of a Shapiro-Wilk tests indicated that baseline maternal and paternal rejection and energy intake were not normally distributed in the neutral and negative mood condition (p 's < .05). Therefore, log 10 transformation was used to normalize the distribution of the data.

Subsequently, preliminary descriptive analyses were conducted. Untransformed scores of the baseline measures, maternal and paternal rejection and emotional eating style, were compared with normative data, using one-sample *t*-tests. In addition, Pearson correlations were performed between the transformed baseline variables maternal and paternal rejection and emotional eating style. Next, independent sample *t*-tests per condition were used to determine whether compliance with instructions to abstain from eating for about 2 hours before arrival affected energy intake. Independent sample *t*-tests were used to determine if there were demographic, baseline or pre-induction differences between conditions. Chi-square test was used to examine the distribution of sexes between both

conditions. A 2x2 repeated-measures ANOVA (Time [pre-induction vs. post-induction] x condition [neutral vs. negative mood]) was conducted on the positive affect scale as a manipulation check. Additionally, a MANOVA with condition as fixed factor was conducted on the energy intake from savoury food and sweet food. Two MANCOVAs were performed to examine the interaction effect between condition and parental rejection (maternal or paternal) on the energy intake of the youngsters. Energy intake from sweet food and savoury food were entered as two separate variables, granted their differential attractiveness, as some experimental studies have demonstrated (e.g., Goldschmidt et al., 2011; Oliver, Huon, Zadro, & Williams, 2001). Data were analyzed using the SPSS version 22.0. *P*-values less than .05 were considered statistically significant.

Results

Descriptive Analyses

Descriptive statistics were calculated for the baseline variables. Regarding maternal and paternal rejection, the mean scores were respectively 26.74 (*SD* = 5.15) and 25.60 (*SD* = 4.88). These scores are comparable with unpublished normative data of 1153 Flemish youngsters between the ages of 10 and 15 years ($t(41) = 1.16, p = .25$; $t(41) = -0.01, p = .99$). Respectively 11.9% and 16.7% of our sample had a high score ($> M + 1SD$) on maternal and paternal rejection, in comparison with normative data. Concerning emotional eating, the mean score was 1.77 (*SD* = 0.85) for boys and 2.27 (*SD* = 1.10) for girls aged 12 years or younger. The mean score was 2.35 (*SD* = 0.69) for boys and 2.56 (*SD* = 1.01) for girls aged 13 years and older. The scores for boys (youngest age group: $t(6) = -1.56, p = .17$; oldest age group: $t(9) = 1.67, p = .13$) and girls (youngest age group: $t(5) = 0.15, p = .89$; oldest age group: $t(18) = 1.57, p = .13$) are comparable with the normative data (Braet et al., 2008).

In our sample, 28.6% of the youngsters had a high score ($> M + 1SD$) on emotional eating, in comparison with normative data. Pearson correlations between the baseline measures showed significant positive relations between maternal and paternal rejection ($r = .59, p < .001$). Neither maternal ($r = .12, p = .46$) nor paternal rejection ($r = -.01, p = .93$) were related to the emotional eating style of the youngster.

Adherence to the Experimental Protocol

More than half of the participants (57.1%) complied with the instructions to abstain from eating for 2 hours prior to the experiment. The smaller half of the participants (42.9%) did not comply. Most of them had abstained from eating for more than 2 hours. Non-compliers did not significantly differ from compliers with regard to energy intake from sweet and savoury food, in either the neutral condition ($t(12) = 1.24, p = .24; t(18) = -0.50, p = .63$) or negative mood condition ($t(19) = -0.13, p = .90; t(19) = .31, p = .76$). As such, this variable was not included as a control variable in subsequent analyses.

Demographic, Baseline and Pre-Induction Differences between Conditions

The results of the independent t -tests showed no differences between conditions, for the demographic variables age ($t(40) = 0.00, p = 1.00$), adjusted BMI ($t(40) = 1.65, p = .11$), and Hollingshead Index of Social Position ($t(37) = -0.04, p = .97$). A chi-square test showed no sex differences between conditions ($\chi^2(1) = 0.89, p = .35$). There were also no differences concerning the baseline measures, maternal and paternal rejection ($t(40) = 0.62, p = .54; t(40) = 0.48, p = .64$), and the emotional eating style ($t(40) = -0.15, p = .88$). Furthermore, results demonstrated no differences regarding pre-induction hunger ($t(32) = -1.51, p = .14$), desire to eat ($t(40) = -0.42, p = .68$) and positive affect ($t(40) = -0.57, p = .57$). As such, none of these variables were included as control variables in the

subsequent analyses. An overview of participants' characteristics separated by condition can be found in Table 1.

Manipulation Check

The results of the 2x2 repeated-measures ANOVA conducted on the positive affect scale showed a significant main effect for time ($F(1,40) = 7.94, p = .007$) and a significant interactional effect of time x condition ($F(1,40) = 6.60, p = .01$). The negative mood induction resulted in a significant greater decrease in positive affect than the neutral mood induction (see Figure 1). The results of the MANOVA with condition as fixed factor on the energy intake showed no significant differences between both groups in energy intake from savoury food ($F(1,40) = 0.06, p = .80$) or energy intake from sweet food ($F(1,40) = 0.20, p = .66$).

Analyses of Energy Intake

First, a MANCOVA was performed with condition as fixed factor, maternal rejection as covariate and the maternal rejection x condition interaction, on the energy intake from sweet and savoury food. Multivariate tests demonstrated a significant main effect for condition ($F(2,37) = 3.90, p = .03$) and an interaction effect for maternal rejection x condition ($F(2,37) = 3.96, p = .03$). Looking at the univariate tests, results showed that the main effect for condition ($F(1,38) = 7.75, p = .008$) and interaction effect ($F(1,38) = 7.87, p = .008$) were only significant for the energy intake from savoury food (see Figure 2). Simple effect analyses demonstrated that, in the neutral condition, maternal rejection did not predict energy intake from savoury food ($t = 0.88, p = .42$). Contrarily, in the negative mood condition, maternal rejection predicted the energy intake from savoury food ($t = 3.28, p = .004$), such that greater maternal rejection predicted greater energy intake.

Next, a MANCOVA was performed with condition as the fixed factor, paternal rejection as covariate and the paternal rejection x condition

interaction, on the energy intake from sweet and savoury food. Multivariate tests only showed a significant main effect for paternal rejection ($F(2,37) = 3.90, p = .03$) and no interaction effect ($F(2,37) = 0.09, p = .91$). Looking at the univariate tests, results demonstrated that the main effect for paternal rejection ($F(1,38) = 7.75, p = .008$) was only significant for the energy intake from savoury food (see Figure 3).

Discussion

The current study examined the interaction between mood induction and reported maternal and paternal rejection on the energy intake of the youngsters. As expected, there was a significant positive relationship between maternal rejection and the energy intake of the youngsters in the negative mood condition, but not in the neutral condition. This corresponds with the results of Vandewalle et al. (2014; 2016) and offers support for the relation between maternal rejection and emotional eating. Interestingly, there were no significant differences in energy intake between youngsters in the negative mood condition and the neutral condition. This finding corresponds with previous research which suggests that not all individuals demonstrate emotional eating (e.g., Nguyen-Rodriguez, Unger, & Spruijt-Metz, 2009). In contrast, some individuals tend to eat less when experiencing negative emotions (e.g., Gibson, 2006). Taken together, our results suggests that not all youngsters demonstrate emotional eating behaviour, but that this behaviour is rather dependent of the level of maternal rejection that youngsters experience. However, the relationship with maternal rejection was only found for the energy intake from savoury food (paprika and salted crisps), and not sweet food (M&M's and chocolate chip cookies). Research on self-reported emotional eating in adults, youngsters and children generally suggests that emotional eaters will turn to both sweet and savoury energy-dense food, when feeling stressed or experiencing negative emotions (e.g., Michels et al.,

2012; Nguyen-Michel, Unger, & Spruijt-Metz, 2007; Oliver & Wardle, 1999). However, results on food preference relating to actual or experimentally induced emotional eating are less clear (e.g., Blissett et al., 2010; Oliver, Wardle, & Gibson, 2000; Zellner et al., 2006). This can partially be explained by the considerable difference in the food offered during these experiments; from extensive multi-item buffets to one food item. Nonetheless, the results of the current study correspond with the results of Goldschmidt et al. (2011), who administered a similar mood induction procedure and served an extensive multi-item buffet afterwards. In their study, overweight girls (6-12 years) with binge eating symptoms only consumed more energy from fat, and not sugar, in the sad condition compared to the neutral condition.

Regarding paternal rejection, the results showed a main effect on the energy intake from savoury food across both conditions, and no interaction effect with condition. As there is no significant interaction effect between paternal rejection and condition on the energy intake, the results cannot be equated with a significant relationship between paternal rejection and *emotional* eating. Previous research has suggested that mothers are more engaged in their children's emotional lives than fathers, and therefore have more influence on the emotion socialization process (Kliewer, Fearnow, & Miller, 1996; Klimes-Dougan et al., 2007). Consequently, mothers may have more influence on the emotional eating behaviour of youngsters than fathers.

This study presents interesting and unique relationships between parental rejection and the consumption of savoury food in the context of negative emotions. Nonetheless, as these findings are novel and this study is not without its limitations, replication is required. Firstly, it would be interesting to include a clinical sample of overweight youngsters, as this would offer the possibility to replicate the findings of Vandewalle et al.

(2014). Secondly, the experimental design of the study can be seen as a limitation on ecological validity. The laboratory setting may perhaps not elicit the same behaviours that youngsters would display in their natural environment. Additionally, this study was not able to include (chronic) stress, next to short term negative emotions, in spite of research having shown the effects of chronic stress on the eating behaviour of youngsters (e.g. Michels et al., 2012; Torres & Nowson, 2007). More fine-grained methodology, for example a diary study, may be more suitable to capture the daily relation between parental rejection and emotional eating in youngsters. Some methodological limitations should be mentioned as well. Firstly, to reduce the time between mood induction and the presentation of the snack buffet, a shortened version of the PANAS was used to assess the participants' mood. This decision affected the reliability of the negative affect scale, which resulted in the scale not being used in analysis. Furthermore, the time of the laboratory visit was set depending on participant's feasibility of abstaining from eating for two hours prior to the visit. Although this may diminish the variation in the amount of hunger participants felt during the experiment, the variation in time might have affected the general results. Strengths of the current study include, in contrast to most studies, the inclusion of both girls and boys. Moreover, to our knowledge, this is the first study to include actual energy intake and experimental mood induction, instead of self-reported emotional eating, to investigate the relationship between parental rejection and emotional eating.

In future research, it might be interesting to include youngsters' attachment style, next to parental rejection. Attachment style reflects the person's pattern of relational expectations. These expectations result from earlier experiences with primary caregivers (Fraley & Shaver, 2000). The studies of Wilkinson, Rowe, Bishop and Brunstrom (2010) and Wilkinson,

Rowe and Heath (2013) showed that attachment anxiety (i.e., worries about relationships and fear of being rejected) is related to disinhibited eating (i.e., general propensity to overeat) in females. Therefore, it would be interesting to investigate how parental rejection and the youngsters' attachment style are related to each other, and to the emotional eating style of youngsters.

More recently, both treatment programs for childhood obesity and binge eating disorder (BED; American Psychiatric Association, 2013) show a tendency towards the incorporation of emotion regulation training (Clyne & Blampied, 2004; Roosen, Safer, Adler, Cebolla, & van Strien, 2012). Research in adults shows promising results for emotion regulation training to reduce emotional eating (Roosen et al., 2012). However, research on emotion regulation training in children and adolescents with emotional eating is missing. Additionally, our results raise the question of whether emotion regulation training will be enough to tackle emotional eating in youngsters experiencing high levels of parental rejection. Therefore, we suggest assessing, and if mandatory, improving the emotional bond between parent and child in the prevention and intervention of emotional eating.

References

- Adriaanse, M. A., de Ridder, D. T. D., & Evers, C. (2011). Emotional eating: Eating when emotional or emotional about eating? *Psychology & Health, 26*, 23-39. doi: 10.1080/08870440903207627
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington DC: American Psychiatric Association.
- Barrett, K. C., & Campos, J. J. (1987). Perspective on emotional development II: A functionalist approach to emotions. In J. D. Osofsky (Ed.), *Handbook of infant development* (2nd ed., pp. 555-578). Oxford, UK: Wiley.
- Blissett, J., Haycraft, E., & Farrow, C. (2010). Inducing preschool children's emotional eating: relations with parental feeding practices. *American Journal of Clinical Nutrition, 92*, 359-365. doi: 10.3945/ajcn.2010.29375
- Bongers, P., Jansen, A., Houben, K., & Roefs, A. (2013). Happy eating: The Single Target Implicit Association Test predicts overeating after positive emotions. *Eating Behaviors, 14*, 348-355. doi: 10.1016/j.eatbeh.2013.06.007
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology, 13*, 733-743. doi: 10.1177/1359105308093850
- Brenner, E. (2000). Mood induction in children: Methodological issues and clinical implications. *Review of General Psychology, 4*, 264-283. doi:10.1037/1089-2680.4.3.264
- Clyne, C., & Blampied, N. M. (2004). Training in emotion regulation as a treatment for binge eating: A preliminary study. *Behaviour Change, 21*, 269-281. doi: 10.1375/bech.21.4.269.66105

- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*, 241-273. doi: 10.1207/s15327965pli0904_1
- Fraley, R. C., & Shaver, P. R. (2000). Adult romantic attachment: Theoretical developments, emerging controversies, and unanswered questions. *Review of General Psychology, 4*, 132–154. doi: 10.1037//1089-2680.4.2.132
- Gallant, A. R., Tremblay, A., Perusse, L., Bouchard, C., Despres, J. P., & Drapeau, V. (2010). The Three-Factor Eating Questionnaire and BMI in adolescents: results from the Quebec Family Study. *British Journal of Nutrition, 104*, 1074-1079. doi: 10.1017/s0007114510001662
- Gerlsma, C., Arrindell, W. A., Vanderveen, N., & Emmelkamp, P. M. G. (1991). A parental rearing questionnaire for use with adolescents – psychometric evaluation of the EMBU-A. *Personality and Individual Differences, 12*, 1245-1253. doi: 10.1016/0191-8869(91)90196-i
- Gibson, E. L. (2006). Emotional influences on food choice: Sensory, physiological and psychological pathways. *Physiology & Behavior, 89*, 53-61. doi: 10.1016/j.physbeh.2006.01.024
- Goldschmidt, A. B., Tanofsky-Kraff, M., & Wilfley, D. E. (2011). A laboratory-based study of mood and binge eating behavior in overweight children. *Eating Behaviors, 12*, 37-43. doi: 10.1016/j.eatbeh.2010.11.001
- Hawkins II, R. C., & Clement, P. F. (1984). Binge eating: Measurement problems and a conceptual model. In R. C. Hawkins, W. J. Fremouw & P. F. Clement (Eds.), *The binge purge syndrome: Diagnosis, treatment, and research* (pp. 229-251). New York: Springer.

- Kaplan, H. I., & Kaplan, H. S. (1957). The psychosomatic concept of obesity. *Journal of Nervous and Mental Disease*, *125*, 181-201.
- Khaleque, A., & Rohner, R. P. (2012). Pancultural Associations Between Perceived Parental Acceptance and Psychological Adjustment of Children and Adults: A Meta-Analytic Review of Worldwide Research. *Journal of Cross-Cultural Psychology*, *43*, 784-800. doi: 10.1177/0022022111406120
- Kirschenbaum, D. S., & Tomarken, A. J. (1982). Some antecedents of regulatory eating by restrained and unrestrained eaters. *Journal of Abnormal Psychology*, *91*, 326-336. doi: 10.1037//0021-843x.91.5.326
- Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development*, *67*, 2339-2357. doi: 10.1111/j.1467-8624.1996.tb01861.x
- Klimes-Dougan, B., Brand, A. E., Zahn-Waxler, C., Usher, B., Hastings, P. D., Kendziora, K., & Garside, R. B. (2007). Parental Emotion Socialization in Adolescence: Differences in Sex, Age and Problem Status. *Social Development*, *16*, 326-342. doi: 10.1111/j.1467-9507.2007.00387.x
- Koenders, P. G., & van Strien, T. (2011). Emotional Eating, Rather Than Lifestyle Behavior, Drives Weight Gain in a Prospective Study in 1562 Employees. *Journal of Occupational and Environmental Medicine*, *53*, 1287-1293. doi: 10.1097/JOM.0b013e31823078a2
- Laurent, J., Catanzaro, S. J., Joiner, T. E., Rudolph, K. D., Potter, K. I., Lambert, S., . . . Gathright, T. (1999). A measure of positive and negative affect for children: Scale development and preliminary validation. *Psychological Assessment*, *11*, 326-338. doi: 10.1037/1040-3590.11.3.326

- Meyer, C., & Waller, G. (2000). Subliminal activation of abandonment- and eating-related schemata: Relationship with eating disordered attitudes in a nonclinical population. *International Journal of Eating Disorders*, 27, 328-334. doi: 10.1002/(sici)1098-108x(200004)27:3<328::aid-eat10>3.0.co;2-u
- Michels, N., Sioen, I., Braet, C., Eiben, G., Hebestreit, A., Huybrechts, I., . . . De Henauw, S. (2012). Stress, emotional eating behaviour and dietary patterns in children. *Appetite*, 59, 762-769. doi: 10.1016/j.appet.2012.08.010
- Nguyen-Michel, S. T., Unger, J. B., & Spruijt-Metz, D. (2007). Dietary correlates of emotional eating in adolescence. *Appetite*, 49, 494-499. doi: 10.1016/j.appet.2007.03.005
- Nguyen-Rodriguez, S. T., Unger, J. B., & Spruijt-Metz, D. (2009). Psychological determinants of emotional eating in adolescence. *Eating Disorders*, 17, 211-224. doi: 10.1080/10640260902848543
- Oliver, G., & Wardle, J. (1999). Perceived effects of stress on food choice. *Physiology & Behavior*, 66, 511-515. doi: 10.1016/s0031-9384(98)00322-9
- Oliver, G., Wardle, J., & Gibson, E. L. (2000). Stress and food choice: A laboratory study. *Psychosomatic Medicine*, 62, 853-865. doi: 10.1097/00006842-200011000-00016
- Oliver, K. G., Huon, G. F., Zadro, L., & Williams, K. D. (2001). The role of interpersonal stress in overeating among high and low disinhibitors. *Eating Behaviors*, 2, 19-26. doi: [http://dx.doi.org/10.1016/S1471-0153\(00\)00020-9](http://dx.doi.org/10.1016/S1471-0153(00)00020-9)
- Perris, C., Jacobsson, L., Lindstrom, H., Knorring, L. V., & Perris, H. (1980). Development of a new inventory for assessing memories of

- parental rearing behavior. *Acta Psychiatrica Scandinavica*, *61*, 265-274. doi: 10.1111/j.1600-0447.1980.tb00581.x
- Power, T. G. (2004). Stress and Coping in Childhood: The Parents' Role. *Parenting-Science and Practice*, *4*, 271-317. doi: 10.1207/s15327922par0404_1
- Roelants, M., Hauspie, R., & Hoppenbrouwers, K. (2009). References for growth and pubertal development from birth to 21 years in Flanders, Belgium. *Annals of Human Biology*, *36*, 680-694. doi: 10.3109/03014460903049074
- Roosen, M. A., Safer, D., Adler, S., Cebolla, A., & van Strien, T. (2012). Group dialectical behavior therapy adapted for obese emotional eaters; a pilot study. *Nutricion Hospitalaria*, *27*, 1141-1147. doi: DOI 10.3305/nh.2012.27.4.5843
- Schuetzmann, M., Richter-Appelt, H., Schulte-Markwort, M., & Schimmelmann, B. G. (2008). Associations among the perceived parent-child relationship, eating behavior, and body weight in preadolescents: Results from a community-based sample. *Journal of Pediatric Psychology*, *33*, 772-782. doi: 10.1093/jpepsy/jsn002
- Shapiro, J. R., Woolson, S. L., Hamer, R. M., Kalarchian, M. A., Marcus, M. D., & Bulik, C. M. (2007). Evaluating binge eating disorder in children: Development of the Children's Binge Eating Disorder Scale (C-BEDS). *International Journal of Eating Disorders*, *40*, 82-89. doi: 10.1002/eat.20318
- Spoor, S. T. P., Bekker, M. H., Van Strien, T., & van Heck, G. L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite*, *48*, 368-376. doi: 10.1016/j.appet.2006.10.005
- Torres, S. J., & Nowson, C. A. (2007). Relationship between stress, eating behavior, and obesity. *Nutrition*, *23*, 887-894. doi: 10.1016/j.nut.2007.08.008

- Turker, P. F., Saka, M., Koseler, E., Metin, S., Yilmaz, B., & Bas, M. (2012). Body mass index in Turkish female adolescents: The role of emotional eating, restrained eating, external eating and depression. *Healthmed*, 6, 1367-1374.
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*, 5, 295-315. doi: 10.1002/1098-108x(198602)5:2<295::aid-eat2260050209>3.0.co;2-t
- van Strien, T., & Oosterveld, P. (2008). The children's DEBQ for assessment of restrained, emotional, and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders*, 41, 72-81. doi: 10.1002/eat.20424
- Van Winckel, M., & van Mil, E. (2001). Wanneer is dikt té dik? In C. Braet & M. Van Winckel (Eds.), *Behandelingsstrategieën bij kinderen met overgewicht*. Houten/Diegem: Bohn Stafleu Van Loghum.
- Vandewalle, J., Moens, E., Beyers, W., & Braet, C. (2016). Can we link emotional eating with the emotion regulation skills of adolescents? *Psychology & Health*. doi: 10.1080/08870446.2016.1149586
- Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation. *International Journal of Obesity*, 38, 525-530. doi: 10.1038/ijo.2013.233
- Waller, G., & Barter, G. (2005). The impact of subliminal abandonment and unification cues on eating behavior. *International Journal of Eating Disorders*, 37, 156-160. doi: 10.1002/eat.20072
- Waller, G., & Mijatovich, S. (1998). Preconscious processing of threat cues: Impact on eating among women with unhealthy eating

- attitudes. *International Journal of Eating Disorders*, 24, 83-89. doi: 10.1002/(SICI)1098-108X(199807)24:1<83::AID-EAT7>3.0.CO;2-X
- Webber, L., Hill, C., Saxton, J., Van Jaarsveld, C. H. M., & Wardle, J. (2009). Eating behaviour and weight in children. *International Journal of Obesity*, 33, 21-28. doi: 10.1038/ijo.2008.219
- Westermann, R., Spies, K., Stahl, G., & Hesse, F. W. (1996). Relative effectiveness and validity of mood induction procedures: A meta-analysis. *European Journal of Social Psychology*, 26, 557-580. doi: 10.1002/(sici)1099-0992(199607)26:4<557::aid-ejsp769>3.0.co;2-4
- Wilkinson, L. L., Rowe, A. C., Bishop, R. J., & Brunstrom, J. M. (2010). Attachment anxiety, disinhibited eating, and body mass index in adulthood. *International Journal of Obesity*, 34, 1442-1445. doi: 10.1038/ijo.2010.72
- Wilkinson, L. L., Rowe, A. C., Heath, G. H. (2013). Eating me up inside: Priming attachment security and anxiety, and their effects on snacking. *Journal of Social and Personal Relationships*, 30, 795-804. doi: 10.1177/0265407512468371
- Yeomans, M. R., & Coughlan, E. (2009). Mood-induced eating. Interactive effects of restraint and tendency to overeat. *Appetite*, 52, 290-298. doi: <http://dx.doi.org/10.1016/j.appet.2008.10.006>
- Zellner, D. A., Loaiza, S., Gonzalez, Z., Pita, J., Morales, J., Pecora, D., & Wolf, A. (2006). Food selection changes under stress. *Physiology & Behavior*, 87, 789-793. doi: 10.1016/j.physbeh.2006.01.01

Table 1

Characteristics of participants in negative mood condition and neutral mood condition

	Negative mood condition (<i>n</i> = 21)	Neutral mood condition (<i>n</i> = 21)
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Age	13.29 (1.90)	13.29 (1.79)
Adjusted BMI	101.89 (13.57)	110.00 (18.25)
Hollingshead Index of Social Position	3.21 (0.63)	3.20 (0.95)
Maternal rejection (EMBU-A)	26.13 (3.99)	27.34 (6.14)
Paternal rejection (EMBU-A)	25.25 (4.69)	25.96 (5.16)
Emotional eating style (DEBQ)	2.36 (1.09)	2.31 (0.79)
Hunger score before mood induction	3.90 (2.45)	3.05 (2.77)
Desire to eat score before mood induction	3.95 (2.87)	4.05 (3.37)
Positive affect score before mood induction	4.36 (0.62)	4.26 (0.57)
Positive affect score after mood induction	3.95 (0.94)	4.24 (0.76)
Energy intake from savoury food	48.62 (48.56)	56.12 (66.61)
Energy intake from sweet food	151.00 (170.98)	113.16 (118.41)

Note: EMBU-A, *Egna Minnen Beträffande Uppfostran*: My memories of child upbringing - Adolescent version; DEBQ, Dutch Eating Behaviour Questionnaire

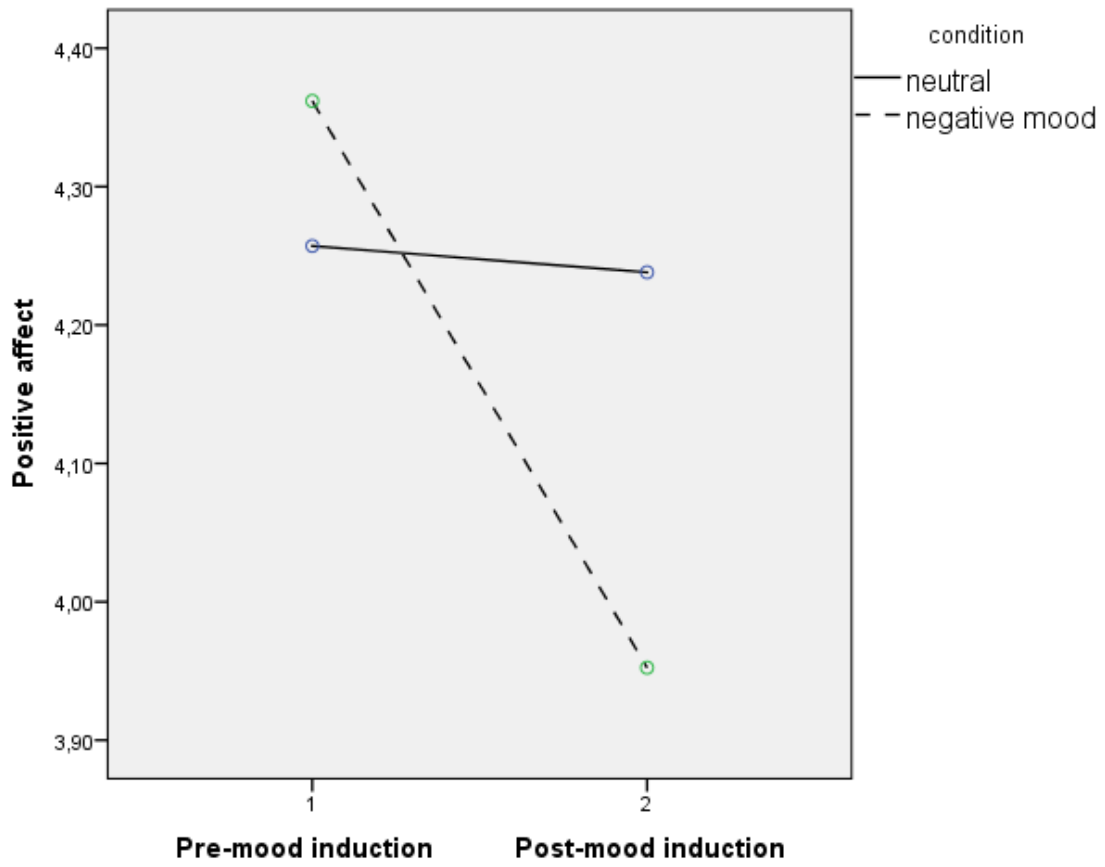


Figure 1. Changes in positive affect before and after mood induction in neutral and negative mood conditions.

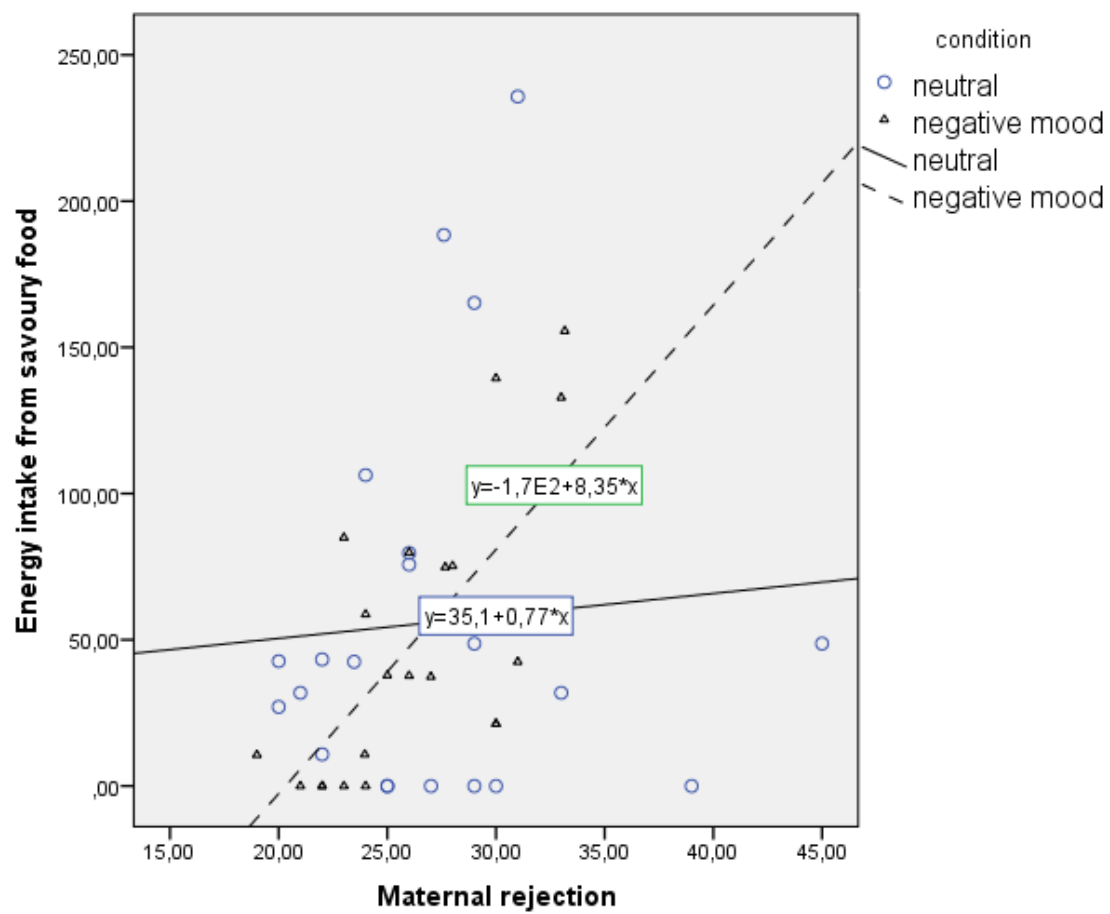


Figure 2. The effect of maternal rejection on energy intake from savoury food in the neutral and negative mood conditions.

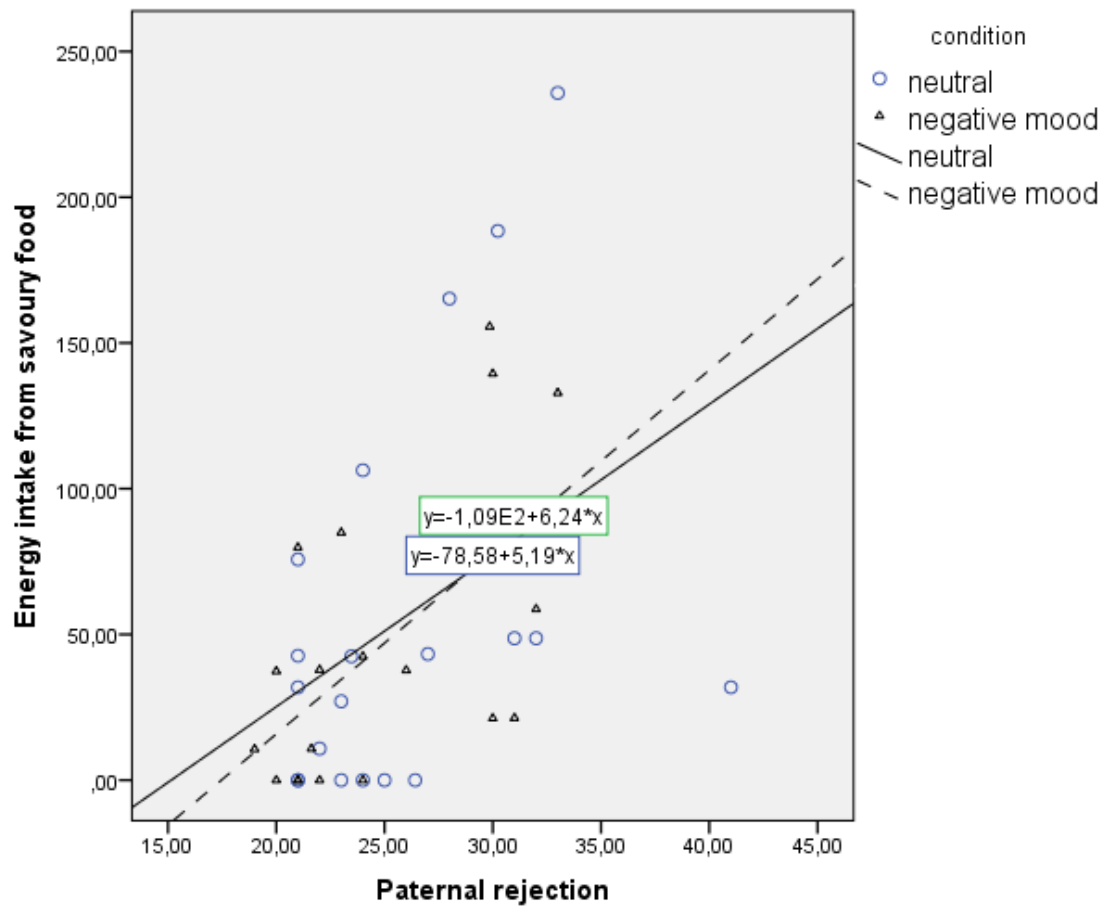


Figure 3. The effect of paternal rejection on energy intake from savoury food in the neutral and negative mood condition.

Chapter 5

The daily relation between parental rejection, peer rejection and emotional eating in youngsters: a diary study¹

Abstract

This study investigated the daily relation between parental rejection and peer rejection on the one hand and emotional eating in youngsters on the other hand. Participants ($N = 55$) between the ages of 11 and 15 years completed a 7-day diary. A multilevel design was used to examine day-to-day within-person relationships between parental and peer rejection and the emotional eating of youngsters. The results showed that daily variations in parental rejection were related to daily variations in emotional eating of the youngsters. Daily peer rejection was only marginally significantly related to the emotional eating of the youngsters. These results indicate that only parental rejection has influence on the emotional eating of youngsters. The findings highlight the importance of addressing the parent-child relationship in interventions for emotional eating in youngsters.

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Introduction

Emotional eating is defined as ‘the tendency to overeat in response to negative emotions such as anxiety or irritability’ (van Strien et al., 2007, p. 106). Overeating can imply eating beyond the saturation point as well as eating in the absence of hunger. Emotional eating is characterized by eating comfort food, which is highly palatable food rich in sugar and fat, like desserts and fast food (Gibson, 2012). Thus, emotional eating might contribute to an unhealthy lifestyle and cause overweight or obesity over time (e.g., Braet et al., 2008; Bryant, King, & Blundell, 2008). In addition, the longitudinal study of Stice, Presnell, and Spangler (2002) demonstrated that emotional eating is an important predictor of binge eating. Binge eating is defined as eating large amounts of food in short periods of time, while loss of control over eating is experienced and is a key symptom of the mental disorders Binge Eating Disorder (BED) and Bulimia Nervosa (BN; American Psychiatric Association, 2013).

Studies indicate that emotional eating is already present in children and adolescents (e.g., Blissett, Haycraft, & Farrow, 2010; Nguyen-Michel, Unger, & Spruijt-Metz, 2007). A study of Shapiro et al. (2007) showed that in their sample, 63% of children, aged 5 until 13 years, answered affirmative when they were asked “Do you ever eat because you feel bad, sad, bored or any other mood?”. However, other research suggests that the prevalence of emotional eating is rather low in children, but increases in adolescence (e.g., van Strien & Oosterveld, 2008; Wardle, Guthrie, Sanderson, & Rapoport, 2001). Further, research in patients with BED showed that, on average, the onset of binge eating occurs in adolescence, suggesting that this is a critical period in the development of binge eating (Spurrell, Wilfley, Tanofsky, & Brownell, 1997). Since emotional eating is an important predictor of binge eating, early adolescence may be a crucial period for the prevention and intervention of emotional eating.

Studies investigating the antecedents of emotional eating indicate that particularly incidents that elicit low- to moderate intense negative emotions, like daily hassles, trigger emotional eating (e.g., Macht, 2008). More specifically, the interpersonal model states that hassles related to interpersonal problems are a prominent predictor of disturbed eating behaviour (Sullivan, 1953; Tanofsky-Kraff et al., 2007). According to this model, interpersonal problems elicit negative affect, which triggers disturbed eating behaviour in an attempt to regulate the negative affect (Wilfley, Pike, & Striegel-Moore, 1997). This model has been supported by research on binge eating in adults and adolescents (e.g., Goldschmidt et al., 2014), but has not been tested for emotional eating.

Research on emotional eating in youngsters has demonstrated the importance of parental rejection (e.g., Vandewalle, Moens, & Braet, 2014). Parental rejection is characterized by a lack of parental warmth and acceptance and/or the presence of physically and psychologically hurtful behaviours towards the child (Khaleque & Rohner, 2012). The association between parental rejection and emotional eating in youngsters has been confirmed in a clinical survey study in obese youngsters (Vandewalle et al., 2014) as well as in community-based survey studies (Schuetzmann, Richter-Appelt, Schulte-Markwort, & Schimmelmann, 2008; Vandewalle, Moens, Beyers, & Braet, 2016). Moreover, the results suggest that maternal rejection is more clearly linked to youngster's emotional eating than paternal rejection. All studies were cross-sectional except the study of Vandewalle et al. (2016), which included two time moments ($M = 71$ days between time moments). However, the results of this study did not show relations between changes in maternal rejection and changes in youngster's emotional eating. This may be explained by the large stability of maternal rejection found in this study. Although this study suggests that, in general, parental rejection is rather stable over longer times, day-

to-day fluctuations in parental rejection probably do occur and, based on the interpersonal model, may be related to day-to-day fluctuations in emotional eating. Therefore, additional research assessing day-to-day fluctuations in parental rejection and emotional eating, may perhaps provide further insight into the hypothesized relationship between parental rejection and emotional eating in youngsters.

Next to parental rejection, peer rejection might also be an important antecedent of emotional eating in youngsters. Adolescence is characterized by increased importance of peer relationships, greater sensitivity to peer rejection and more psychological problems associated with peer rejection (Masten et al., 2009). Research in adolescents has found significant relationships between peer rejection and disturbed eating behaviour, like binge eating (e.g., Gardner, Stark, Friedman, & Jackson; Schutz & Paxton, 2007). However, to our knowledge, no studies have investigated the relationship between peer rejection and emotional eating in youngsters. As peer rejection may vary from day to day, a daily diary design may be an ideal methodology to explore the relationship between peer rejection and emotional eating.

Aim of the Present Study

The present study aimed to examine the day-to-day within-person relationships between parental and peer rejection and the emotional eating behaviour of youngsters over 7 days, using a daily diary design. We hypothesized that daily parental rejection and daily peer rejection will both be positively associated with daily emotional eating of youngsters.

Method

Participants

Participants were enrolled in a larger study (Generation 2020) conducted at school, which investigated the school readiness of pupils. Parents and children were asked in a letter to indicate if they were

interested to participate in a second part of the study, which would take place at home. If parents and youngster agreed, the family was contacted by telephone and information about the study was provided. Eighty-six families were contacted of which 59 families agreed to participate. Of these 59 participants, four participants were removed from the dataset because four or more of the seven daily entries were not completed or invalid (i.e. submitting data about multiple days in a single day). The final sample of 55 youngsters (49.1% boys and 50.9% girls) had a mean age of 12.36 ($SD = 0.87$) with a range of 11-15 years. The youngsters were measured and weighed by the researcher during a home visit. The BMI was calculated as weight (in kg)/height (in m)². We used the adjusted BMI ((actual BMI/percentile 50 of BMI for age and gender) x 100). This method allowed us to compare the BMI of children of different ages and gender. The 50th percentiles of the BMI for age and gender were based on normative data in a Flemish sample (Roelants, Hauspie, & Hoppenbrouwers, 2009). Adjusted BMI below 85% is classified as underweight, above 120% is classified as overweight and above 140% is classified as obese (Van Winckel & van Mil, 2001). The participants had a mean adjusted BMI of 102.86% ($SD = 18.42$) with a range of 76.66-153.28%. The familial socioeconomic situation was calculated using the Hollingshead Index of Social Position. The mothers of the youngsters were asked to fill in the education and occupation of both parents, which was then used to classify the families in one of five social position indexes. We recoded the five social position indexes into three social classes (high = upper and upper-middle, middle and low = lower-middle and lower). Most of the families (65.5%) were situated in the middle class, 27.3% in the high class and 7.3% in the lower class. The mothers were also asked to fill in the domestic situation of the youngster. The majority of the youngsters (92.7%) lived with both parents (intact family or co-

parenting), two youngsters (3.6%) lived with mother and stepparent and two youngsters (3.6%) lived alone with their mother.

Procedure

Trained psychology students visited the participants at home. First, the informed consent of both youngster and mother was obtained. The youngster and mother were then asked to fill in some questionnaires, which fall out of the scope of this study. Then, the youngster was weighed and measured by the psychology student. Next, the psychology student illustrated the use of the online diary. The youngsters were asked to visit the study website, log in with their unique code, provided by the researcher, and complete a test page as exercise. Youngsters were then instructed to complete the online diary questionnaires at the end of each day, for a period of seven consecutive days, starting the day after the home visit. Seven days is a common timeframe in diary studies, as it reduces participants fatigue and minimizes dropout (e.g., Almeida, Wethington, & Kessler, 2002; Bolger, Davis, & Rafaeli, 2003). Participants answered the same questions each day and were asked to think about each item as they had experienced it that day. To help them remember to complete the diary each night, the youngsters were offered a glow in the dark bracelet. Furthermore, youngsters were given a paper version diary, so it was possible for them to write some things down during the day, which may help them to more accurately complete the online diary questionnaires at night. Afterwards, the researcher checked each day if the participants had completed the diary questionnaires, via an online administrator tool. If participants had failed to complete the diary questionnaires, an email was sent the next day as a reminder. Via this email participants were instructed not to make up for the lost day, but instead complete the diary about the present day and continue until seven days were reached. As parental and peer rejection and emotional eating may differ between weekdays and

weekend days, a comment was added that the diary should still be completed in five weekdays and two weekend days and that skipping other days was allowed in order to meet this requirement. If the next day participants still had not completed the diary questionnaires, a telephone call was made to offer assistance and further instructions. Participants were given a small voucher as reimbursement after their 7-day diary was completed. The study was approved by the Institutional Ethical Committee.

Measures

Daily parental rejection and daily peer rejection. A shortened version of the Children's Daily Hassles Scale (CHS; Kanner, Coyne, Schaefer, & Lazarus, 1981) was used to assess parental rejection and peer rejection. Each item of the original scale was examined on face validity. Regarding parental rejection, three items were retained from the original 25 items (e.g., 'Your mother or father was mad at you for getting bad school results'). In addition, three items were retained for peer rejection (e.g., 'Children at school bullied or teased you'). Participants were first asked to indicate if the rejection occurred that day. If the rejection had occurred, participants had to rate whether they felt 'not bad' (1 point), 'sort of bad' (2 points) or 'very bad' (3 points) as a result of this rejection. The intensity score (severity sum of the rejection that occurred that day) was calculated for parental rejection as well as for peer rejection.

Daily emotional eating. An adapted version of The Dutch Eating Behaviour Questionnaire - child version (DEBQ; Braet et al., 2008; van Strien, Frijters, Bergers, & Defares, 1986) was used to assess the daily emotional eating behaviour of the youngster. The DEBQ consists of 33 items, assessing the presence of three types of disturbed eating behaviour: restrained eating, external eating, and emotional eating. Only an adapted version of the subscale emotional eating was assessed in this study.

Original items are formulated as specific eating behaviours and have to be rated on their frequency of occurrence on a five-point Likert scale from 1 = never to 5 = very often (13 items; e.g. ‘If you’re angry, do you have the desire to eat?’). In the current study, items were adapted so that participants were asked if they had experienced the emotion that day and if they then felt like eating (e.g. ‘Were you angry today and did you then have the desire to eat?’). Items were rated on a five-point Likert scale from 1 = not at all to 5 = very much. Studies have demonstrated the usefulness of the Dutch version of the DEBQ in children and adolescents between the age of 7 and 17 years (Braet, Tanghe, De Bode, Franckx, & Van Winckel, 2003; Braet, Tanghe, Decaluwe, Moens, & Rosseel, 2004). Research showed a stable factor structure, satisfying internal consistency reliability and good test–retest reliability (Braet et al., 2008). Furthermore, research showed a good external validity for the DEBQ in children (Ricciardelli & McCabe, 2001).

Plan of Analysis

In this diary study, several variables were repeatedly measured on 7 days (i.e., Level 1), which were nested within 55 participants (i.e., Level 2). To take into account between- and within-person differences, multilevel analyses were conducted with the statistical software package MLwiN 2.16. Predictor variables at Level 1, reflecting within-participant predictors, were group-mean centered (i.e., centered around the participant’s mean), whereas predictors at Level 2, reflecting between-participant predictors, were centered around the grand mean.

First, intercept-only models (null model) were estimated to examine whether there was significant daily variability in emotional eating, parental rejection and peer rejection. These models do not explain any variance, but decompose the total amount of variance into the proportion of variance that is due to the between-person and within-person variation.

This proportion is reflected in the intraclass correlation (ICC). In a next step, daily peer rejection (i.e., Level 1) and several background variables at Level 2 were entered simultaneously in a first model as predictors of daily emotional eating. Age, gender and adjusted BMI were included as background variables, as previous research has shown that these variables may have an effect on the emotional eating of youngsters (Braet et al., 2008). Lastly, daily parental rejection (i.e., Level 1) and the background variables (age, gender and adjusted BMI) at Level 2 were entered simultaneously in a second model as predictors of daily emotional eating.

Results

Descriptive Statistics and Preliminary Analyses

Table 1 shows correlations, means, and standard deviations of the diary variables and background variables age and adjusted BMI. For descriptive purposes, aggregated scores were created by averaging daily scores over the seven days.

Primary Analyses

Day-to-day variability in the study variables. Regarding the outcome variable, the ICC value indicated that 52% of the variance in emotional eating reflects between-person differences. With regard to daily parental and daily peer rejection, the ICC values indicated that, respectively, 28% and 31% of the variance reflect between person differences. This means that most of the variance (i.e., around 50% and more) for all day-level variables is situated at the within-person level, although that part of this within-person variance also reflects measurement error.

Daily parental rejection, peer rejection and emotional eating. Table 2 presents the findings for daily emotional eating. As can be noticed in Model 1, daily peer rejection had a marginally significant positive association with daily emotional eating. Model 2 showed that daily

parental rejection had a significant positive association with daily emotional eating.

Discussion

This study aimed to examine the day-to-day within-person relationships between parental and peer rejection and emotional eating of youngsters over seven days. Firstly, results showed significant daily variability in parental rejection, peer rejection and emotional eating, making it possible to examine the relationships between these variables. As predicted, daily parental rejection was positively related to the daily emotional eating of the youngsters. This corresponds with the cross-sectional results of Vandewalle et al. (2014) and Schuetzmann et al. (2008) and suggests, for the first time using a naturalistic daily diary design, that parental rejection may trigger emotional eating in youngsters. In contrast to our hypothesis, the association between daily peer rejection and emotional eating was only marginally significant. These results suggests that only parental rejection influences the emotional eating of youngsters. Scholte and Van Aken (2006) state that, although peer relationships become increasingly important in adolescence, the relationship between parent and adolescent is still significant in adolescents' lives. For example, research has shown that family support, and not peer support, has a protective influence on the development of depression in adolescents (McFarlane, Bellissimo, & Norman, 1995; McFarlane, Bellissimo, Norman, & Lange, 1994). Furthermore, longitudinal research suggests that peer rejection may be a consequence of the emotion regulation behaviour of children, instead of an antecedent (e.g., Kim & Cicchetti, 2010; Trentacosta & Shaw, 2009). Children who have difficulty managing their negative emotions have more chance of becoming disruptive in social relationships, which may lead to lower peer acceptance and more peer rejection (Maszk, Eisenberg, & Guthrie, 1999).

Furthermore, it should be noted that descriptive analysis of the study variables in our sample showed that youngsters reported less daily peer rejection than daily parental rejection. Additionally, the variance of daily peer rejection was smaller than the variance of daily parental rejection, which might explain the marginally significant relationship with emotional eating.

There are a few limitations to this study that require comment. Bongers, Jansen, Houben, and Roefs (2013) state that people are generally rather poor at recalling their emotions, their eating behaviour and the associations between the two. Although this study tried to overcome this by using a daily diary method, using event- or interval- contingent diary methods may fully eliminate this recall bias. However, these methods may have the disadvantage of being too burdensome for the participants, which may decrease the motivation and increase the drop-out. In addition, using multiple assessment moments throughout the day may influence participants' eating behaviour during that day. Furthermore, recent event- or interval-contingent diary studies utilize a palm top computer or smartphone app to signal the participants at the end of each interval or to facilitate event-contingent assessment. Considering the sample's age, it should be taken into account that some schools do not allow the use of electronical devices, like smartphones, during the school hours. Nonetheless, it would be interesting if future research would include complementary measures of emotional eating. For example, assessing actual food intake preceded by negative emotions, which then can be converted into calorie intake. Additionally, it would be interesting to include data from other informants, like the parents. In this study, only youngsters' perception was assessed, which might be affected by the youngsters' mental health. For example, depression can be characterized by an attentional bias for negative interpersonal stimuli (e.g., Gotlib,

Krasnoperova, Yue, & Joormann, 2004). Including multi-method and multi-informant data would offer more objective evidence of the relationship between parental rejection and the eating behaviour of youngsters. Secondly, parental rejection might be viewed as a feature of the broader family climate, given the stability found in longitudinal research (Vandewalle et al., 2016). In order to capture the daily fluctuations in parental and peer rejection, we decided to select items from the Children's Daily Hassles Scale (CHS; Kanner, Coyne, Schaefer, & Lazarus, 1981), based on the face validity of the items. However, we should question whether this method is the most appropriate one, or if we could measure parental rejection on a day-to-day level in a more suitable manner. Furthermore, as we preserved the original items of the CHS, we did not distinguish between maternal and paternal rejection. Considering research suggests that maternal rejection is more clearly linked to youngster's emotional eating than paternal rejection, it would be interesting to investigate the influence of daily maternal and paternal rejection on daily emotional eating of youngsters separately.

To conclude, the results of this study demonstrated the relationship between daily parental rejection and daily emotional eating in youngsters. Therefore, it might be advisable to assess the parent-child relationship, and if mandatory, improve the parent-child relationship in the treatment of emotional eating in youngsters. Interpersonal psychotherapy, based on the interpersonal model of binge eating, focuses on helping the patient develop strategies for improving interpersonal functioning (Cassidy et al., 2013; Tanofsky-Kraff et al., 2007) and has been proven to be effective in reducing binge eating in adults in the short- and long-term (Kass, Kolko, & Wilfley, 2013). Furthermore, preliminary evidence from a pilot study suggests that this therapy may also reduce loss of control over eating and lead to a smaller BMI increase over one year in adolescent girls

(Tanofsky-Kraff et al., 2010). It would be fruitful if future research would test the effectiveness of interpersonal psychotherapy on the parent-child relationship and the emotional eating in youngsters.

References

- Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The Daily Inventory of Stressful Events: An Interview-Based Approach for Measuring Daily Stressors. *Assessment, 9*, 41-55. doi: 10.1177/1073191102091006
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington DC: American Psychiatric Association.
- Blissett, J., Haycraft, E., & Farrow, C. (2010). Inducing preschool children's emotional eating: relations with parental feeding practices. *American Journal of Clinical Nutrition, 92*, 359-365. doi: 10.3945/ajcn.2010.29375
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary Methods: Capturing Life as it is Lived. *Annual Review of Psychology, 54*, 579-616. doi:10.1146/annurev.psych.54.101601.145030
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology, 13*, 733-743. doi: 10.1177/1359105308093850
- Braet, C., Tanghe, A., De Bode, P., Franckx, H., & Van Winckel, M. (2003). Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. *European Journal of Pediatrics, 162*, 391-396. doi: 10.1007/s00431-003-1155-5
- Braet, C., Tanghe, A., Decaluwe, V., Moens, E., & Rosseel, Y. (2004). Inpatient treatment for children with obesity: Weight loss, psychological well-being, and eating behavior. *Journal of Pediatric Psychology, 29*, 519-529. doi: 10.1093/jpepsy/jsh054

- Bryant, E. J., King, N. A., & Blundell, J. E. (2008). Disinhibition: its effects on appetite and weight regulation. *Obesity Reviews*, *9*, 409-419. doi: 10.1111/j.1467-789X.2007.00426.x
- Cassidy, O., Sbrocco, T., Vannucci, A., Nelson, B., Jackson-Bowen, D., Heimdal, J., . . . Tanofsky-Kraff, M. (2013). Adapting Interpersonal Psychotherapy for the Prevention of Excessive Weight Gain in Rural African American Girls. *Journal of Pediatric Psychology*, *38*, 965-977. doi: 10.1093/jpepsy/jst029
- Gardner, R. M., Stark, K., Friedman, B. N., & Jackson, N. A. Predictors of eating disorder scores in children ages 6 through 14. *Journal of Psychosomatic Research*, *49*, 199-205. doi: 10.1016/s0022-3999(00)00172-0
- Gibson, E. L. (2012). The psychobiology of comfort eating: implications for neuropharmacological interventions. *Behavioural Pharmacology*, *23*, 442-460. doi: 10.1097/FBP.0b013e328357bd4e
- Goldschmidt, A. B., Wonderlich, S. A., Crosby, R. D., Engel, S. G., Lavender, J. M., Peterson, C. B., . . . Mitchell, J. E. (2014). Ecological Momentary Assessment of Stressful Events and Negative Affect in Bulimia Nervosa. *Journal of Consulting and Clinical Psychology*, *82*, 30-39. doi: 10.1037/a0034974
- Gotlib, I. H., Krasnoperova, E., Yue, D. N., & Joormann, J. (2004). Attentional Biases for Negative Interpersonal Stimuli in Clinical Depression. *Journal of Abnormal Psychology*, *113*, 127-135. doi: 10.1037/0021-843x.113.1.121
- Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine*, *4*, 1-39. doi: 10.1007/bf00844845

- Kass, A. E., Kolko, R. P., & Wilfley, D. E. (2013). Psychological treatments for eating disorders. *Curr Opin Psychiatry*, *26*, 549-555. doi: 10.1097/YCO.0b013e328365a30e
- Khaleque, A., & Rohner, R. P. (2012). Pancultural Associations Between Perceived Parental Acceptance and Psychological Adjustment of Children and Adults: A Meta-Analytic Review of Worldwide Research. *Journal of Cross-Cultural Psychology*, *43*, 784-800. doi: 10.1177/0022022111406120
- Kim, J., & Cicchetti, D. (2010). Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology. *Journal of Child Psychology and Psychiatry*, *51*, 706-716. doi: 10.1111/j.1469-7610.2009.02202.x
- Macht, M. (2008). How emotions affect eating: A five-way model. *Appetite*, *50*, 1-11. doi: 10.1016/j.appet.2007.07.002
- Masten, C. L., Eisenberger, N. I., Borofsky, L. A., Pfeifer, J. H., McNealy, K., Mazziotta, J. C., & Dapretto, M. (2009). Neural correlates of social exclusion during adolescence: understanding the distress of peer rejection. *Social Cognitive and Affective Neuroscience*, *4*, 143-157. doi: 10.1093/scan/nsp007
- Maszk, P., Eisenberg, N., & Guthrie, I. K. (1999). Relations of children's social status to their emotionality and regulation: A short-term longitudinal study. *Merrill-Palmer Quarterly-Journal of Developmental Psychology*, *45*, 468-492.
- McFarlane, A. H., Bellissimo, A., & Norman, G. R. (1995). The role of family and peers in social self-efficacy: Links to depression in adolescence. *American Journal of Orthopsychiatry*, *65*, 402-410. doi: 10.1037/h0079655
- McFarlane, A. H., Bellissimo, A., Norman, G. R., & Lange, P. (1994). Adolescent depression in a school-based community sample –

- preliminary findings on contributing social factors. *Journal of Youth and Adolescence*, 23, 601-620. doi: 10.1007/bf01537632
- Nguyen-Michel, S. T., Unger, J. B., & Spruijt-Metz, D. (2007). Dietary correlates of emotional eating in adolescence. *Appetite*, 49, 494-499. doi: 10.1016/j.appet.2007.03.005
- Ricciardelli, L. A., & McCabe, M. P. (2001). Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review*, 21, 325-344. doi: 10.1016/s0272-7358(99)00051-3
- Roelants, M., Hauspie, R., & Hoppenbrouwers, K. (2009). References for growth and pubertal development from birth to 21 years in Flanders, Belgium. *Annals of Human Biology*, 36, 680-694. doi: 10.3109/03014460903049074
- Scholte, H. G., & Van Aken, M. A. G. (2006). Peer relations in adolescent. In S. Jackson & L. Goossens (Eds.), *Handbook of adolescent development* (pp. 175-199). Hove: Psychology Press.
- Schuetzmann, M., Richter-Appelt, H., Schulte-Markwort, M., & Schimmelmann, B. G. (2008). Associations among the perceived parent-child relationship, eating behavior, and body weight in preadolescents: Results from a community-based sample. *Journal of Pediatric Psychology*, 33, 772-782. doi: 10.1093/jpepsy/jsn002
- Schutz, H. K., & Paxton, S. J. (2007). Friendship quality, body dissatisfaction, dieting and disordered eating in adolescent girls. *British Journal of Clinical Psychology*, 46, 67-83. doi: 10.1348/014466506x115993
- Shapiro, J. R., Woolson, S. L., Hamer, R. M., Kalarchian, M. A., Marcus, M. D., & Bulik, C. M. (2007). Evaluating binge eating disorder in children: Development of the Children's Binge Eating Disorder

- Scale (C-BEDS). *International Journal of Eating Disorders*, 40, 82-89. doi: 10.1002/eat.20318
- Spurrell, E. B., Wilfley, D. E., Tanofsky, M. B., & Brownell, K. D. (1997). Age of onset for binge eating: Are there different pathways to binge eating? *International Journal of Eating Disorders*, 21, 55-65.
- Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology*, 21, 131-138. doi: 10.1037//0278-6133.21.2.131
- Sullivan, H. S. (1953). *The Interpersonal Theory of Psychiatry*. New York: Norton.
- Tanofsky-Kraff, M., Wilfley, D. E., Young, J. F., Mufson, L., Yanovski, S. Z., Glasofer, D. R., & Salaita, C. G. (2007). Preventing excessive weight gain in adolescents: Interpersonal psychotherapy for binge eating. *Obesity*, 15, 1345-1355. doi: 10.1038/oby.2007.162
- Tanofsky-Kraff, M., Wilfley, D. E., Young, J. F., Mufson, L., Yanovski, S. Z., Glasofer, D. R., . . . Schvey, N. A. (2010). A pilot study of interpersonal psychotherapy for preventing excess weight gain in adolescent girls at-risk for obesity. *Int J Eat Disord*, 43, 701-706. doi: 10.1002/eat.20773
- Trentacosta, C. J., & Shaw, D. S. (2009). Emotional self-regulation, peer rejection, and antisocial behavior: Developmental associations from early childhood to early adolescence. *Journal of Applied Developmental Psychology*, 30, 356-365. doi: 10.1016/j.appdev.2008.12.016
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International*

- Journal of Eating Disorders*, 5, 295-315. doi: 10.1002/1098-108x(198602)5:2<295::aid-eat2260050209>3.0.co;2-t
- van Strien, T., & Oosterveld, P. (2008). The children's DEBQ for assessment of restrained, emotional, and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders*, 41, 72-81. doi: 10.1002/eat.20424
- van Strien, T., van de Laar, F. A., van Leeuwe, J. F. J., Lucassen, P., van den Hoogen, H. J. M., Rutten, G., & van Weel, C. (2007). The dieting dilemma in patients with newly diagnosed type 2 diabetes: Does dietary restraint predict weight gain 4 years after diagnosis? *Health Psychology*, 26, 105-112. doi: 10.1037/0278-6133.26.1.105
- Van Winckel, M., & van Mil, E. (2001). Wanneer is dikt té dik? In C. Braet & M. Van Winckel (Eds.), *Behandelingsstrategieën bij kinderen met overgewicht*. Houten/Diegem: Bohn Stafleu Van Loghum.
- Vandewalle, J., Moens, E., Beyers, W., & Braet, C. (2016). Can we link emotional eating with the emotion regulation skills of adolescents? *Psychology & Health*. doi: 10.1080/08870446.2016.1149586
- Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation. *International Journal of Obesity*, 38, 525-530. doi: 10.1038/ijo.2013.233
- Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. (2001). Development of the children's eating behaviour questionnaire. *Journal of Child Psychology and Psychiatry*, 42, 963-970. doi: 10.1111/1469-7610.00792
- Wilfley, D., Pike, K., & Striegel-Moore, R. (1997). Toward an integrated model of risk for binge eating disorder. *Journal of Gender Culture and Health*, 2, 1-32.

Table 1
Descriptive Statistics and Correlations between Dispositional and Daily Variables

	<i>M</i>	<i>SD</i>	1	2	3	4
1. Age	12.36	.87				
2. Adjusted BMI	102.86	18.42	.15			
3. Daily Peer Rejection	0.06	0.22	.24	-.10		
4. Daily Parental Rejection	.30	.55	-.11	-.05	-.08	
5. Daily Emotional Eating	14.59	2.90	.04	-.03	.25	.47**

** $p < .01$

Table 2
Daily Emotional Eating as a Function of Daily Peer Rejection and Daily Parental Rejection and Person Level Variables

	Null model	Model 1	Model 2
<i>Fixed effects</i>			
Overall Intercept	14.58 (.39)***	14.43 (.55)***	14.44 (.55)***
Day level			
Daily Peer Rejection		.99 (.54)†	
Daily Parental Rejection			.66 (.19)***
Person level			
Adjusted BMI		-.01 (.02)	-.01 (.02)
Gender		.29 (.77)	.29 (.77)
Age		.13 (.45)	.13 (.45)
<i>Random effects</i>			
u ₀	7.19 (1.56)***	7.16 (1.55)***	7.19 (1.55)***
e ₀	6.487 (.52)***	6.42 (.51)***	6.26 (.50)***
-2*loglikelihood	1844.429	1840.787	1832.901

Random effects at the between-person level: u₀ (amount of between-person variation);

Random effects at the within-person level: e₀ (amount of within-person variation)

†*p*<.1, ****p*<.001

Chapter 6

Parental rejection as a predictor of emotional eating after inpatient weight loss treatment for youngsters¹

Abstract

The main objective of the study was to examine the relationships between parental rejection, maladaptive emotion regulation strategies and the emotional eating style of youngsters who finished an inpatient multidisciplinary weight loss treatment programme and were back in their home environment. Participants were 52 youngsters (age 11-17 years) with an average percent over ideal BMI of 186.11% ($SD = 27.54$) before treatment and 136.37% ($SD = 19.65$) at a mean follow-up of 4 months. Participants completed questionnaires assessing maternal and paternal rejection, maladaptive emotion regulation strategies and emotional eating. Data were analysed using bootstrapping procedure. Mediation analyses showed that maladaptive emotion regulation partially mediated the association between maternal rejection and the youngsters' emotional eating style. Paternal rejection was directly related to emotional eating. The results suggest that the family climate may have an impact on the eating style of the youngsters after weight loss treatment.

¹ Vandewalle, J., Moens, E., Tanghe, A., De Guchtenaere, A., & Braet, C. (submitted). Parental Rejection as a Predictor of Emotional Eating after Inpatient Weight Loss Treatment for Youngsters. Manuscript submitted for publication.

Introduction

Obesity has become a global epidemic. Research shows that, particularly in children and adolescents in developed countries, the prevalence of overweight and obesity has substantially increased (based on the International Obesity Task Force [IOTF] cut-offs). In 2013, 23.8% of boys and 22.6% of girls were overweight or obese worldwide (Ng et al., 2014). Multidisciplinary treatments focusing on a healthy lifestyle have shown promising weight loss in children and adolescents. However, relapse after treatment is still a common issue (e.g. Wilfley et al., 2007). Braet, Tanghe, De Bode, Franckx, and Van Winckel (2003) reported that during a 10-month inpatient multidisciplinary weight loss treatment for children and adolescents, participants showed an average decrease of 48 percent over the ideal Body Mass Index (BMI). Six months after treatment, 39% of the participants had regained more than 10 percent over the ideal BMI. Fourteen months after treatment, this percentage had increased to 51.9% of participants. This resulted in 51.9% of participants being obese and 25.9% of participants being overweight. Therefore, studying the risk factors that contribute to youngsters' relapse after treatment could be considered an important research topic.

Research in adults suggests that the emotional eating style of patients, defined as eating in response to emotions, is associated with their weight regain after weight loss treatment. Canetti, Berry, and Elizur (2009) found that the individual's level of emotional eating before participating in a weight loss programme or undergoing bariatric surgery was negatively related to their weight loss 1 year after treatment. Similarly, Blair, Lewis, and Booth (1990) found that 1 year after participating in a weight loss programme, individuals who initially reported high levels of emotional eating but showed a reduction over time, were more successful at losing weight and approaching their target weight

during that year, than individuals who still reported high levels of emotional eating. To our knowledge, only one study examined this relationship in children and adolescents. The study of Halberstadt et al. (2015) found that girls between the ages of 8 and 19 years, who scored higher on emotional eating before weight loss treatment, had a higher weight regain in the year following treatment. However, results were inconclusive; when analyses were rerun with imputed data, this relationship was no longer significant.

Furthermore, the results of Halberstadt et al. (2015) showed that the girls' emotional eating style had not changed after the one-year multidisciplinary weight loss treatment, even though the programme incorporated techniques to treat emotional eating. In addition, Braet and colleagues investigated in two studies whether the emotional eating style of the patients (10-17 years) had changed after a 10-month inpatient multidisciplinary weight loss treatment, which incorporated cognitive behavioural therapy (CBT) to target emotional eating. In the first study, a comparison between pretest and post-test data showed that emotional eating had not changed (Braet et al., 2003). In the second study by Braet, Tanghe, Decaluwe, Moens, and Rosseel (2004), a comparison between pretest data and a 14-month follow-up was added. The results were similar. Since the youngsters' emotional eating style seems hard to change in treatment, and emotional eating might be related to youngsters' weight regain after treatment, we want to examine which determinants might contribute to youngsters' emotional eating after weight loss treatment.

Research suggests that emotional eating can be explained as a learned emotion regulation (ER) strategy (e.g. Booth, 1994). According to Gibson (2006), eating food rich in sugar and/or fat leads to a temporary increase in positive mood and reduction of stress, because these types of food induce sensory pleasure. Telch (1997) suggested that, in particular,

individuals having difficulty regulating their emotions turned to food as an alternative ER strategy. Cross-sectional and longitudinal research in adults and children has demonstrated that individuals with an emotional eating style lack effective or adaptive ER strategies or/and use maladaptive or ineffective ER strategies, like emotional suppression, to deal with negative emotions (Czaja, Rief, & Hilbert, 2009; Harrist, Hubbs-Tait, Topham, Shriver, & Page, 2013; Taube-Schiff et al., 2015; Spoor, Bekker, van Strien, & van Heck, 2007). It is assumed that these maladaptive ER strategies fail to downregulate negative emotions in a persistent way, subsequently leading to the use of alternative ER strategies, like emotional eating. This assumption was supported by the experimental study of Evers, Stok, & de Ridder (2010). This study demonstrated that randomly manipulating the adaptive and maladaptive ER strategies of females after a negative affect induction had a significant effect on the amount of comfort food eaten afterwards.

Deficits in ER can be traced back to early childhood, as research suggests that ER skills are learned in the interaction with caregivers and significant others (e.g. Barrett & Campos, 1987). Responsive, affectionate caregivers help the child to regulate their emotions by acknowledging the emotion, modelling ER strategies and teaching the child ER strategies (e.g. attend to relevant stimuli, generate alternatives) (Power, 2004). This helps the child to internalize effective ER strategies and to use them later on in the absence of caregivers (Eisenberg, Cumberland, & Spinrad, 1998). In contrast, this process of emotion socialization is impeded in unresponsive rejecting caregivers, which may lead to a lack of adaptive ER strategies and/or to the use of maladaptive ER strategies in children (e.g. Shipman et al., 2007).

Parental rejection, conceptualized as the absence of parental warmth and/or disliking, disapproving or being indifferent towards the child, does

not only have an influence on the development of children's ER (Rohner, 1975). Rejecting behaviour of parents may also maintain the deficit in ER further in life, as this rejecting behaviour can install a lack of confidence in the child. The child may believe that he or she will not be able to tackle stressful situations (Rhee, Pan, Norman, Crow, & Boutelle, 2013). Furthermore, the rejecting behaviour of parents itself can induce negative emotions, which in turn elicits maladaptive ER strategies. The relationship between parental rejection, reported by youngsters as well as by parents, and ER of youngsters has been confirmed in cross-sectional and longitudinal survey studies (e.g. Meesters & Muris, 2004; Wagner, Cohen, & Brook, 1996; Saritas, Grusec, & Gencoz, 2013). Additionally, this relationship was confirmed in a laboratory study, assessing actual behaviour. In the study of Yap, Schwartz, Byrne, Simmons, and Allen (2010), mother's rejecting behaviours towards the youngster and youngster's ER skills were measured during a mother-child interaction. Results confirmed that youngsters whose mothers showed more negative behaviours like contemptuousness, belligerent affect or disapproval, displayed more emotionally dysregulated behaviours.

Building on this knowledge, Vandewalle, Moens, and Braet (2014) investigated the relation between maternal and paternal rejection, maladaptive ER strategies and emotional eating in youngsters with obesity (10-16 years), before their participation in a weight loss treatment programme. Vandewalle et al. (2014) found that maternal rejection, and not paternal rejection, was related to the emotional eating of the youngsters, via the mediator maladaptive ER strategies of the youngster. These results offer support for the idea that parental rejection can trigger the use of maladaptive ER strategies in youngsters and that this in turn may lead to emotional eating. Furthermore, these results suggest that

mothers have more influence on the ER of youngsters than fathers (Kliwer, Fearnow, & Miller, 1996).

Aim of the Present Study

To conclude, research suggests that the emotional eating style of youngsters with obesity may be a stable feature, even when youngsters receive treatment. Moreover, emotional eating may be linked to relapse after weight loss treatment. Therefore, getting insight into the determinants of emotional eating after treatment may provide useful knowledge on how to reduce emotional eating after treatment and subsequently prevent from relapse. Research by Vandewalle et al. (2014) on the determinants of emotional eating before treatment suggests the influence of parental rejection and maladaptive ER strategies. In this present study, we want to extend the results of Vandewalle et al. (2014) by conducting a follow-up (FU) when the youngsters are back in their home environment, after inpatient multidisciplinary weight loss treatment.

First, we want to test if there are changes in maternal and paternal rejection, maladaptive ER strategies, emotional eating and weight of the youngsters between pretest (PT) and FU. Based on the studies of Braet et al. (2003; 2004) and Halberstadt et al. (2015), we assume that emotional eating will not have changed between PT and FU. Additionally, we assume that the possible determinants of emotional eating, parental rejection and maladaptive ER, will not have changed between PT and FU, which could explain the hypothesized stability of emotional eating. Furthermore, we expect that the weight of the youngsters will have significantly decreased between PT and FU. Next, the main objective of the present study is to test two mediation models. Firstly, we assume that maternal rejection will be positively related to the emotional eating of the youngsters at FU and that this relation will be mediated by the maladaptive ER strategies of the youngsters. Secondly, based on the

results of Vandewalle et al. (2014), we hypothesize that paternal rejection will not be related to the emotional eating nor to the maladaptive ER strategies of youngsters at FU, which implies that mediation will not occur. Figure 1 depicts the mediation models we want to test. In addition, we want to examine if the possible weight gain youngsters experience after treatment is related to the level of emotional eating of the youngsters at FU. Based on the previous research, we hypothesize that the weight gain after treatment will be positively associated with the level of emotional eating at FU (Blair et al., 1990; Canetti et al., 2009; Halberstadt et al. 2015).

Method

Participants

All subjects took part in a one-year inpatient weight loss treatment programme for youngsters, under the age of 18 years, in a Belgian medical centre. The participants had been referred to the centre by a physician, based on their overweight classification (more than 40 percent over ideal BMI according to age and gender) and previous weight control attempts (at least one outpatient treatment).

Participants were first addressed about the study before the start of treatment (PT). During the intake at the treatment centre, the youngsters and their parents were given verbal and written information about the study. It was explained to them that the study would consist of two time moments; during the intake and a follow-up after treatment. Additionally, participants were informed that participation was voluntary and that they had the choice to drop out of the study at any given moment. Written informed consent was obtained from both the youngsters and their parents. At PT, 110 children and adolescents (42.7% boys and 57.3% girls) between 10 and 16 years ($M = 13.59$ years, $SD = 1.64$) participated (see Vandewalle et al. (2014) for more elaborated description of sample).

Youngsters not meeting the age criteria, cognitive impaired youngsters and youngsters not understanding Dutch were excluded from this study. The response rate at PT was 86%. This sample was used in the study of Vandewalle et al. (2014).

The participants were asked to participate a second time during a booster session at the treatment centre, 4 months after treatment (FU). Participants were informed about this booster session and the follow-up of the study via a letter send by the staff of the treatment centre. If participants could not attend the booster session, instructions were provided by the researcher to fill in the questionnaires online at home. This information was send via email or letter, depending on the available contact information. If participants did not respond to this email/letter, a telephone call was made by the researcher to ask participants if they had received the email/letter and if they were interested to further participate in the study. If participants verbally agreed to participate, the information was resend by email. A reminder email was send if participants did not respond to this email. Nineteen participants (17.27%) were excluded from the FU because they did not complete the one-year treatment programme, as they had left the programme on their own initiative or based on the decision of the staff of the treatment centre. Of the 91 youngsters who were eligible, 52 youngsters participated at FU (28.8% boys and 71.2% girls, study drop-out 35.45%). Of these 52 youngsters, 33 youngsters participated during the booster session and 19 youngsters filled in the questionnaires at home. The time between end of treatment and follow-up (follow-up time) ranged from 93 to 217 days, with an average of 124 days (4 months). At FU, the youngsters were between the ages of 11 and 17 years ($M = 14.85$ years, $SD = 1.70$). The study was approved by the Institutional Ethical Committee.

Inpatient Treatment Programme

During the treatment, all the participants lived in the treatment centre and also went to school there. They were allowed to go home for the weekend three times a month and for half of the holidays. The treatment programme is a multidisciplinary non-diet healthy lifestyle programme, focusing on healthy eating habits, moderate exercises and cognitive behavioural therapy (CBT). This last component consists of teaching the youngsters several self-regulation skills applied to an eating-related context, such as self-observation, self-instructions, self-evaluation and self-reward. The purpose of this training is to enhance the self-awareness of the patients concerning their eating behaviour and to strengthen their capacity to modify their behavioural response (for example emotional eating in a high-risk situation like feeling alone) (Braet et al., 2003). With regard to the parental involvement in this programme, parents were requested to help their child to adopt their new lifestyle. Parents were stimulated to do so via family days in the treatment centre. These family days focused on exercising as a family, cooking healthy meals as a family (via cooking workshops) and supporting the new lifestyle as a family. More specifically, parents were instructed about motivational encouragement, supporting the self-image of the child and parenting skills. Instructions on parenting skills were based on the research of Patterson, Reid, and Dishion (1992), with a focus on setting limits, problem solving, monitoring, positive involvement and positive reinforcement (Braet et al., 2003; Braet et al., 2004).

Measures

Anthropometric measures. The youngsters were measured and weighed by a staff member at the treatment centre during the PT, at the end of the treatment (post-test) and during the booster session (FU). Youngsters who filled in the questionnaires at home at FU had to enter

their height and weight online. BMI was calculated as weight (in kg)/height (in m)². We used the percent over ideal BMI ((actual BMI/percentile 50 of BMI for age and gender)*100). This method allowed us to compare the BMI of children of different ages and gender. The 50th percentiles of the BMI for age and gender are based on normative data in a Flemish sample (Roelants & Hauspie, 2004). Percent over ideal BMI above 120% is classified as overweight, above 140% is classified as obese and above 160% is classified as severe obese (Van Winckel & van Mil, 2001). To correct possible underestimation in the self-reported height and weight measures filled in by the youngsters at home at FU, we used the equations from Epstein, Valoski, Wing, and McCurley (1994). This equation is based on data of over 1000 pairs of measured and self-reported data: girls' weight, $Y_G = 2.472 + 1.006X_G$; boys' weight, $Y_B = .373 + 1.016X_B$; girls' height, $Y_G = 2.860 + .949X_G$; boys' height, $Y_B = 2.642 + .952 X_B$ (with X = self-reported weight or height and Y = the corrected weight or height).

Maternal and paternal rejection. The EMBU-A (Egna Minnen Beträffande Uppfostran: My memories of child upbringing - Adolescent version; Gerlsma, Arrindell, Vanderveen, & Emmelkamp, 1991), a Dutch adolescent version of the original EMBU (Perris, Jacobsson, Lindstrom, Knorrning, & Perris, 1980) was used to assess maternal and paternal rejection at both PT and FU. The original EMBU is a self-report measure, intended to assess adults' recollections of their parents' child-rearing behaviour. In designing the EMBU-A, the items of the original adult EMBU were adapted for use with young adolescents, so current perceptions of parenting while living at home can be obtained. The EMBU-A consists of 56 items assessing four domains of parental behaviour: emotional warmth, rejection, overprotection, and favouring subject. To limit the load on the participants only the subscale rejection

was assessed in the present study (19 items concerning mother and 19 items concerning father, e.g. ‘Is your mother/father ever harsh and unfriendly to you?’). All of the items are behaviour-oriented in their formulation, as such excluding an attributional evaluation. Items were to be answered for mother and father separately, on four-point Likert-scale from 1 = No, never to 4 = Yes, most of the time. Analyses of Gerlsma et al. (1991) showed a good internal consistency reliability and construct validity for the subscale rejection. In this study, the Cronbach α were .91 and .90 at PT and .96 and .95 at FU for maternal rejection and paternal rejection respectively.

Emotion regulation of the youngster. The FEEL-KJ (Fragenbogen zur Erhebung der Emotionregulation: bei Kindern und Jugendlichen; Questionnaire to Assess Children's and Adolescents' Emotion Regulation Strategies; Braet, Cracco, & Theuwis, 2013; Grob & Smolenski, 2005) was used to assess the ER of the youngsters at PT and FU. The FEEL-KJ is a 90-item self-report measure used to assess 15 ER strategies in response to three emotions; anxiety, sadness, and anger. In this study, only ER strategies in response to sadness and anger were included in order to limit the load on the participants. The emotions sadness and anger were chosen considering that sadness has been numerously associated with emotional eating (e.g. Goldschmidt, Tanofsky-Kraff, & Wilfley, 2011; Macht & Mueller, 2007) and that hostility and aggression have been associated with paternal rejection (Rohner, 2004). The FEEL-KJ measures 15 primary strategies and two secondary scales revealed by factor analysis: an adaptive strategies scale (seven strategies; problem-oriented action, cognitive problem solving, acceptance, neglect, distraction, reevaluation, and put into good humor) and a maladaptive strategies scale (five strategies; giving up, withdrawal, aggressive action, self-devaluation, and perseveration). The three additional strategies (social support,

expression, and control over emotion) are not part of the secondary scales, but considered separately. The secondary maladaptive strategies scale, consisting of the emotions sadness and anger, was used in this study (10 items per emotion; e.g. ‘When I’m sad/angry, I don’t want to see anyone’). Items were to be answered on five-point Likert-scale from 1 = Almost never to 5 = Almost always. Analysis showed good internal consistency, with Cronbach α between .69 and .91 for the ER strategies. In this study the Cronbach α for the maladaptive strategies scale was .87 at PT and FU.

Emotional eating of the youngster. The Dutch Eating Behaviour Questionnaire - child version (DEBQ; Braet et al., 2008; van Strien, Frijters, Bergers, & Defares, 1986) was used to assess the emotional eating of the youngsters at PT and FU. The DEBQ consists of 33 items, assessing the presence of three types of disturbed eating behaviour: restrained eating, external eating, and emotional eating. Only the subscale emotional eating was assessed in the current study (13 items; e.g. ‘If you’re angry, do you feel like eating something?’). Items are formulated as specific eating behaviours and have to be rated on their frequency of occurrence on a five-point Likert scale from 1 = never to 5 = very often. Studies have demonstrated the usefulness of the Dutch version of the DEBQ in children and adolescents between the age of 7 and 17 years (Braet et al., 2003; Braet et al., 2004). Research showed a stable factor structure, satisfying internal consistency reliability and good test–retest reliability (Braet et al., 2008). Furthermore, research showed a good external validity for the DEBQ in children (Ricciardelli & McCabe, 2001). In the present study, the coefficient α for the subscale emotional eating was .94 at PT and .96 at FU.

Analytic Plan

Firstly, the descriptive analyses of the ‘percent over ideal BMI’ of the youngsters were performed. Secondly, as a preliminary analysis, a one-

way analysis of variance (ANOVA) was conducted with the PT variables, comparing the FU dropouts ($n = 39$) with those who participated at FU ($n = 52$). Concerning the categorical variables gender, a Pearson's chi-square test was performed. In addition to this, to detect possible differences at FU between those who filled in the questionnaires during the booster session and those who filled in the questionnaires at home, a one-way ANOVA with the study variables at FU was conducted. Subsequently, using univariate repeated-measures analyses, the scores on the study variables maternal rejection, paternal rejection, maladaptive ER strategies, emotional eating and percent over ideal BMI were compared between PT and FU. Because the time between end of treatment and FU substantially varied between participants, this follow-up time was added as covariate in the analyses. Furthermore, Pearson's partial correlation coefficients were conducted between PT and FU score for each study variable, while controlling for follow-up time. Regarding the mediation analysis of the study variables at FU, we first checked for possible confounding variables (age, percent over ideal BMI at FU and gender), using Pearson's correlation coefficient and univariate analysis of variance (ANOVA). Then, two mediation analyses were executed, with follow-up time added as covariate. Mediation analyses were executed separately for independent variables maternal rejection and paternal rejection. In this way, youngsters living with a single parent could still be included in one of the mediation analyses. The bootstrapping procedure was used to test the mediation model, considering this procedure imposes no distributional assumptions and takes into account the effect of control variables (Preacher & Hayes, 2008). The SPSS Macro provided by Hayes and Preacher (2011) was used to perform the bias-corrected bootstrap procedure, with 5000 re-samples to derive the 95% confidence interval for the indirect effect. For mediation to occur, the indirect path between the independent variable (maternal or

paternal rejection) and the dependent variable (emotional eating) through the mediator (maladaptive ER strategies) should be significant (ab-path) (rather than a significant decrease in the direct effect; Rucker, Preacher, Tormala, & Petty, 2011). This is indicated by the 95% confidence interval not including 0. This indirect path (ab-path) can only be significant if the independent variable (maternal or paternal rejection) is significantly correlated with the supposed mediator (maladaptive ER strategies) (a-path) and the mediator is significantly correlated with the dependent variable (emotional eating), after controlling for the independent variable (maternal or paternal rejection) (b-path). Figure 1 illustrates the different paths tested, including the direct effect of the independent variables (maternal and paternal rejection) on the dependent variable (emotional eating), after controlling for the mediator (maladaptive ER strategies) (c'-path). Furthermore, to examine the link between the emotional eating of the youngsters at FU and the difference in percent over ideal BMI scores between post-test and FU, a Pearson's partial correlation coefficient was calculated, controlling for follow-up time.

Data were analyzed using the SPSS version 22.0. P-values less than .05 were considered statistically significant.

Results

Descriptive Analyses of Percent over Ideal BMI

At PT, the youngsters had a mean percent over ideal BMI of 186.11% ($SD = 27.54$). At FU, the mean percent over ideal BMI was 136.37% ($SD = 19.65$). In comparison with the percent over ideal BMI at the end of the treatment programme (post-test; $M = 125.08\%$, $SD = 15.79$), the percent over ideal BMI of the youngsters had increased an average of 11.03% between post-test and FU.

Preliminary Analyses

One-way ANOVA showed no differences between the FU dropouts ($n = 39$) and those who participated at FU ($n = 52$) on the PT variables maternal rejection, maladaptive strategies, emotional eating, percent over ideal BMI and age (all $ps > .05$). A Pearson's chi-square test showed a difference in gender between both groups ($\chi^2(1) = 8.70, p = .003$), showing that a bigger percentage of boys dropped out of the study compared to girls. Additionally, one-way ANOVA showed no differences between the two groups at FU (booster session versus online at home) on the FU variables maternal and paternal rejection, maladaptive strategies, emotional eating and percent over ideal BMI (all $ps > .05$).

Changes in Study Variables between Pretest and Follow-up

Repeated-measures ANOVA's showed no differences in maternal rejection, paternal rejection, maladaptive ER strategies and emotional eating between PT and FU, while controlling for follow-up time (all $ps > .05$). Percent over ideal BMI, on the other hand, significantly decreased (see Table 1). Pearson partial correlation coefficients between PT and FU scores of maternal rejection ($r = .59, p < .001$), maladaptive ER strategies ($r = .46, p = .004$), emotional eating ($r = .43, p = .007$) and percent over ideal BMI ($r = .51, p = .001$) were significant. Pearson partial correlation coefficient between PT and FU scores of paternal rejection was not significant ($r = .30, p = .06$).

Mediation Analyses at Follow-up

Concerning possible confounding variables, results showed that the age of the youngsters was related to the dependent variable of the emotional eating of the youngsters, $r = .33, p = .02$. Furthermore, the score on the mediator maladaptive ER strategies differed between boys and girls, with girls reporting significantly more maladaptive ER strategies, $F(1, 50) = 6.55, p = .01$. Percent over ideal BMI at FU was not related to

the dependent variable or mediator. Consequently, age and gender were included as confounding variables in the mediation analyses, next to follow-up time.

Regarding the mediation analysis with maternal rejection as the independent variable, results confirmed a significant relation between maternal rejection and maladaptive ER strategies (a-path; $\beta = .32$, $t = 2.23$, $p = .03$). Secondly, results showed that maladaptive ER strategies were significantly related to emotional eating, when controlling for maternal rejection (b-path; $\beta = .27$, $t = 2.03$, $p = .048$). The indirect effect of maternal rejection on emotional eating through the mediator maladaptive ER strategies (ab-path) was significantly different from zero (estimated to lie between 0.004 and 0.290, with 95% confidence interval). Furthermore, results showed a significant direct effect of maternal rejection on emotional eating, while controlling for maladaptive ER strategies (c'-path; $\beta = .34$, $t = 2.62$, $p = .01$). As such, the results indicated that partial mediation occurred. The model explained 39% of the variance in emotional eating (see Figure 2). Concerning the mediation analysis with paternal rejection as independent variable, results showed that paternal rejection was not significantly related to maladaptive ER strategies (a-path; $\beta = .31$, $t = 1.99$, $p = .05$). Moreover, the results showed that maladaptive ER strategies were not significantly related to emotional eating, when controlling for paternal rejection (b-path; $\beta = .26$, $t = 1.80$, $p = .08$). Additionally, the indirect effect of paternal rejection on emotional eating through the mediator maladaptive ER strategies (ab-path) was not significantly different from zero (estimated to lie between -0.002 and 0.361, with 95% confidence interval). Thus, the results indicate that mediation did not occur. Besides this, results also showed that the direct effect of paternal rejection on emotional eating, while controlling for maladaptive ER strategies, was significant (c'-path: $\beta = .37$, $t = 2.56$, $p =$

.02). The model explained 39% of the variance in emotional eating (see Figure 2).

Link between Emotional Eating at Follow-up and Changes in Percent over Ideal BMI after Treatment

A Pearson's partial correlation coefficient was calculated between the level of emotional eating at FU and the change score in percent over ideal BMI between the post-test and the FU, while controlling for follow-up time. Results showed that the change in percent over ideal BMI after treatment was not related to the level of emotional eating at FU, $r = .09$, $p = .28$.

Discussion

Building on previous studies in clinical samples of youngsters with obesity, the current study investigated the relation between maternal and paternal rejection, maladaptive ER and the emotional eating style of youngsters, after they finished an inpatient weight loss treatment and were back in their home environment. Furthermore, this study examined the relation between the weight change youngsters experienced after treatment and the level of emotional eating of the youngster at FU.

Overall, the results showed that maternal rejection, maladaptive ER strategies and the emotional eating style of youngsters had not changed between PT and FU. The results may suggest that, after inpatient treatment, youngsters come home to a family climate that has not changed in terms of parental rejection. Additionally, the results may suggest that these youngsters have not changed in the way they deal with negative emotions in their home environment. The stability in emotional eating found in this study is in line with the results of Braet et al. (2003; 2004) and Halberstadt et al. (2015). Furthermore, the results showed that maternal rejection was related to the youngsters' level of emotional eating after treatment. In contrast to the results of Vandewalle et al. (2014), the

results showed that paternal rejection was also related to the emotional eating of the youngsters. These results suggest that when youngsters are back in their home environment after inpatient treatment, parental rejection may still influence the emotional eating of the youngsters. This may imply that youngsters struggle to apply what they have learned during the treatment, due to the unchanged family climate.

In accordance with Vandewalle et al. (2014), the results of the present study confirm partial mediation, in which maladaptive ER strategies are the mediator between maternal rejection and emotional eating. In contrast, the relation between paternal rejection and emotional eating was not mediated by the maladaptive ER strategies, as paternal rejection was not related to the maladaptive ER strategies. These results correspond with the results of McEwen and Flouri (2009), who found that father's parenting was directly related to adolescents' eating disorder symptoms and that this relation was not mediated by the adolescents' difficulties in ER. In addition, the results suggest that maternal rejection may have a broader influence on the ER of the youngster than paternal rejection. As Kliever et al. (1996) already suggested, children may be more exposed to maternal, versus paternal influences, which may explain the greater impact on the children's ER. In addition, the results of our correlational analysis suggests that paternal rejection is less stable than maternal rejection.

In conclusion, the results indicate that parental rejection may trigger youngsters' emotional eating directly, or indirectly via the general ER strategies. Although some researchers (e.g. Spoor et al., 2007) suggest that maladaptive ER strategies fail to downregulate negative emotions and that this in turn leads to the use of alternative ER strategies like emotional eating, other researchers posit that negative emotions directly elicit emotional eating (e.g. van Strien, Engels, Van Leeuwe, & Snoek, 2005).

Both assumptions may be valid. In time, emotional eating may become a habitual behaviour and ingrained strategy for dealing with negative emotions, without the use of other maladaptive ER strategies beforehand.

Lastly, we found that the percent over ideal BMI significantly decreased between PT and post-test, but on average, increased 11.3% after treatment (FU). However, this increase in percent over ideal BMI was not related to the level of emotional eating at FU, contrary to our hypothesis. Researchers suggest that emotional eating may be associated with other individual characteristics which diminish the risk of weight regain, like attempting to restrict eating behaviour (Gibson, 2012; Greeno & Wing, 1994). So, youngsters may compensate their emotional eating behaviour by increasing their food restriction afterwards. The study by Braet et al. (2004) found that youngsters who participated in a weight loss treatment showed an increase in dietary restraint between pretest and post-test. This suggests that, during treatment, youngsters learn how to restrict their eating behaviour. This combination of emotional eating and restriction afterwards may lead to fluctuations in weight (yoyo-effect), lower general well-being, lower eating self-efficacy and higher stress levels (Polivy, 1996). In the long term, this may also lead to weight gain. Thus, the non-significant correlation in our study may possibly be explained by the short time frame between the end of the treatment and the follow-up.

There are some limitations that must be considered. A primary limitation of this study is the exclusive reliance on self-report measures. The youngster's perceptions on their ER strategies and emotional eating style may be influenced by their ability to assess their own behaviour (e.g. Evers, de Ridder, & Adriaanse, 2009; Tull, Barrett, McMillan, & Roemer, 2007). Bongers, Jansen, Houben, and Roefs (2013) argue that people are generally rather poor at recalling their emotions, their eating behaviour and the associations between the two. However, during the

treatment patients could have become more conscious of their emotions, their eating behaviour and the association between the two. Thus, the lack of change in maladaptive ER strategies and emotional eating between PT and FU in our sample may be explained by the youngsters under-reporting at PT. In terms of future research, it would be interesting to conduct a diary study, assessing current emotions and actual food intake, to avoid recall bias (Evers, Adriaanse, de Ridder, & de Witt Huberts, 2013). Moreover, it would be interesting to include a control group, so results could be compared between a treatment- and waiting list group. Secondly, the cross-sectional nature of the study does not allow us to determine the causal order among the variables. Therefore, it would be interesting to conduct an experiment to examine the influence of parental rejection on experimentally induced emotional eating behaviour. Finally, it would be desirable to repeat the study with a larger sample, as our study suffered from relatively high study attrition.

The results of this study suggest that the family climate may have an impact on the eating style of the youngsters after weight loss treatment, and therefore might be a topic in (relapse) prevention and treatment of emotional eating in youngsters. This implies first assessing, and then, if necessary, improving the emotional bond between the parent and child in treatment. Although family-based interventions for childhood and adolescent obesity are numerous, only a small part of these interventions focus on the emotional bond between parent and child (Kitzmann & Beech, 2006). Most family-based treatments show a narrow family focus; parents are instructed on how they can increase children's healthy eating and exercise. However, some researchers have noted that greater parental involvement is more costly and that there is not always evidence of greater effectiveness (Haddock, Shadish, Klesges, & Stein, 1994). We therefore share the opinion of Kitzmann and Beech (2006) and Schuetzmann,

Richter-Appelt, Schulte-Markwort, and Schimmelmann (2008), who argue for a more individualized treatment approach. Schuetzmann et al. (2008) posit that children with overweight, deviant eating behaviour and an adverse parent-child relationship may benefit much more from intensive family-based therapeutic interventions, than solely behavioural therapeutic interventions, focused on modifying weight related behaviour.

References

- Barrett, K. C., & Campos, J. J. (1987). Perspective on emotional development II: A functionalist approach to emotions. In J. D. Osofsky (Ed.), *Handbook of infant development* (2nd ed., pp. 555-578). Oxford, UK: Wiley.
- Blair, A. J., Lewis, V. J., & Booth, D. A. (1990). Does emotional eating interfere with success in attempts at weight control? *Appetite, 15*, 151-157. doi: 10.1016/0195-6663(90)90047-c
- Bongers, P., Jansen, A., Houben, K., & Roefs, A. (2013). Happy eating: The Single Target Implicit Association Test predicts overeating after positive emotions. *Eating Behaviors, 14*, 348-355. doi: 10.1016/j.eatbeh.2013.06.007
- Booth, D. A. (1994). *Psychology of nutrition*. London: Taylor & Francis.
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology, 13*, 733-743. doi: 10.1177/1359105308093850
- Braet, C., Cracco, E., & Theuwis, L. (2013). *FEEL-KJ: vragenlijst voor emotieregulatie bij kinderen en jongeren*. Amsterdam, Nederland: Hogrefe.
- Braet, C., Tanghe, A., De Bode, P., Franckx, H., & Van Winckel, M. (2003). Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. *European Journal of Pediatrics, 162*, 391-396. doi: 10.1007/s00431-003-1155-5
- Braet, C., Tanghe, A., Decaluwe, V., Moens, E., & Rosseel, Y. (2004). Inpatient treatment for children with obesity: Weight loss, psychological well-being, and eating behavior. *Journal of Pediatric Psychology, 29*, 519-529. doi: 10.1093/jpepsy/jsh054

-
- Canetti, L., Berry, E. M., & Elizur, Y. (2009). Psychosocial Predictors of Weight Loss and Psychological Adjustment Following Bariatric Surgery and A Weight-Loss Program: The Mediating Role of Emotional Eating. *International Journal of Eating Disorders, 42*, 109-117. doi: 10.1002/eat.20592
- Czaja, J., Rief, W., & Hilbert, A. (2009). Emotion Regulation and Binge Eating in Children. *International Journal of Eating Disorders, 42*, 356-362. doi: 10.1002/eat.20630
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*, 241-273. doi: 10.1207/s15327965pli0904_1
- Epstein, L. H., Valoski, A., Wing, R. R., & McCurley, J. (1994). Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology, 13*, 373-383. doi: dx.doi.org/10.1037/0278-6133.13.5.373
- Evers, C., Adriaanse, M., de Ridder, D. T. D., & de Witt Huberts, J. C. (2013). Good mood food. Positive emotion as a neglected trigger for food intake. *Appetite, 68*, 1-7. doi: 10.1016/j.appet.2013.04.007
- Evers, C., de Ridder, D., & Adriaanse, M. (2009). Assessing yourself as an emotional eater: Mission impossible? *Psychology & Health, 24*, 166-166.
- Evers, C., Stok, F. M., & de Ridder, D. T. D. (2010). Feeding Your Feelings: Emotion Regulation Strategies and Emotional Eating. *Personality and Social Psychology Bulletin, 36*, 792-804. doi: 10.1177/0146167210371383
- Gerlsma, C., Arrindell, W. A., Vanderveen, N., & Emmelkamp, P. M. G. (1991). A parental rearing style questionnaire for use with adolescents – psychometric evaluation of the EMBU-A. *Personality*

- and Individual Differences*, 12, 1245-1253. doi: 10.1016/0191-8869(91)90196-i
- Gibson, E. L. (2006). Emotional influences on food choice: Sensory, physiological and psychological pathways. *Physiology & Behavior*, 89, 53-61. doi: 10.1016/j.physbeh.2006.01.024
- Gibson, E. L. (2012). The psychobiology of comfort eating: implications for neuropharmacological interventions. *Behavioural Pharmacology*, 23, 442-460. doi: 10.1097/FBP.0b013e328357bd4e
- Greeno, C. G., & Wing, R. R. (1994). Stress-induced eating. *Psychological Bulletin*, 115, 444-464. doi: 10.1037/0033-2909.115.3.444
- Grob, A., & Smolenski, C. (2005). *Fragebogen zur Erhebung der Emotionsregulation bei Kindern und Jugendlichen (FEEL-KJ)*. Bern.
- Haddock, C. K., Shadish, W. R., Klesges, R. C., & Stein, R. J. (1994). Treatments for childhood and adolescent obesity. *Annals of Behavioral Medicine*, 16, 235-244.
- Halberstadt, J., van Strien, T., de Vet, E., Eekhout, I., Braet, C., & Seidell, J. C. (2015). The association of eating styles with weight change after an intensive combined lifestyle intervention for children and adolescents with severe obesity. *Appetite*, 99, 82-90. doi: 10.1016/j.appet.2015.12.032
- Harrist, A. W., Hubbs-Tait, L., Topham, G. L., Shriver, L. H., & Page, M. C. (2013). Emotion Regulation is Related to Children's Emotional and External Eating. *Journal of Developmental and Behavioral Pediatrics*, 34, 557-565. doi: 10.1097/DBP.0b013e3182a5095f
- Hayes, A. F., & Preacher, K. J. (2011). Mediate macro. Retrieved from <http://www.afhayes.com/spss-sas-and-mplus-macros-and-code.html>

-
- Kitzmann, K. M., & Beech, B. M. (2006). Family-based interventions for pediatric obesity: Methodological and conceptual challenges from family psychology. *Journal of Family Psychology, 20*, 175-189. doi: 10.1037/0893-3200.20.2.175
- Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development, 67*, 2339-2357. doi: 10.1111/j.1467-8624.1996.tb01861.x
- Little, R. J. A. (1988). Missing-data adjustments in large surveys. *Journal of Business & Economic Statistics, 6*, 287-296. doi: 10.2307/1391878
- McEwen, C., & Flouri, E. (2009). Fathers' parenting, adverse life events, and adolescents' emotional and eating disorder symptoms: the role of emotion regulation. *European Child & Adolescent Psychiatry, 18*, 206-216. doi: 10.1007/s00787-008-0719-3
- Meesters, C., & Muris, P. (2004). Perceived parental rearing behaviours and coping in young adolescents. *Personality and Individual Differences, 37*, 513-522. doi: 10.1016/j.paid.2003.09.022
- Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., . . . Gakidou, E. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet, 384*, 766-781. doi: 10.1016/S0140-6736(14)60460-8
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial boys*. Eugene, OR: Castalia.
- Perris, C., Jacobsson, L., Lindstrom, H., Knorrning, L. V., & Perris, H. (1980). Development of a new inventory assessing memories of

- parental rearing behaviour. *Acta Psychiatrica Scandinavica*, *61*, 265-274. doi: 10.1111/j.1600-0447.1980.tb00581.x
- Polivy, J. (1996). Psychological Consequences of Food Restriction. *Journal of the American Dietetic Association*, *96*, 589-592. doi: [http://dx.doi.org/10.1016/S0002-8223\(96\)00161-7](http://dx.doi.org/10.1016/S0002-8223(96)00161-7)
- Power, T. G. (2004). Stress and Coping in Childhood: The Parents' Role. *Parenting-Science and Practice*, *4*, 271-317. doi: 10.1207/s15327922par0404_1
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879-891. doi: 10.3758/BRM.40.3.879
- Rhee, K. E., Pan, T. Y., Norman, G. J., Crow, S., & Boutelle, K. (2013). Relationship between maternal parenting and eating self-efficacy in overweight children when stressed. *Eating and Weight Disorders-Studies on Anorexia Bulimia and Obesity*, *18*, 283-288. doi: 10.1007/s40519-013-0043-x
- Ricciardelli, L. A., & McCabe, M. P. (2001). Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review*, *21*, 325-344. doi: 10.1016/s0272-7358(99)00051-3
- Roelants, M., & Hauspie, R. (2004). Flemish Growth Charts 2-20 years. Retrieved June, 6th, 2011, from <http://www.vub.ac.be/groeicurven/english.html>
- Rohner, R. P. (1975). *They love me, they love me not: A worldwide study of the effects of parental acceptance and rejection*. New Haven, CT: Human Relations Area Files.
- Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new

recommendations. *Social and Personality Compass*, 5/6, 359-371.
doi: 10.1111/j.1751-9004.2011.00355.x

- Schuetzmann, M., Richter-Appelt, H., Schulte-Markwort, M., & Schimmelmann, B. G. (2008). Associations among the perceived parent-child relationship, eating behavior, and body weight in preadolescents: Results from a community-based sample. *Journal of Pediatric Psychology*, 33, 772-782. doi: 10.1093/jpepsy/jns002
- Saritas, D., Grusec, J. E., & Gencoz, T. (2013). Warm and harsh parenting as mediators of the relation between maternal and adolescent emotion regulation. *Journal of Adolescence*, 36, 1093-1101. doi: 10.1016/j.adolescence.2013.08.015
- Shipman, K. L., Schneider, R., Fitzgerald, M. M., Sims, C., Swisher, L., & Edwards, A. (2007). Maternal Emotion Socialization in Maltreating and Non-maltreating Families: Implications for Children's Emotion Regulation. *Social Development*, 16, 268-285. doi: 10.1111/j.1467-9507.2007.00384.x
- Spoor, S. T. P., Bekker, M. H., van Strien, T., & van Heck, G. L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite*, 48, 368-376. doi: 10.1016/j.appet.2006.10.005
- Taube-Schiff, M., Van Exan, J., Tanaka, R., Wnuk, S., Hawa, R., & Sockalingam, S. (2015). Attachment style and emotional eating in bariatric surgery candidates: The mediating role of difficulties in emotion regulation. *Eating Behaviors*, 18, 36-40. doi: 10.1016/j.eatbeh.2015.03.011
- Telch, C. F. (1997). Skills training treatment for adaptive affect regulation in a woman with binge-eating disorder. *International Journal of Eating Disorders*, 22, 77-81. doi: 10.1002/(sici)1098-108x(199707)22:1<77::aid-eat10>3.0.co;2-f

- Tull, M. T., Barrett, H. M., McMillan, E. S., & Roemer, L. (2007). A preliminary investigation of the relationship between emotion regulation difficulties and posttraumatic stress symptoms. *Behavior Therapy, 38*, 303-313. doi: 10.1016/j.beth.2006.10.001
- van Strien, T., Engels, R., Van Leeuwe, J., & Snoek, H. A. (2005). The Stice model of overeating: Tests in clinical and non-clinical samples. *Appetite, 45*, 205-213. doi: 10.1016/j.appet.2005.08.004
- van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders, 5*, 295-315. doi: 10.1002/1098-108x(198602)5:2<295::aid-eat2260050209>3.0.co;2-t
- Van Winckel, M., & van Mil, E. (2001). Wanneer is dikt té dik? In C. Braet & M. Van Winckel (Eds.), *Behandelingsstrategieën bij kinderen met overgewicht*. Houten/Diegem: Bohn Stafleu Van Loghum.
- Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation. *International Journal of Obesity, 38*, 525-530. doi: 10.1038/ijo.2013.233
- Wagner, B. M., Cohen, P., & Brook, J. S. (1996). Parent/adolescent relationships: Moderators of the effects of stressful life events. *Journal of Adolescent Research, 11*, 347-374. doi: 10.1177/0743554896113005
- Wilfley, D. E., Tibbs, T. L., Van Buren, D. J., Reach, K. P., Walker, M. S., & Epstein, L. H. (2007). Lifestyle interventions in the treatment of childhood overweight: A meta-analytic review of randomized controlled trials. *Health Psychology, 26*, 521-532. doi: 10.1037/0278-6133.26.5.521

Yap, M. B. H., Schwartz, O. S., Byrne, M. L., Simmons, J. G., & Allen, N. B. (2010). Maternal Positive and Negative Interaction Behaviors and Early Adolescents' Depressive Symptoms: Adolescent Emotion Regulation as a Mediator. *Journal of Research on Adolescence, 20*, 1014-1043. doi: 10.1111/j.1532-7795.2010.00665.x

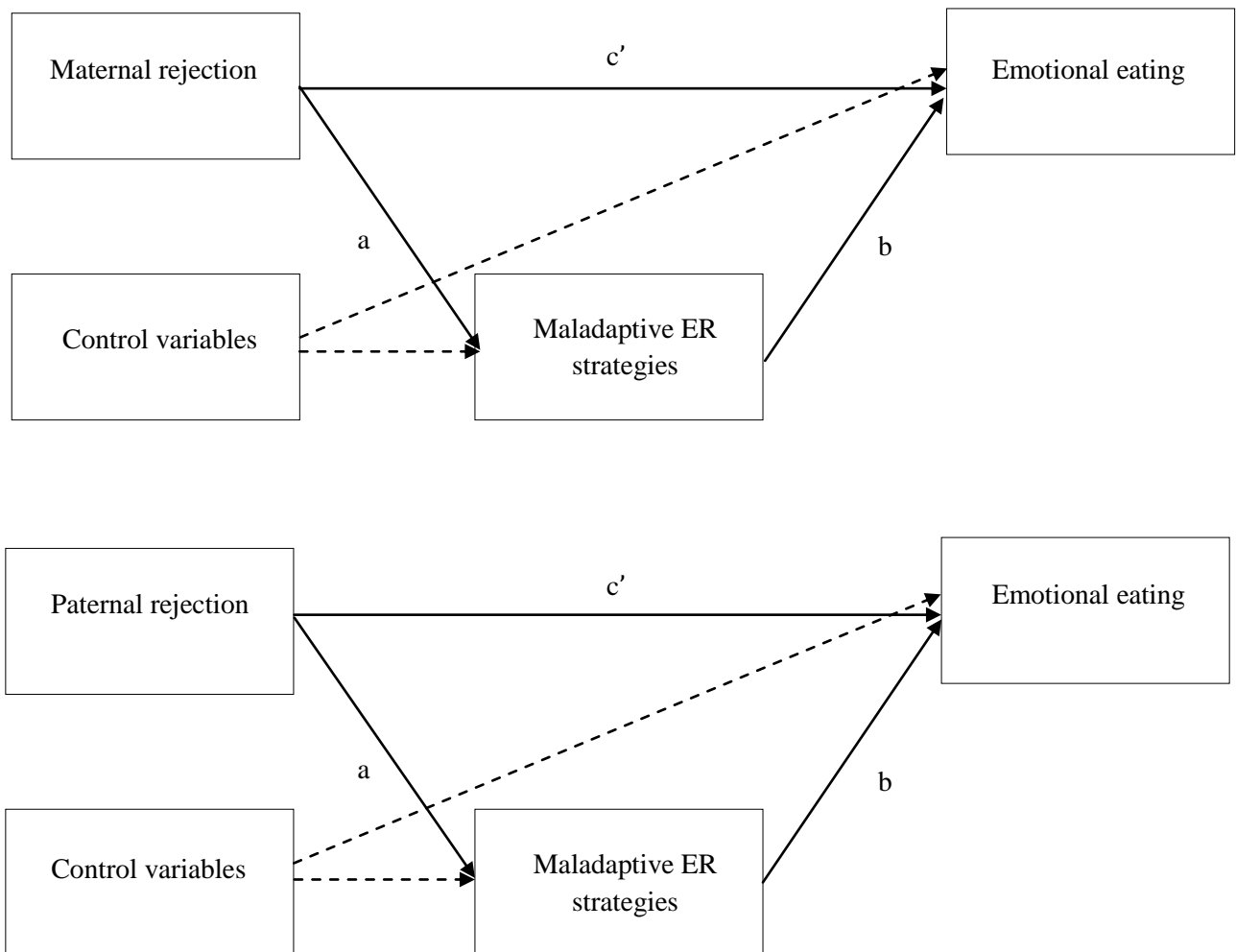


Figure 1. Model of the relations between study variables investigated at follow-up.

Note: Dashed lines represent the effect of control variables. Abbreviation: ER, emotion regulation.

Table 1

Mean Scores (and Standard Deviations) between Study Variables at Pretest and Follow-up

	Pretest	Follow-up	Pretest vs. follow-up
Maternal rejection	26.59 (7.19)	28.12 (10.70)	F value (1, 45) 3.60
Paternal rejection	27.03 (6.38)	26.53 (9.30)	F value (1, 38) 0.53
Maladaptive ER strategies	50.31 (11.57)	50.35 (10.86)	F value (1, 50) 0.04
Emotional eating	1.97 (0.78)	1.98 (0.79)	1.47
Percent over ideal BMI	186.11 (27.54)	136.37 (19.65)	190.42**

Note. Abbreviation: BMI, body mass index. * $p < .001$.

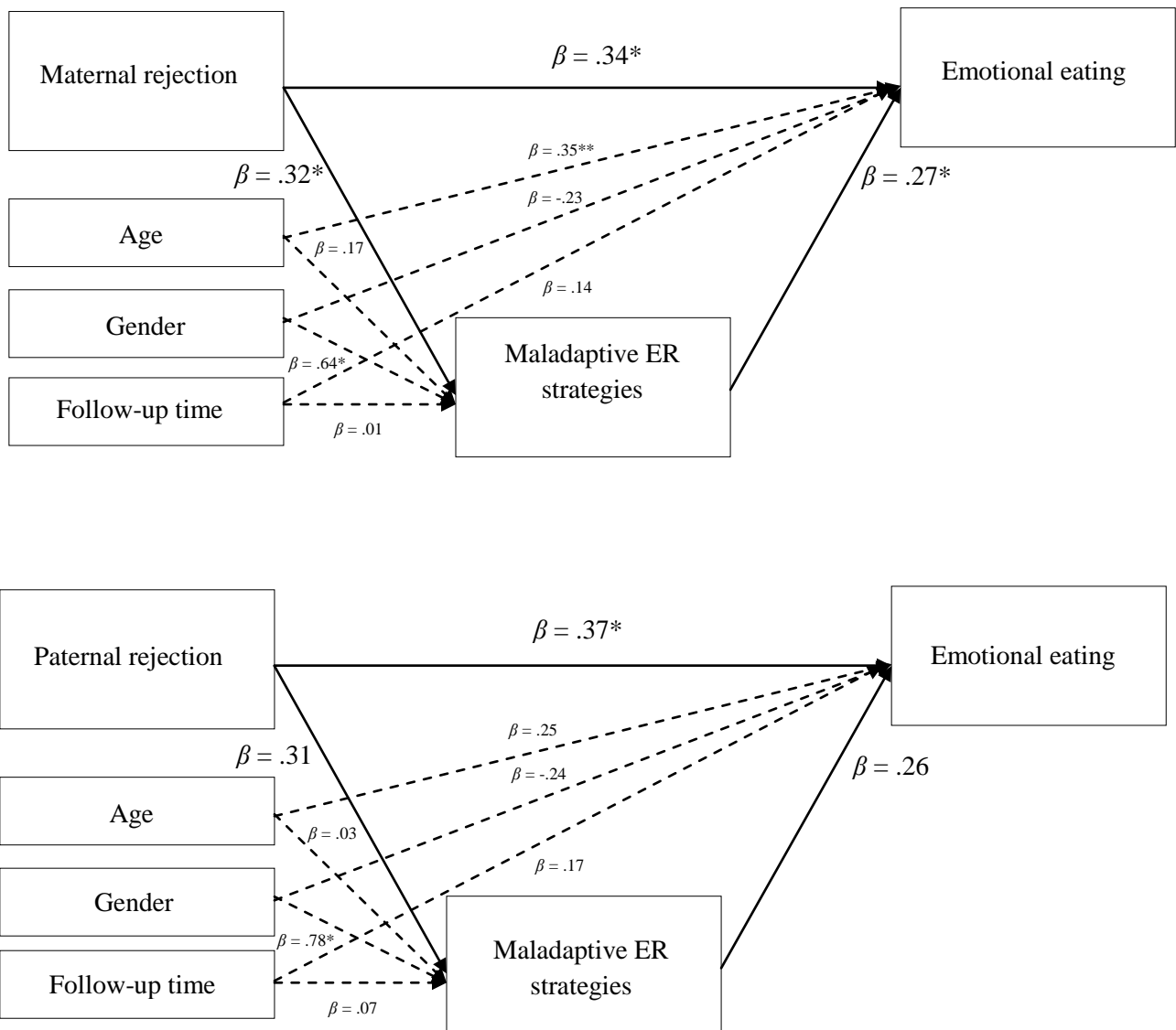


Figure 2. Mediation models with maladaptive emotion regulation strategies as mediator between maternal and paternal rejection and emotional eating.

Note: Dashed lines represent the effect of control variables. Abbreviation: ER, emotion regulation. $*p < .05$, $**p < .01$.

Chapter 7

General discussion

In this section, the results of the various studies are first summarized and then discussed in terms of our main research questions and clinical implications. In addition, some strengths and limitations of our studies and directions for future research are presented.

Research Overview

The doctoral dissertation investigated the relationship between maternal and paternal rejection and emotional eating in youngsters (aged between 10 and 17 years). This relationship was examined using different research designs (cross-sectional and longitudinal survey studies, experimental and diary design) and included a clinical sample of obese youngsters as well as community samples. Secondly, the mediating role of youngsters' emotion regulation (ER) in the relationship between maternal and paternal rejection and emotional eating was examined. Lastly, the doctoral dissertation investigated if the presence of maternal and paternal rejection can explain the persistency of emotional eating after treatment.

The first study (chapter 2), a cross-sectional survey study, examined the relationship between maternal and paternal rejection, youngsters' ER and emotional eating, in a clinical sample of obese youngsters seeking treatment. The results revealed that the use of maladaptive ER strategies mediated the relation between maternal rejection and emotional eating in obese youngsters. Paternal rejection was neither associated with the ER nor with the emotional eating of the youngster. Similar to the first study, the second survey study (chapter 3) examined the relationship between maternal and paternal rejection, youngsters' ER and emotional eating. By contrast, data were longitudinal (including level and change) and collected in a community sample of youngsters. Comparable to the results of the first study, the second study showed that the levels of maternal rejection, maladaptive ER and emotional eating were related in youngsters from the community. The indirect effect of the level of maternal rejection on the level of emotional eating through the level of maladaptive ER was marginally significant, offering limited support for mediation. Also similar to the results of the first study, the level of paternal rejection was not related to the level of the other study variables. With regard to the changes

in the study variables, maternal rejection showed, on average, no change over time, whereas the other variables decreased. The changes in the study variables were not related. Chapter 4 presented the results of the experimental study examining the relationship between maternal and paternal rejection and actual food intake after mood induction. Youngsters were randomly assigned to a neutral mood condition or negative mood condition, followed by a multi-item snack buffet. Beforehand, youngsters were asked to report about maternal and paternal rejection. Results showed that in the negative mood condition, youngsters reporting high levels of maternal rejection consumed more savoury food (calorie intake). In addition, results indicated that also paternal rejection predicted energy intake from savoury food, however, there was no significant interaction-effect between paternal rejection and condition. In chapter 5, the results of the 7-day diary study were presented. In this study, the relationship between day-to-day within-person fluctuations in parental and peer rejection and emotional eating of youngsters were examined. The results showed that daily parental rejection was related to the daily emotional eating of the youngsters. The relationship between daily peer rejection and daily emotional eating was only marginally significant. The third survey study (chapter 6), the follow-up study in the obese youngsters, examined if the variables maternal and paternal rejection and maladaptive ER could explain the stability of emotional eating after an inpatient weight loss treatment which incorporated cognitive behavioural techniques to treat emotional eating. The results showed that the study variables had not changed between pretest and follow-up. Moreover, mediation analysis showed that maladaptive ER partially mediated the association between maternal rejection and the youngsters' emotional eating at follow-up. In addition, mediation analysis showed that paternal rejection was only directly related to emotional eating and not indirectly via the mediator

maladaptive ER. Lastly, this study also examined if the level of youngsters' emotional eating at follow-up was related to their weight gain after treatment. In contrast to our hypothesis, the association was not significant.

In the following section, the results of the studies are discussed in terms of our three main research questions. The first two research questions are discussed simultaneously considering the results are inextricably linked to each other.

Parental Rejection as a Risk Factor in the Development and Maintenance of Emotional Eating and the Mediating Role of Emotion Regulation

The first aim of the doctoral dissertation was to investigate if parental rejection, whereby we distinguished between maternal and paternal rejection, is a risk factor in the development and maintenance of emotional eating. All the studies in this doctoral dissertation showed a significant relationship between parental rejection, especially maternal rejection, and emotional eating, self-reported as well as actual food intake after mood induction. This offers support for our hypothesis that parental rejection is a risk factor in the development and maintenance of emotional eating. Our second aim was to investigate the role of ER in this relationship. Based on the IPARTheory (Rohner, 1975, 1980, 1986) and the study of Eisenberg, Cumberland, and Spinrad (1998), we hypothesized that parental rejection would have an influence on the ER of youngsters; more parental rejection would lead to more maladaptive ER in youngsters. Based on the affect regulation models (e.g. Evers, Stok, & de Ridder, 2010; Telch, 1997), we hypothesized that in turn, ER would have an influence on the emotional eating of youngsters; as these 'primary' maladaptive ER strategies fail to downregulate negative emotions, they may lead to the use of 'secondary' ER strategies, like emotional eating,

which offers temporary relief. Results of our survey studies offer support for both assumptions, suggesting that maladaptive ER is a mediator in the relationship between parental rejection and emotional eating of youngsters, although findings were not conclusive. The findings on the mediating role of ER will be further discussed later in text. First, we discuss the role of parental rejection in more detail.

Parental rejection as stable feature versus momentary trigger.

Concerning parental rejection as a risk factor in the development and maintenance of emotional eating, our results provide evidence for two ways in which parental rejection may influence the ER and emotional eating of youngsters. Firstly, based on the IPARTheory (Rohner, 1975, 1980, 1986), parental rejection can be viewed as a stable feature, a factor that reflects the quality of the affectional relationship between parent and child and that can impair the emotion socialization process from early childhood onwards, leading to a general ER deficit. Results from our longitudinal data (chapter 3 & 6) indicate that especially maternal rejection is stable over a period of time. This may suggest that, in comparison with paternal rejection, maternal rejection has a more stable, and therefore perhaps more profound effect on the child's emotion socialization from early childhood onwards. This would lead to a general increase in the use of maladaptive ER strategies when the child experiences negative emotions. This line of reasoning is supported by the results of our experimental study (chapter 4), in which youngsters were first asked to report about general maternal and paternal rejection and, later on, were randomly assigned to a neutral mood condition or negative mood condition, followed by a multi-item snack buffet. Results showed that in the negative mood condition, youngsters reporting high levels of maternal rejection consumed more energy from savoury food. This indicates that, in general, youngsters experiencing high levels of maternal

rejection more easily turn to food for comfort when feeling negative emotions.

Next to the enduring effect on the emotion socialization, Eisenberg et al. (1998) suggested that parental rejecting behaviour itself might also cause momentary distress in youngsters, which in turn elicits the use of maladaptive ER strategies to deal with that distress. Evidence for this might be found in our diary study (chapter 5). The results of this study showed that there was a substantial within-person variance in daily parental rejecting behaviour. These fluctuations were related to fluctuations in the daily emotional eating of the youngsters. This suggests that, on a momentary basis, parental rejecting behaviour can trigger the use of emotional eating in youngsters.

Taken together, this doctoral dissertation offers support for two ways in which parental rejection may influence the ER and emotional eating of youngsters. First, parental rejection, specifically maternal rejection, may have a general effect on the way youngsters deal with their emotions, via the emotion socialization process. This is supported by the results of our experimental study (chapter 4). Secondly, parental rejecting behaviour itself may induce distress and consequently elicit the use of maladaptive ER strategies, as a way of dealing with the distress parental rejection causes. This is supported by the results of our diary study (chapter 5). This entails that the cross-sectional results of our survey studies (chapter 2, 3 & 6) can also be understood in two ways.

The mediating role of emotion regulation. We investigated in three survey studies (chapter 2, 3 & 6) if maladaptive ER is a mediator in the relation between maternal and paternal rejection and emotional eating in youngsters. The results from these studies suggest that maladaptive ER is a mediator in the relationship between maternal rejection and emotional eating in youngsters from the community (chapter 3) as well as in obese

youngsters seeking treatment (chapter 2). However, it should be noted that in our survey study in the community sample, the indirect effect through maladaptive ER was only marginally significant. In addition, results from the follow-up study in the clinical sample (chapter 6) showed that the relation between maternal rejection and emotional eating was only partially mediated by maladaptive ER. This implies that maternal rejection is also directly related to the emotional eating of youngsters. In contrast to the results of our first two survey studies, that did not show a relationship between paternal rejection and emotional eating, paternal rejection was significantly related to the emotional eating of the youngster in the follow-up study. This relationship was directly, and not indirectly via the mediator maladaptive ER. These mixed findings might be explained by a shift in the relationship between parental rejection, as a momentary trigger of distress, maladaptive ER and emotional eating.

Firstly, youngsters experiencing maternal rejection may turn to maladaptive ER strategies to deal with the distress. These maladaptive ER strategies do not sufficiently ameliorate these negative emotions. Therefore, youngsters ultimately turn to ‘secondary’ ER strategies, like emotional eating, which offers temporary relief (Spoor, Bekker, van Strien, & van Heck, 2007). This assumption was supported by the experimental study of Evers et al. (2010). This study demonstrated that randomly manipulating the adaptive and maladaptive ER strategies of females after a negative affect induction had a significant effect on the amount of comfort food eaten afterwards. Furthermore, Spoor et al. (2007) found in their study in women that maladaptive ER strategies like avoidance distraction were related to emotional eating, while controlling for levels of negative affect.

In contrast, the results of our studies indicate that maternal and paternal rejection might also directly elicit emotional eating. This could

suggest that, over time, emotional eating becomes a habitual behaviour, an ingrained strategy for dealing with negative affect, without the use of other maladaptive ER strategies beforehand. Affect regulation models suggest that emotional eating is a learned emotion regulation strategy which is reinforced through operant conditioning (eating reduces negative affect, e.g. Booth, 1994). In time, also other learning processes play a role as negative emotions may function as cues that automatically elicit craving for palatable food. The occurrence of conditioning processes has been supported by the study of Blechert, Goltsche, Herbert, and Wilhelm (2014), which examined individuals with a high or low emotional eating style on experiential and neuronal responses to high-calorie food images, under neutral or negative mood conditions. The results showed that emotional eaters reported more craving in the negative mood condition compared to the neutral mood condition. In addition, EEG data showed that, in the negative mood condition, emotional eaters responded with stronger responses in reward related brain areas to the food images, compared to the neutral mood condition. This may reflect the learned significance of food as a means to regulate negative emotions.

To conclude, the results of our research suggests that maternal rejection, as momentary trigger, may have an effect on the emotional eating of youngsters via two distinct pathways; via the use of maladaptive ER strategies beforehand, and directly, without the use of maladaptive ER strategies beforehand. This could explain our mixed results on the mediating role of ER in the relationship between maternal rejection and emotional eating. The results of our follow-up study suggests that paternal rejection, as momentary trigger, directly elicits emotional eating as ER strategy.

Maternal versus paternal rejection. In this doctoral dissertation parental rejection was subdivided into maternal rejection and paternal

rejection, making it possible to examine the difference in influence between mother and father on the ER and emotional eating of youngsters. This subdivision gives in to the limitation of the existing literature that generally does not make the distinction between parents or inclusion of both parents, making a comparison impossible. The results of our studies generally show more evidence for the influence of maternal rejection than paternal rejection. Specifically, the results from the first survey study revealed that only maternal rejection, and not paternal rejection, was associated with the ER and emotional eating of the obese youngsters seeking treatment. The second survey study showed that results were the same in a community sample of youngsters. These results are in line with previous research which indicates that mothers are more engaged in their children's emotional lives than fathers, and therefore have more influence on the ER of children and adolescents (Kliewer, Fearnow, & Miller, 1996; Klimes-Dougan et al., 2007). As mentioned before, our results suggest that maternal rejection, more than paternal rejection, has a general effect on the ER of youngsters, through the emotion socialization process. Results from the survey study in the community sample (chapter 3) and the follow-up study (chapter 6) indicate that maternal rejection also functions as a momentary trigger, that directly elicits emotional eating. Regarding paternal rejection, results of the follow-up study in the clinical sample showed that paternal rejection was directly related to the emotional eating, and not via the ER of the youngsters. Together with the results of the other survey studies and experimental study, our results suggest that paternal rejection is more a momentary trigger that directly elicits emotional eating, than a stable feature of the emotional family climate, that impedes the child's emotion socialization process.

The Influence of Parental Rejection on the Stability of Emotional Eating after Treatment and Related Clinical Implications

In the follow-up study, we investigated if maternal and paternal rejection could explain the stability of emotional eating of youngsters who participated in an inpatient weight loss treatment. This treatment programme incorporated cognitive behavioural techniques to teach youngsters several self-regulation skills applied to an eating-related context. The results showed that, after treatment, maladaptive ER partially mediated the association between maternal rejection and the youngsters' emotional eating, and that paternal rejection was directly related to emotional eating. These results might imply that, after treatment, maternal rejection still influences the emotion socialization process and that maternal rejection, next to paternal rejection, is also a momentary trigger of distress which directly elicits emotional eating. Because our results suggests that parental rejection influences emotional eating in two ways, we plead for a more intensive inclusion of parents in treatment of emotional eating in youngsters. Recently, Knatz, Braden, and Boutelle (2015) proposed a parent-focused intervention, which teaches parents to appropriately respond to their children's emotion dysregulation and become their child's 'emotion coach'. This intervention could influence the emotional eating of youngsters in two ways; by teaching parents to appropriately respond to the child's emotions, the emotion socialization process is restored and the parental behaviour itself decreases the child's distress instead of increasing distress. This emotion-focused family therapy (EFFT) has shown promising results in children and adolescents with eating disorders, but still has to be tested for the treatment of emotional eating (e.g. Robinson, Dolhanty, & Greenberg, 2015).

Methodological Strengths

A number of strengths of the presented studies should be brought to notice. A first important strength of this dissertation is the use of different research designs. We have used cross-sectional, longitudinal, experimental and diary designs to get insight into the relationship between parental rejection and emotional eating in youngsters. By means of this methodological variety, we were able to demonstrate a relationship between self-reported maternal rejection and self-reported emotional eating, as well as between self-reported maternal rejection and experimentally induced emotional eating. This is an important asset, since recent research indicates that self-reported emotional eating is very susceptible to recall bias (e.g. Adriaanse, de Ridder, & Evers, 2011). With regard to self-reported emotional eating, we were able to demonstrate a relationship with self-reported maternal rejection cross-sectionally, as well as on a day-to-day level in a diary study, which diminishes the probability of recall bias. A second strength is the inclusion of both community samples and a clinically-referred sample of obese youngsters. Data collection in clinical samples is generally time and energy consuming, but it does offer multiple insights and levers in the optimization of intervention programs. Clinically-referred obese youngsters are a select subgroup with increased psychiatric comorbidity, ER difficulties and disturbed eating, making the generalizability of our results in this sample questionable. For example, Van Vlierberghe, Braet, Goossens, and Mels (2009) found that 37.50% of 150 obese youngsters referred for treatment met criteria for at least one mental disorder. However, the results of our study in the community sample were similar to the results in our study in the clinically-referred sample, which provides support for the generalizability of these results. Thirdly, this doctoral dissertation adds to the previous research by subdividing parental rejection into maternal

rejection and paternal rejection, making it possible to examine the difference in influence between mother and father on the ER and emotional eating of youngsters. Previous studies did not make this distinction or only investigated the influence of one of both (e.g. Rhee, Pan, Norman, Crow, & Boutelle, 2013; Schuetzmann, Richter-Appelt, Schulte-Markwort, & Schimmelmann, 2008). Taken together, the results of our studies suggests that maternal rejection has a bigger influence on the ER and emotional eating of youngsters, than paternal rejection. This emphasizes the importance of mother's inclusion in prevention and intervention programs, next to the ideal scenario of inclusion of both parents. Finally, this doctoral dissertation tried to address the influence of peer rejection, next to parental rejection, on the emotional eating of youngsters, by assessing this variable in our diary study. Research showed that adolescence is characterized by increased importance of peer relationships, greater sensitivity to peer rejection and more psychological problems associated with peer rejection (Masten et al., 2009). Therefore, we hypothesized that peer rejection would also have influence on the emotional eating behaviour of youngsters. However, our results suggested that the influence of peer rejection is minor compared to the influence of parental rejection.

Limitations and Directions for Future Research

As previously mentioned, this doctoral dissertation offers support for two distinct ways in which parental rejection influences the ER and emotional eating of youngsters; through the ER socialization and as a momentary trigger of negative affect. However, evidence could have been strengthened by making some methodological adjustments in the studies. In the longitudinal study in the community sample, we investigated the relation between the changes ($M = 71$ days) in maternal and paternal rejection, ER and emotional eating. The results showed that maternal

rejection had not changed and that the changes in variables were not related. These non-significant results might be explained by the short time frame between both measurement moments in this study. Firstly, to test the assumption that maternal rejection affects the child's emotion socialization process from early childhood onwards, which leads to a general ER deficit and consequently to the use of emotional eating as ER strategy, it would be more suitable to conduct a longitudinal study from early childhood to adolescence. In addition, it would be preferably to include three measurements instead of two. For example, maternal rejection could be assessed during early childhood, ER of the child during middle childhood and emotional eating during adolescence. Secondly, results of the diary study offer some support for the assumption that parental rejection is a momentary trigger. Nonetheless, it would be more beneficial to use an event- or interval-contingent diary method instead of a daily diary method. In our diary study, youngsters reported about the parental rejection and emotional eating they had experienced that day, at the end of the day. Using an event- or interval-contingent diary method would offer more support on the causality of the relationship between parental rejection and emotional eating. Besides, an experiment in which parental rejection is primed and food is presented afterwards, might offer additional evidence that parental rejection can trigger emotional eating. To our knowledge, no study has investigated how parental rejection can be primed in youngsters, and so this should first be thoroughly investigated.

Next, it should be noted that not all individuals with an ER deficit develop an emotional eating style. ER deficits can result in various problem behaviours (e.g. Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Recent research suggests that genetic vulnerability may have a moderating role (van Strien, Snoek, van der Zwaluw, & Engels, 2010). This genetic vulnerability is reflected in the personality trait 'sensitivity to

reward'. In the brain, the neurotransmitter dopamine leads to the activation of reward and pleasure centers (Singh, 2014). Research has demonstrated that, next to drugs of abuse, comfort food can also potentially engage this brain reward pathway (e.g. Olsen, 2011; Pichers et al., 2010). The incentive value of food is not equal in all individuals, but rather dependent of the individual's personality trait sensitivity to reward. This construct is described as the ability to derive pleasure or reward from natural reinforcers like food and pharmacologic rewards like drugs, and is assumed to be normally distributed in the general population (Davis, Strachan, & Berkson, 2004; Meehl, 1975). Research has demonstrated a positive relation between the trait sensitivity to reward and emotional eating in adults and adolescents (Davis et al., 2004; De Cock et al., 2016). As such, individuals with ER deficits may only develop an emotional eating style when they are sensitive to reward. Therefore, it is desirable that future research on the relationship between parental rejection, ER and emotional eating includes the trait sensitivity to reward as well. This would offer a more comprehensive insight into the development of emotional eating, taking into account the interaction between predispositional vulnerabilities and environmental stressors.

Next to parental rejection, research suggests that also other parental behaviour can have an influence on the emotional eating of children. For example, Braden et al. (2014) found that mothers' emotional feeding behaviour (i.e., a tendency to offer food to soothe a child's negative emotions) was significantly related to emotional eating in children aged 8 until 12 years old. It would be interesting to investigate if parental emotional feeding behaviour is still present during adolescence and which influence this behaviour has on the ER and emotional eating in youngsters, next to parental rejection.

Lastly, although we used a multi-method approach in this doctoral dissertation, a multi-informant approach was lacking. Only youngsters were included as informant. It might be interesting to also include data from parents, especially with regard to parental rejection. However, Rohner (2004) stresses the importance of perception: a child may feel unloved and this in turn may affect the child's mental health, even if outside observers fail to detect parental rejection. Nonetheless, it should be taken into account that youngsters might suffer from psychological disorders which affect the youngster's perception as well as their ER. For instance, depression can be characterized by an attentional bias for negative interpersonal stimuli (e.g. Gotlib, Krasnoperova, Yue, & Joormann, 2004) and is related to emotional eating (e.g. Ouwens, van Strien, & van Leeuwe, 2009). Therefore, future research should consider including perspectives of multiple informants or including mental disorders, like depression, as confounding variable.

Conclusion

To conclude, this doctoral dissertation offers support for the influence of paternal rejection, especially maternal rejection, on the emotional eating of youngsters from the community, as well as obese youngsters seeking treatment and youngsters who received weight-loss treatment. Our results suggest that maternal rejection has a general effect on the ER of youngsters through the emotion socialization process and that maternal rejection also functions as a momentary trigger that (in)directly elicits emotional eating. Regarding paternal rejection, the results of the follow-up study suggests that paternal rejection can function as a momentary trigger that directly elicits emotional eating. However, results from the other survey studies did not show a significant relationship between paternal rejection and emotional eating, making the influence of paternal rejection questionable. Generally, our results emphasize the

importance of including parents, especially mothers, as emotional coach in the prevention and intervention programs of emotional eating.

References

- Adriaanse, M. A., de Ridder, D. T. D., & Evers, C. (2011). Emotional eating: Eating when emotional or emotional about eating? *Psychology & Health, 26*, 23-39. doi: 10.1080/08870440903207627
- Blechert, J., Goltsche, J. E., Herbert, B. M., & Wilhelm, F. H. (2014). Eat your troubles away: electrocortical and experiential correlates of food image processing are related to emotional eating style and emotional state. *Biological Psychology, 96*, 94-101. doi: 10.1016/j.biopsycho.2013.12.007
- Booth, D. A. (1994). *Psychology of nutrition*. London: Taylor & Francis.
- Braden, A., Rhee, K., Peterson, C. B., Rydell, S. A., Zucker, N., & Boutelle, K. (2014). Associations between child emotional eating and general parenting style, feeding practices, and parent psychopathology. *Appetite, 80*, 35-40. doi: 10.1016/j.appet.2014.04.017
- Davis, C., Strachan, S., & Berkson, M. (2004). Sensitivity to reward: implications for overeating and overweight. *Appetite, 42*, 131-138. doi: 10.1016/j.appet.2003.07.004
- De Cock, N., Van Lippevelde, W., Goossens, L., De Clercq, B., Vangeel, J., Lachat, C., . . . Van Camp, J. (2016). Sensitivity to reward and adolescents' unhealthy snacking and drinking behavior: the role of hedonic eating styles and availability. *International Journal of Behavioral Nutrition and Physical Activity, 13*. doi: 10.1186/s12966-016-0341-6
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*, 241-273. doi: 10.1207/s15327965pli0904_1
- Evers, C., Stok, F. M., & de Ridder, D. T. D. (2010). Feeding Your Feelings: Emotion Regulation Strategies and Emotional Eating.

- Personality and Social Psychology Bulletin*, 36, 792-804. doi: 10.1177/0146167210371383
- Gotlib, I. H., Krasnoperova, E., Yue, D. N., & Joormann, J. (2004). Attentional Biases for Negative Interpersonal Stimuli in Clinical Depression. *Journal of Abnormal Psychology*, 113, 127-135. doi: 10.1037/0021-843x.113.1.121
- Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development*, 67, 2339-2357. doi: 10.1111/j.1467-8624.1996.tb01861.x
- Klimes-Dougan, B., Brand, A. E., Zahn-Waxler, C., Usher, B., Hastings, P. D., Kendziora, K., & Garside, R. B. (2007). Parental Emotion Socialization in Adolescence: Differences in Sex, Age and Problem Status. *Social Development*, 16, 326-342. doi: 10.1111/j.1467-9507.2007.00387.x
- Knatz, S., Braden, A., & Boutelle, K. N. (2015). Parent Coaching Model for Adolescents With Emotional Eating. *Eating Disorders*, 23, 377-386. doi: 10.1080/10640266.2015.1044352
- Masten, C. L., Eisenberger, N. I., Borofsky, L. A., Pfeifer, J. H., McNealy, K., Mazziotta, J. C., & Dapretto, M. (2009). Neural correlates of social exclusion during adolescence: understanding the distress of peer rejection. *Social Cognitive and Affective Neuroscience*, 4, 143-157. doi: 10.1093/scan/nsp007
- Meehl, P. E. (1975). Hedonic capacity – some conjectures. *Bulletin of the Menninger Clinic*, 39, 295-307.
- Olsen, C. M. (2011). Natural rewards, neuroplasticity, and non-drug addictions. *Neuropharmacology*, 61, 1109-1122. doi: 10.1016/j.neuropharm.2011.03.010

-
- Ouwens, M. A., van Strien, T., & van Leeuwe, J. F. J. (2009). Possible pathways between depression, emotional and external eating. A structural equation model. *Appetite*, *53*, 245-248. doi: <http://dx.doi.org/10.1016/j.appet.2009.06.001>
- Pitchers, K. K., Balfour, M. E., Lehman, M. N., Richtand, N. M., Yu, L., & Coolen, L. M. (2010). Neuroplasticity in the Mesolimbic System Induced by Natural Reward and Subsequent Reward Abstinence. *Biological Psychiatry*, *67*, 872-879. doi: [10.1016/j.biopsych.2009.09.036](https://doi.org/10.1016/j.biopsych.2009.09.036)
- Rhee, K. E., Pan, T. Y., Norman, G. J., Crow, S., & Boutelle, K. (2013). Relationship between maternal parenting and eating self-efficacy in overweight children when stressed. *Eating and Weight Disorders-Studies on Anorexia Bulimia and Obesity*, *18*, 283-288. doi: [10.1007/s40519-013-0043-x](https://doi.org/10.1007/s40519-013-0043-x)
- Robinson, A. L., Dolhanty, J., & Greenberg, L. (2015). Emotion-Focused Family Therapy for Eating Disorders in Children and Adolescents. *Clinical Psychology & Psychotherapy*, *22*, 75-82. doi: [10.1002/cpp.1861](https://doi.org/10.1002/cpp.1861)
- Rohner, R. P. (1975). *They love me, they love me not: A worldwide study of the effects of parental acceptance and rejection*. New Haven, CT: Human Relations Area Files.
- Rohner, R. P. (1980). Worldwide tests of parental acceptance-rejection theory – An overview. *Behavior Science Research*, *15*, 1-21.
- Rohner, R. P. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory*. Newbury Park, CA: Sage.
- Rohner, R. P. (2004). The parental "acceptance-rejection syndrome": Universal correlates of perceived rejection. *American Psychologist*, *59*, 830-840. doi: [10.1037/0003-066x.59.8.830](https://doi.org/10.1037/0003-066x.59.8.830)

- Schuetzmann, M., Richter-Appelt, H., Schulte-Markwort, M., & Schimmelfmann, B. G. (2008). Associations among the perceived parent-child relationship, eating behavior, and body weight in preadolescents: Results from a community-based sample. *Journal of Pediatric Psychology, 33*, 772-782. doi: 10.1093/jpepsy/jsn002
- Singh, M. (2014). Mood, food, and obesity. *Frontiers in Psychology, 5*, 925. doi: 10.3389/fpsyg.2014.00925
- Spoor, S. T. P., Bekker, M. H., Van Strien, T., & van Heck, G. L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite, 48*, 368-376. doi: 10.1016/j.appet.2006.10.005
- Telch, C. F. (1997). Skills training treatment for adaptive affect regulation in a woman with binge-eating disorder. *International Journal of Eating Disorders, 22*, 77-81. doi: 10.1002/(sici)1098-108x(199707)22:1<77::aid-eat10>3.0.co;2-f
- van Strien, T., Snoek, H. M., van der Zwaluw, C. S., & Engels, R. C. M. E. (2010). Parental control and the dopamine D2 receptor gene (DRD2) interaction on emotional eating in adolescence. *Appetite, 54*, 255-261. doi: 10.1016/j.appet.2009.11.006
- Van Vlierberghe, L., Braet, C., Goossens, L., & Mels, S. (2009). Psychiatric disorders and symptom severity in referred versus non-referred overweight children and adolescents. *European Child & Adolescent Psychiatry, 18*, 164-173. doi: 10.1007/s00787-008-0717-5
- Zeman, J., Cassano, M., Perry-Parrish, C., & Stegall, S. (2006). Emotion regulation in children and adolescents. *Journal of Developmental and Behavioral Pediatrics, 27*, 155-168. doi: 10.1097/00004703-200604000-00014

Nederlandstalige samenvatting

Emotioneel eten bij jongeren: De rol van verwerping en emotieregulatie

Hoofdstuk 1: Algemene Inleiding

Emotionaal eten wordt gedefinieerd als ‘de tendens om te overeten bij het ervaren van negatieve emoties zoals angst en irriteerbaarheid’ (van Strien et al., 2007, p. 106). Niet iedereen vertoont emotioneel eetgedrag. Macht (2008) concludeerde in zijn literatuurstudie dat in vragenlijstonderzoek gemiddeld 30% van de participanten aangeeft meer zin in eten te hebben of meer te eten ten gevolge van emotionele stress. Ook kinderen en jongeren kunnen reeds emotioneel eetgedrag vertonen (Blissett, Haycraft, & Farrow, 2010; Carper, Fisher, & Birch, 2000; Nguyen-Michel, Unger, & Spruijt-Metz, 2007). In een studie van Shapiro et al. (2007) gaf 63% van een groep van 55 kinderen (5-13 jaar) aan ooit gegeten te hebben omdat ze zich slecht voelden, verdrietig waren, zich verveelden of omwille van andere gevoelens. Daarentegen geeft ander onderzoek aan dat de prevalentie van emotioneel eten bij kinderen eerder laag is, maar wel stijgt tijdens de adolescentie (Carper et al., 2000; van Strien & Oosterveld, 2008; Wardle, Guthrie, Sanderson, & Rapoport, 2001).

Emotioneel eten wordt gekenmerkt door het eten van ‘comfort voedsel’ zonder afstemming op honger- of verzadigingsgevoelens. Comfort voedsel is appetijtelijk voedsel, rijk in vet en/of suiker, zoals desserts en fast food (Gibson, 2012). Hierdoor kan emotioneel eten een ongezonde levensstijl bevorderen alsook leiden tot gewichtstoename op

lange termijn. Daarnaast toont longitudinaal onderzoek van Stice, Presnell, en Spangler (2002) aan dat emotioneel eten een belangrijke predictor is van eetbuien bij adolescente meisjes. De aanvang van deze eetbuien situeert zich vaak in de adolescentie, wat doet vermoeden dat de adolescentie een kritische periode is in het ontwikkelen van een eetbuistoornis (Spurrell, Wilfley, Tanofsky, & Brownell, 1997).

Er zijn verschillende theorieën over het ontstaan van emotioneel eten. Deze theorieën kunnen als complementair beschouwd worden; elke theorie benadrukt het belang van een specifieke risicofactor. Oorspronkelijk spitsten deze theorieën zich enkel toe op het verklaren van emotioneel eten bij obese individuen (Bruch, 1973; Kaplan & Kaplan, 1957). Tegenwoordig is er ook aandacht voor het verklaren van emotioneel eten binnen de algemene populatie (e.g. Canetti, Bachar, & Berry, 2002; Evers, Stok, & de Ridder, 2010). Deze laatste theorieën kunnen onder de noemer van ‘affect regulatie theorieën’ geplaatst worden. Affect of emotie regulatie (ER) wordt gedefinieerd als ‘de pogingen van het individu om invloed uit te oefenen op welke emoties ze voelen, wanneer ze deze voelen en hoe de emoties worden ervaren en uitgedrukt’ (Gross, 1999). Een onderscheid kan gemaakt worden tussen adaptieve of functionele ER strategieën, die de emotionele balans herstellen, en maladaptieve of disfunctionele ER strategieën, die op lange of korte termijn gelinkt zijn aan psychopathologische symptomen (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Volgens Telch (1997) is het gebruik van maladaptieve ER strategieën gerelateerd aan een tekort of afwezigheid van adaptieve ER strategieën. Affect regulatie modellen stellen dat verstoord eetgedrag zoals eetbuien en emotioneel eten aangeleerde maladaptieve ER strategieën zijn, die leiden tot een tijdelijke afname in negatief affect. Onderzoek bij volwassenen heeft aangetoond dat ER moeilijkheden gerelateerd zijn aan emotioneel eten (e.g. Evers et al., 2010; Spoor,

Bekker, van Strien, & van Heck, 2007; Taube-Schiff et al., 2015). Evers et al. (2010) toonden in hun experimentele studie aan dat het ad random manipuleren van ER strategieën bij vrouwen (adaptief versus maladaptief) na het induceren van negatief affect, een significant effect had op de hoeveelheid comfort voedsel die de vrouwen nadien aten. Dit impliceert dat het gebruik van ‘primaire’ maladaptieve ER strategieën, zoals bijvoorbeeld het onderdrukken van gevoelens, daaropvolgend kan leiden tot het gebruik van ‘secundaire’ maladaptieve ER strategieën, in dit geval emotioneel eten, wat dan weer een tijdelijke verbetering van de gemoedstoestand oplevert. Deze assumptie wordt tevens ondersteund door het onderzoek van Spoor et al. (2007), die aantoonde dat het gebruik van ‘primaire’ maladaptieve ER strategieën gerelateerd was aan emotioneel eten bij vrouwen, terwijl er werd gecontroleerd voor hun negatief affect. Daarentegen heeft ander onderzoek aangetoond dat negatief affect emotioneel eten ook rechtstreeks kan uitlokken als ER strategie, zonder het gebruik van andere ER strategieën vooraf (e.g. van Strien, Engels, Van Leeuwe, & Snoek, 2005; van Strien, van der Zwaluw, & Engels, 2010). Dit impliceert mogelijks dat emotioneel eten na verloop van tijd kan evolueren naar een ingebakken, automatische strategie om met negatief affect om te gaan.

Wat kinderen en jongeren betreft, is onderzoek over deze associatie tussen ER en emotioneel eten beperkt. Eén studie van Harrist, Hubbs-Tait, Topham, Shriver, en Page (2013) toonde aan dat het gebruik van maladaptieve ER strategieën gerelateerd was aan emotioneel eten bij kinderen tussen 7 en 9 jaar. Ondanks deze beperkte evidentie heeft onderzoek aangetoond dat problemen in ER reeds in de vroege kindertijd ontstaan (e.g. Baker & Hoerger, 2012; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Rohner, 2004). Volgens de Interpersonal Acceptance-Rejection Theory (IPARTheory; Rohner, 1975; Rohner, 1980, 1986),

vertonen alle kinderen een emotionele nood aan troost, ondersteuning en zorg van primaire zorgfiguren. Indien er niet wordt voldaan aan deze nood, door een gebrek aan ouderlijke warmte of de aanwezigheid van ouderlijke verwerping (e.g. afkeer of onverschilligheid tegenover het kind), is het kind in sterke mate vatbaar voor het ontwikkelen van emotionele instabiliteit. Deze emotionele instabiliteit kan begrepen worden in termen van ER. Volgens Barrett en Campos (1987) leren jonge kinderen ER vaardigheden in de interactie met zorgfiguren. Eisenberg, Cumberland en Spinrad (1998) stellen dat helpende en sensitieve reacties van zorgfiguren, zoals het erkennen en benoemen van de emoties van het kind, het internaliseren van deze effectieve ER strategieën bespoedigt. Bij een tekort aan helpende reacties, zal dit internalisatieproces, ook wel emotioneel socialisatieproces genoemd, daarentegen verstoord worden, wat kan leiden tot een verstoring in ER of een tekort aan adaptieve ER strategieën. Dit kan het kind ertoe aanzetten om maladaptieve ER strategieën te gebruiken. Daarnaast stelt Eisenberg et al. (1998) dat afwijzende reacties op de emoties van het kind, zoals kritiek of verwerping, het leed van het kind vergroten en het kind aanzetten om zijn/haar emoties te onderdrukken. Dit impliceert mogelijks dat ouderlijke verwerping niet enkel een algemeen effect heeft op de ER van kinderen via het emotionele socialisatieproces, maar ook als momentane trigger kan functioneren; ouderlijke verwerping lokt tijdelijk emotioneel leed uit bij het kind, wat vervolgens tot het gebruik van maladaptieve ER strategieën kan leiden, zoals het onderdrukken van emoties, om om te gaan met dit leed. De relatie tussen ouderlijke verwerping en het gebruik van maladaptieve ER strategieën werd reeds cross-sectioneel en longitudinaal aangetoond bij adolescenten (e.g. Meesters & Muris, 2004; Saritas, Grusec, & Gencoz, 2013; Wagner, Cohen, & Brook, 1996).

Interventies binnen de behandeling van emotioneel eten zijn vaak gebaseerd op de affect regulatie modellen en focussen dan ook op het ondersteunen van de ER (e.g. Roosen, Safer, Adler, Cebolla, & van Strien, 2012). Alhoewel onderzoek bij volwassenen de effectiviteit van verschillende therapeutische technieken in de behandeling van emotioneel eten kon aantonen, is onderzoek bij kinderen en jongeren zo goed als onbestaande. Enkele studies onderzochten wel het effect van multidisciplinaire programma's gericht op het aanleren van een gezonde levensstijl bij obese kinderen en jongeren. Deze programma's omvatten allen cognitieve gedragstherapeutische technieken (psycho-educatie, aanleren alternatieve ER strategieën, etc.) om emotioneel eten te behandelen. Braet en collega's vonden in twee studies dat het emotioneel eten van de patiënten (10-17 jaar) niet was veranderd na de 10 maanden behandeling (Braet, Tanghe, De Bode, Franckx, & Van Winckel, 2003; Braet, Tanghe, Decaluwe, Moens, & Rosseel, 2004). Daarnaast vond Halberstadt et al. (2015) dat enkel de jongens, en niet de meisjes (8-19 jaar), een daling in emotioneel eten vertoonden na een behandeling van 1 jaar. Waarom deze behandelingsprogramma's weinig effect blijken te hebben op de emotionele eetstijl van de jongeren is tot nog toe onbekend. Gezien onderzoek aangeeft dat kinderen ER strategieën leren in interactie met primaire zorgfiguren, kan er gesteld worden dat ouders een cruciale rol kunnen spelen in de behandeling van emotioneel eten. Recent stelden Knatz, Braden, en Boutelle (2015) een interventie voor specifiek gericht op ouders, waarbij zij op een correcte manier leren omgaan met de emotionele disregulatie van het kind en op die manier de 'emotionele coach' van het kind kunnen worden. Deze 'emotion-focused family therapy' (EFFT) blijkt effectief te zijn in de behandeling van eetstoornissen bij kinderen en jongeren, maar werd nog niet getest in de

behandeling van emotioneel eten (e.g. Robinson, Dolhanty, & Greenberg, 2015).

Om te besluiten kan dus gesteld worden dat preventie en interventie van emotioneel eten essentieel is in de vroege adolescentie, gezien de adolescentie een kritische periode vormt in de ontwikkeling van zowel obesitas als eetbuien (Levitan & Davis, 2010; Stice, Killen, Hayward, & Taylor, 1998). Daarom focust dit proefschrift zich op de risicofactoren in de ontwikkeling en instandhouding van emotioneel eten bij jongeren uit de normale populatie alsook bij obese jongeren aangemeld voor behandeling. Gebaseerd op de affect regulatie modellen wordt de focus gelegd op de invloed van ER. Gezien onderzoek aangeeft dat ouderlijke verwerping gerelateerd is aan ER, wordt eveneens de relatie tussen ouderlijke verwerping en emotioneel eten nagegaan. Dit proefschrift heeft drie algemene onderzoeksvragen.

Ten eerste gaat dit proefschrift na of ouderlijke verwerping een risicofactor vormt in de ontwikkeling en instandhouding van emotioneel eten bij jongeren uit de normale populatie, alsook bij obese jongeren aangemeld voor behandeling. Door gebruik te maken van verschillende onderzoekdesigns wordt er rekening gehouden met de verschillende manieren waarop ouderlijke verwerping een invloed kan hebben op emotioneel eten; als momentane trigger van emotioneel leed of als algemeen klimaat dat het emotionele socialisatieproces verstoort. Gezien vorig onderzoek het onderscheid tussen verwerping van moeder en vader niet maakte, wordt in dit proefschrift zowel verwerping van moeder als vader als aparte variabelen opgenomen, om zo meer inzicht in de unieke rol van beide ouders te krijgen. Aansluitend wordt ten tweede onderzocht of ER een mediator is in de relatie tussen ouderlijke verwerping en emotioneel eten. Als laatste wordt onderzocht of ouderlijke verwerping ook emotioneel eten na een behandeling kan verklaren.

Hoofdstuk 2: Begrijpen van Emotioneel Eten bij Obese Jongeren: de Rol van Ouderlijke Verwerping en Emotieregulatie

In deze vragenlijststudie werd de relatie onderzocht tussen ouderlijke verwerping (moeder en vader), ER en emotioneel eten bij een klinische groep van obese jongeren. Er werd vooropgesteld dat de relatie tussen de verwerping van moeder en vader en het emotioneel eten van de jongeren via de ER van de jongere zou lopen (mediatie). Daarbij werd de mediërende rol van zowel adaptieve als maladaptieve ER onderzocht.

Participanten waren 110 obese jongeren (42.7% jongens en 57.3% meisjes) met een leeftijd tussen 10 en 16 jaar ($M = 13.59$, $SD = 1.64$). Alle jongeren waren aangemeld in een Belgisch behandelingscentrum voor obesitas. De gemiddelde adjusted Body Mass Index (BMI) was 186.85% ($SD = 27.50$) met een range van 132-290% ($> 120 =$ overgewicht, $> 140 =$ obesitas).

Mediatie analyse toonde aan dat maladaptieve ER de relatie tussen verwerping van moeder en het emotioneel eten van de jongere medieerde. Adaptieve ER bleek geen mediator te zijn in deze relatie. Daarnaast toonden resultaten aan dat verwerping van vader niet gerelateerd was aan de ER noch aan het emotioneel eten van de jongere.

De resultaten van deze studie impliceren dat enkel de verwerping van de moeder gerelateerd is aan de ER en het emotioneel eten van de jongere. Mogelijks kan er gesteld worden dat moeders een grotere impact hebben op het emotionele socialisatieproces dan vaders (Kliewer, Fearnow, & Miller, 1996). Daarnaast toont deze studie aan dat het inzetten van emotioneel eten als ER strategie niet noodzakelijk gelinkt is aan een gebrek aan adaptieve ER strategieën, maar wel aan het toepassen van maladaptieve ER strategieën.

Hoofdstuk 3: Kan Emotioneel Eten gelinkt worden aan de Emotieregulatie Vaardigheden van Adolescenten?

Verder bouwend op de cross-sectionele vragenlijststudie bij een klinische groep van obese jongeren (hoofdstuk 2), werd in deze longitudinale vragenlijststudie de relatie tussen ouderlijke verwerping (moeder en vader), maladaptieve ER en emotioneel eten onderzocht bij jongeren uit de normale populatie. Er werd vooropgesteld dat, cross-sectioneel gezien, maladaptieve ER de relatie zou mediëren tussen verwerping van de moeder en het emotioneel eten van de jongere. Gebaseerd op de resultaten van de vragenlijststudie bij de klinische groep, werd aangenomen dat verwerping van de vader niet gerelateerd zou zijn aan de maladaptieve ER of emotioneel eten van de jongere. Longitudinaal bekeken werd gesteld dat de verandering in maladaptieve ER de relatie tussen de verandering in verwerping van de moeder en de verandering in emotioneel eten van de jongere zou mediëren. Opnieuw werd aangenomen dat de verandering in de verwerping van de vader niet gerelateerd zou zijn aan de verandering in de andere variabelen.

Participanten waren 81 jongeren (44.4% jongens en 55.6% meisjes) met een leeftijd tussen 10 en 16 jaar ($M = 12.86$, $SD = 1.65$). Het gemiddelde adjusted BMI was 101.98% ($SD = 16.09$) met een range van 71-155% ($< 85 =$ ondergewicht, $> 120 =$ overgewicht, $> 140 =$ obesitas). De vragenlijsten werden tweemaal afgenomen, met gemiddeld 71 dagen tussen beide meetmomenten.

De cross-sectionele resultaten toonden aan dat het indirecte effect van de verwerping van de moeder op het emotioneel eten van de jongere, via de maladaptieve ER marginaal significant was. Verwerping van de vader was niet gerelateerd aan de maladaptieve ER en emotioneel eten van de jongere. De longitudinale resultaten toonden aan dat de verandering in de variabelen niet aan elkaar gerelateerd waren.

De cross-sectionele resultaten van deze studie tonen aan dat, net zoals bij een klinische groep van obese jongeren, ook bij jongeren uit de normale populatie verwerping van de moeder samenhangt met het emotioneel eten van de jongere, via de maladaptieve ER van de jongere. Ook bij deze groep bleek de verwerping van vader geen invloed te hebben op de maladaptieve ER en emotioneel eten van de jongere. De longitudinale resultaten in deze studie bleken niet significant. Dit ligt mogelijks aan het feit dat de verwerping van de moeder niet significant veranderd was tussen beide meetmomenten.

Hoofdstuk 4: Het effect van Ouderlijke Verwerping op Emotioneel Eetgedrag bij Jongeren: een Labostudie

Recent rapporteerden Bongers, Jansen, Houben en Roefs (2013) dat mensen in het algemeen vrij slecht zijn in het herinneren van hun emoties, hun eetgedrag en de associatie tussen beide. Adriaanse, de Ridder, en Evers (2011) vergeleken in hun studie zelf-gerapporteerd emotioneel eten met het werkelijke snack gedrag voorafgegaan door negatieve emoties van vrouwen. De auteurs concludeerden dat de zelf-rapportage niet overeenstemde met het feitelijke emotioneel eetgedrag, maar eerder de persoons overtuiging reflecteerde over hun eetgedrag, emoties, en de associatie daartussen. Rekening houdende met deze bevindingen kunnen we stellen dat er in het onderzoek naar de relatie tussen ouderlijke verwerping en emotioneel eten bij jongeren naast zelfrapportage ook aandacht besteed moet worden aan een gedragsmaat voor emotioneel eten.

Om deze relatie te onderzoeken werd gebruikt gemaakt van een experimenteel design, waarbij participanten ad random werden toegewezen aan een neutrale mood conditie of negatieve mood conditie en vervolgens een multi-item buffet (zoute en zoete snacks) werden voorgeschoteld. In beide condities werden er videofragmenten getoond om de gewenste gemoedstoestand (neutraal versus negatief) te induceren en

werd voor en na de inductie het gemoed bevraagd. Participanten vulden thuis vooraf een vragenlijst in over ouderlijke verwerping (moeder en vader). Gebaseerd op de voorgaande vragenlijststudies (hoofdstuk 2 & 3) werd vooropgesteld dat er een significant interactie effect verwerping van moeder x conditie zou zijn op de energie-inname. Meer specifiek, verwachtten we een significant positieve relatie tussen de verwerping van moeder en de energie-inname van de jongere in de negatieve mood conditie, maar niet in de neutrale mood conditie. Er werd geen dergelijk interactie effect verwacht voor de verwerping van vader.

De participanten waren 46 jongeren (43.5% jongens en 56.5% meisjes) tussen 10 en 17 jaar ($M = 13.17$, $SD = 1.81$). Het adjusted BMI varieerde tussen 81.14% en 151.17%, met een gemiddelde van 105.24% ($SD = 16.23$) ($< 85 =$ ondergewicht, $> 120 =$ overgewicht, $> 140 =$ obesitas).

De resultaten van de manipulatiecheck bevestigden dat de participanten in de negatieve mood conditie een sterkere daling in positief affect ervaarden bij het zien van het videofragment dan de participanten in de neutrale mood conditie. Daarnaast toonden de resultaten aan dat er geen significant verschil in energie-inname (zout en zoete snacks) was tussen de neutrale en negatieve mood conditie. Verder toonden resultaten een significant interactie effect aan tussen verwerping van moeder en conditie op de energie-inname van zoute snacks. Concreet werd een positieve relatie gevonden tussen verwerping van de moeder en de energie-inname van zoute snacks in de negatieve mood conditie, maar niet in de neutrale mood conditie. Deze interactie werd niet teruggevonden voor de verwerping van de vader.

Deze resultaten duiden erop dat niet alle jongeren emotioneel eten, maar dat dit afhankelijk is van de verwerping van de moeder; het ervaren

van meer verwerping van de moeder leidt tot meer eten bij het ervaren van negatieve gevoelens.

Hoofdstuk 5: De Dagelijkse Relatie tussen Ouderlijke Verwerping, Verwerping van Leeftijdsgenoten en Emotioneel Eten bij Jongeren: een Dagboekstudie

De resultaten van de longitudinale vragenlijststudie (hoofdstuk 3) toonden aan dat er geen significante relaties waren tussen de veranderingen in ouderlijke verwerping (moeder en vader) en de verandering in emotioneel eten van de jongere. Dit kan mogelijks verklaard worden door de stabiliteit van de ouderlijke verwerping tussen beide meetmomenten ($M = 71$ dagen). Ondanks dat deze longitudinale studie aantoonde dat ouderlijke verwerping stabiel is over een langere periode, kunnen we er vanuit gaan dat dagelijkse fluctuaties in ouderlijke verwerping wel voorkomen, en mogelijks gerelateerd zijn aan dagelijkse fluctuaties in emotioneel eetgedrag van de jongere. Daarnaast vormt verwerping van leeftijdsgenoten mogelijks ook een belangrijke antecedent van emotioneel eten bij jongeren. Onderzoek bij adolescenten heeft significante relaties gevonden tussen verwerping van leeftijdsgenoten en verstoord eetgedrag, zoals eetbuien (e.g., Gardner, Stark, Friedman, & Jackson; Schutz & Paxton, 2007). Om verder inzicht te krijgen in de relatie tussen ouderlijke verwerping en emotioneel eten bij jongeren werd in deze dagboekstudie de relatie onderzocht tussen dagelijkse fluctuaties in ouderlijke verwerping en dagelijkse fluctuaties in emotioneel eten. Daarnaast werd ook de rol van verwerping van leeftijdsgenoten onderzocht, door de relatie na te gaan tussen dagelijkse fluctuaties in verwerping van leeftijdsgenoten en dagelijkse fluctuaties in emotioneel eten.

De participanten waren 55 jongeren (49.1% jongens en 50.9% meisjes) met een gemiddelde leeftijd van 12.36 ($SD = 0.87$, range 11-15

jaar). Het adjusted BMI varieerde tussen 76.66% en 153.28%, met een gemiddelde van 102.86% ($SD = 18.42$) ($< 85 =$ ondergewicht, $> 120 =$ overgewicht, $> 140 =$ obesitas). De participanten vulden gedurende 7 opeenvolgende dagen een online dagboek in op het einde van de dag, over de voorbije dag. Daarbij werden iedere dag dezelfde vragen gesteld om de ervaren ouderlijke verwerping, verwerping van leeftijdsgenoten en emotioneel eten van die dag te meten.

Aan de hand van multilevel analyses werd vastgesteld dat er binnen de participant voldoende variatie in de studiev variabelen aanwezig was over de verschillende dagen heen. Dit betekent dat de relatie tussen dagelijkse fluctuaties in de studiev variabelen onderzocht kon worden. Resultaten toonden een significante positieve relatie aan tussen de dagelijkse fluctuaties in ouderlijke verwerping en dagelijkse fluctuaties in emotioneel eten. De relatie tussen dagelijkse fluctuatie in verwerping van leeftijdsgenoten en dagelijkse fluctuatie in emotioneel eten was slechts marginaal significant.

De resultaten tonen dus aan dat het ervaren van ouderlijke verwerping emotioneel eten bij de jongere op korte termijn kan uitlokken.

Hoofdstuk 6: Ouderlijke Verwerping als Predictor van Emotioneel Eten na een Residentiele Behandeling voor Gewichtsverlies bij Jongeren

Onderzoek bij volwassenen en jongeren heeft aangetoond dat de emotionele eetstijl van patiënten positief gerelateerd is aan de gewichtstoename die zij ondervinden na het volgen van een behandeling voor gewichtsverlies (Canetti, Berry, & Elizur, 2009; Blair, Lewis, & Booth, 1990; Halberstadt et al., 2015). Daarnaast heeft onderzoek aangetoond dat de emotionele eetstijl van jongeren niet veranderd was na een multidisciplinaire behandeling voor gewichtsverlies, niettegenstaande dat de behandeling van emotioneel eten eveneens in dit

behandelingsprogramma was opgenomen. Gezien de stabiliteit van emotioneel eten tijdens de behandeling en de invloed van emotioneel eten op het gewicht na de behandeling, wil deze studie zicht bieden op de determinanten van emotioneel eten bij jongeren na een behandeling voor gewichtsverlies. Daarom werden de obese jongeren die voor de start van de behandeling (pretest) deelnamen aan de cross-sectionele vragenlijststudie (hoofdstuk 2) gevraagd deel te nemen aan een follow-up studie. Gebaseerd op de resultaten van de cross-sectionele vragenlijststudie (hoofdstuk 2) werd vooropgesteld dat, bij de follow-up (gemiddeld 4 maanden na de behandeling), verwerping van moeder gerelateerd zou zijn aan het emotioneel eten van de jongere, via de mediator maladaptieve ER. Er werd verwacht dat verwerping van vader niet gerelateerd zou zijn aan de maladaptieve ER of emotioneel eten van de jongere. Daarnaast werd er vanuit gegaan dat ouderlijke verwerping (moeder en vader), maladaptieve ER en emotioneel eten niet veranderd zouden zijn tussen de pretest en de follow-up. Als laatste werd vooropgesteld dat de gewichtstoename na de behandeling (posttest – follow-up) gelinkt zou zijn met het emotioneel eten op het moment van follow-up.

Op het moment van follow-up waren de participanten 52 jongeren (28.8% jongens en 71.2% meisjes), met een gemiddelde leeftijd van 14.85 jaar ($SD = 1.70$, range 11-17 jaar). Alle jongeren voltooiden een één-jaar durend residentieel multidisciplinair behandelingsprogramma voor gewichtsverlies. Dit programma bevatte cognitief gedragstherapeutische technieken (zoals zelf-observatie, zelf-instructie, zelf-evaluatie en zelf-beloning) om emotioneel eten aan te pakken.

Op het moment van follow-up was het gemiddelde adjusted BMI 136.37% ($SD = 19.65$) ($> 120 =$ overgewicht, $> 140 =$ obesitas). In vergelijking met de posttest, was het adjusted BMI van de jongeren

gemiddeld 11.03% gestegen. Repeated-measures ANOVA toonde geen verschillen aan in de studievariabelen tussen pretest en follow-up, met uitzondering van het adjusted BMI, dat significant gedaald was. Mediatie-analyse toonde aan dat, op het moment van follow-up, de relatie tussen verwerping van moeder en het emotioneel eten van de jongere gedeeltelijk gemedieerd werd door maladaptieve ER. Wat verwerping van vader betreft werd er geen indirect effect op het emotioneel eten van de jongere gevonden via maladaptieve ER, maar wel een significant direct effect. Als laatste bleek de gewichtstoename tussen posttest en follow-up niet gerelateerd aan het emotioneel eten van de jongere op het moment van follow-up.

De resultaten impliceren dat jongeren na de behandeling thuiskomen in een gezinsklimaat dat niet veranderd is in termen van ouderlijke verwerping. Daarnaast wijzen deze resultaten erop dat de jongeren niet veranderd zijn in de manier waarop ze in hun thuisomgeving omgaan met negatieve emoties. Het zou erop kunnen wijzen dat de jongeren moeite hebben om de aangeleerde technieken in de thuiscontext te gebruiken, mogelijks omdat het gezinsklimaat onveranderd is gebleven. Daarnaast blijkt uit de resultaten dat ouderlijke verwerping emotioneel eten ook rechtstreeks kan uitlokken als ER strategie, zonder het voorgaande gebruik van andere maladaptieve ER strategieën.

Hoofdstuk 7: Algemene Discussie

In hoofdstuk 7 werd een overzicht en integratie weergegeven van de belangrijkste onderzoeksresultaten over de verschillende studies heen en de daaraan gekoppelde klinische implicaties. Daarnaast werd ingegaan op de methodologische sterktes van het proefschrift, alsook de beperkingen en de daarbij horende aanbevelingen voor toekomstig onderzoek. Hieronder gaan we voornamelijk in op de integratie van de onderzoeksresultaten en de klinische implicaties. We bespreken de

resultaten van de verschillende studies in termen van de drie algemene onderzoeksvragen.

Het eerste doel van dit proefschrift was het onderzoeken van ouderlijke verwerping (moeder en vader) als risicofactor in de ontwikkeling en instandhouding van emotioneel eten bij jongeren. De verschillende studies in dit proefschrift bieden evidentie dat ouderlijke verwerping, vooral verwerping van moeder, invloed heeft op het emotioneel eten van jongeren. Daarbij vonden we evidentie voor twee manieren waarop ouderlijke verwerping een invloed kan uitoefenen. Ten eerste kan ouderlijke verwerping gezien worden als stabiele factor, een factor die de kwaliteit van de affectieve relatie tussen ouder en kind weergeeft en die het emotionele socialisatieproces reeds vanaf de vroege kindertijd kan verstoren, wat kan leiden tot een algemeen deficit in ER bij de jongere. Dit kan ertoe leiden dat de jongere maladaptieve ER strategieën gebruikt wanneer hij of zij negatieve emoties ervaart (zie hoofdstuk 4). De resultaten van de verschillende studies suggereren dat vooral verwerping van moeder een invloed heeft op emotioneel eten via het emotionele socialisatieproces. Ten tweede kan het ouderlijke verwerpend gedrag gezien worden als momentane trigger van emotioneel leed, dat op zijn beurt het gebruik van maladaptieve ER strategieën kan uitlokken om met deze negatieve gevoelens om te gaan (zie hoofdstuk 5). De resultaten van de verschillende studies suggereren dat verwerping van moeder een trigger kunnen vormen. In één studie (hoofdstuk 6) werd ook evidentie gevonden voor verwerping van vader als trigger.

Ten tweede werd er nagegaan of ER een mediator is in de relatie tussen ouderlijke verwerping en emotioneel eten bij jongeren. De resultaten tonen aan dat maladaptieve ER een mediator is in de relatie tussen verwerping van moeder en het emotioneel eten van de jongere. Daarbij blijkt de mediatie niets altijd volledig te zijn, maar partieel,

waarbij er ook sprake is van een direct effect van de verwerping van moeder op het emotioneel eten. Daarnaast tonen de resultaten aan dat maladaptieve ER geen mediator is in de relatie tussen verwerping van vader en het emotioneel eten van de jongere. De resultaten suggereren dat verwerping van moeder als momentane trigger van emotioneel leed mogelijks op twee manieren een effect kan hebben op het emotioneel eten van de jongere. Ten eerste kan de verwerping leiden tot het gebruik van maladaptieve ER strategieën die het emotionele leed niet voldoende kunnen wegnemen, waardoor de jongere overgaat naar het gebruik van ‘secundaire strategieën’. In dit geval is dat emotioneel eten, dat leidt tot een tijdelijke verbetering van het gemoed. Ten tweede kan de verwerping ook rechtstreeks emotioneel eten uitlokken als ER strategie, zonder het gebruik van andere maladaptieve ER strategieën vooraf. Het zou erop kunnen wijzen dat, op lange termijn, emotioneel eten een gewoonte wordt, een ingebakken strategie om om te gaan met negatieve emoties. Negatieve emoties kunnen mogelijks functioneren als signaal dat automatisch het verlangen naar comfort voedsel opwekt (Blechert, Goltsche, Herbert, & Wilhelm, 2014).

Als laatste werd nagegaan of ouderlijke verwerping (moeder en vader) de stabiliteit in emotioneel eten kan verklaren bij jongeren die een behandeling voor gewichtsverlies hebben gevolgd. De resultaten geven aan dat, na de behandeling, de verwerping van de moeder nog steeds een impact heeft op het emotionele socialisatieproces en dat zowel verwerping van vader als van moeder een momentane trigger vormen dat emotioneel eten kan uitlokken. We pleiten er dan ook voor dat ouders intensiever betrokken worden in de behandeling van emotioneel eten bij jongeren. Recent stelden Knatz et al. (2015) een interventie voor specifiek gericht op ouders, waarbij zij leren omgaan met de emotionele disregulatie van het kind en op die manier de ‘emotionele coach’ van het kind kunnen worden.

Gebaseerd op ons onderzoek kan gesteld worden dat deze interventie mogelijks op twee manieren een positieve invloed kan uitoefenen. Door de ouders te leren omgaan met de emotionele disregulatie van hun kind wordt het emotionele socialisatieproces hersteld en zal het ouderlijke gedrag het emotionele leed van het kind net doen afnemen in plaats van toenemen.

Referenties

- Adriaanse, M. A., de Ridder, D. T. D., & Evers, C. (2011). Emotional eating: Eating when emotional or emotional about eating? *Psychology & Health, 26*, 23-39. doi: 10.1080/08870440903207627
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*, 217-237. doi: 10.1016/j.cpr.2009.11.004
- American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington DC: American Psychiatric Association.
- Baker, C. N., & Hoerger, M. (2012). Parental child-rearing strategies influence self-regulation, socio-emotional adjustment, and psychopathology in early adulthood: Evidence from a retrospective cohort study. *Personality and Individual Differences, 52*, 800-805. doi: 10.1016/j.paid.2011.12.034
- Blair, A. J., Lewis, V. J., & Booth, D. A. (1990). Does emotional eating interfere with success in attempts at weight control? *Appetite, 15*, 151-157. doi: 10.1016/0195-6663(90)90047-c
- Blechert, J., Goltsche, J. E., Herbert, B. M., & Wilhelm, F. H. (2014). Eat your troubles away: electrocortical and experiential correlates of food image processing are related to emotional eating style and emotional state. *Biological Psychology, 96*, 94-101. doi: 10.1016/j.biopsycho.2013.12.007
- Blissett, J., Haycraft, E., & Farrow, C. (2010). Inducing preschool children's emotional eating: relations with parental feeding practices. *American Journal of Clinical Nutrition, 92*, 359-365. doi: 10.3945/ajcn.2010.29375

- Bongers, P., Jansen, A., Houben, K., & Roefs, A. (2013). Happy eating: The Single Target Implicit Association Test predicts overeating after positive emotions. *Eating Behaviors, 14*, 348-355. doi: 10.1016/j.eatbeh.2013.06.007
- Braet, C., Claus, L., Goossens, L., Moens, E., Van Vlierberghe, L., & Soetens, B. (2008). Differences in eating style between overweight and normal-weight youngsters. *Journal of Health Psychology, 13*, 733-743. doi: 10.1177/1359105308093850
- Braet, C., Tanghe, A., De Bode, P., Franckx, H., & Van Winckel, M. (2003). Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. *European Journal of Pediatrics, 162*, 391-396. doi: 10.1007/s00431-003-1155-5
- Braet, C., Tanghe, A., Decaluwe, V., Moens, E., & Rosseel, Y. (2004). Inpatient treatment for children with obesity: Weight loss, psychological well-being, and eating behavior. *Journal of Pediatric Psychology, 29*, 519-529. doi: 10.1093/jpepsy/jsh054
- Bruch, H. (1973). *Eating disorders: obesity, anorexia nervosa and the person within*. New York: Basis Books.
- Canetti, L., Bachar, E., & Berry, E. M. (2002). Food and emotion. *Behavioural Processes, 60*, 157-164. doi: 10.1016/s0376-6357(02)00082-7
- Canetti, L., Berry, E. M., & Elizur, Y. (2009). Psychosocial Predictors of Weight Loss and Psychological Adjustment Following Bariatric Surgery and A Weight-Loss Program: The Mediating Role of Emotional Eating. *International Journal of Eating Disorders, 42*, 109-117. doi: 10.1002/eat.20592
- Carper, J. L., Fisher, J. O., & Birch, L. L. (2000). Young girls' emerging dietary restraint and disinhibition are related to parental control in child feeding. *Appetite, 35*, 121-129. doi: 10.1006/appe.2000.0343

- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, 9, 241-273. doi: 10.1207/s15327965pli0904_1
- Evers, C., Stok, F. M., & de Ridder, D. T. D. (2010). Feeding Your Feelings: Emotion Regulation Strategies and Emotional Eating. *Personality and Social Psychology Bulletin*, 36, 792-804. doi: 10.1177/0146167210371383
- Gardner, R. M., Stark, K., Friedman, B. N., & Jackson, N. A. Predictors of eating disorder scores in children ages 6 through 14. *Journal of Psychosomatic Research*, 49, 199-205. doi: 10.1016/s0022-3999(00)00172-0
- Gibson, E. L. (2012). The psychobiology of comfort eating: implications for neuropharmacological interventions. *Behavioural Pharmacology*, 23, 442-460. doi: 10.1097/FBP.0b013e328357bd4e
- Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition & Emotion*, 13, 551-573. doi: 10.1080/026999399379186
- Halberstadt, J., van Strien, T., de Vet, E., Eekhout, I., Braet, C., & Seidell, J. C. (2015). The association of eating styles with weight change after an intensive combined lifestyle intervention for children and adolescents with severe obesity. *Appetite*, 99, 82-90. doi: 10.1016/j.appet.2015.12.032
- Harrist, A. W., Hubbs-Tait, L., Topham, G. L., Shriver, L. H., & Page, M. C. (2013). Emotion Regulation is Related to Children's Emotional and External Eating. *Journal of Developmental and Behavioral Pediatrics*, 34, 557-565. doi: 10.1097/DBP.0b013e3182a5095f
- Hawkins II, R. C., & Clement, P. F. (1984). Binge eating: Measurement problems and a conceptual model. In R. C. Hawkins, W. J. Fremouw & P. F. Clement (Eds.), *The binge purge syndrome:*

- Diagnosis, treatment, and research* (pp. 229-251). New York: Springer.
- Kaplan, H. I., & Kaplan, H. S. (1957). The psychosomatic concept of obesity. *Journal of Nervous and Mental Disease*, *125*, 181-201.
- Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child Development*, *67*, 2339-2357. doi: 10.1111/j.1467-8624.1996.tb01861.x
- Knatz, S., Braden, A., & Boutelle, K. N. (2015). Parent Coaching Model for Adolescents With Emotional Eating. *Eating Disorders*, *23*, 377-386. doi: 10.1080/10640266.2015.1044352
- Levitan, R. D., & Davis, C. (2010). Emotions and Eating Behaviour: Implications for the Current Obesity Epidemic. *University of Toronto Quarterly*, *79*, 783-799. doi: 10.3138/utq.79.2.783
- Macht, M. (2008). How emotions affect eating: A five-way model. *Appetite*, *50*, 1-11. doi: 10.1016/j.appet.2007.07.002
- Meesters, C., & Muris, P. (2004). Perceived parental rearing behaviours and coping in young adolescents. *Personality and Individual Differences*, *37*, 513-522. doi: 10.1016/j.paid.2003.09.022
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development*, *16*, 361-388. doi: 10.1111/j.1467-9507.2007.00389.x
- Nguyen-Michel, S. T., Unger, J. B., & Spruijt-Metz, D. (2007). Dietary correlates of emotional eating in adolescence. *Appetite*, *49*, 494-499. doi: 10.1016/j.appet.2007.03.005
- Robinson, A. L., Dolhanty, J., & Greenberg, L. (2015). Emotion-Focused Family Therapy for Eating Disorders in Children and Adolescents.

- Clinical Psychology & Psychotherapy*, 22, 75-82. doi: 10.1002/cpp.1861
- Rohner, R. P. (1975). *They love me, they love me not: A worldwide study of the effects of parental acceptance and rejection*. New Haven, CT: Human Relations Area Files.
- Rohner, R. P. (1980). Worldwide tests of parental acceptance-rejection theory – An overview. *Behavior Science Research*, 15, 1-21.
- Rohner, R. P. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory*. Newbury Park, CA: Sage.
- Rohner, R. P. (2004). The parental "acceptance-rejection syndrome": Universal correlates of perceived rejection. *American Psychologist*, 59, 830-840. doi: 10.1037/0003-066x.59.8.830
- Roosen, M. A., Safer, D., Adler, S., Cebolla, A., & van Strien, T. (2012). Group dialectical behavior therapy adapted for obese emotional eaters; a pilot study. *Nutricion Hospitalaria*, 27, 1141-1147. doi: DOI 10.3305/nh.2012.27.4.5843
- Saritas, D., Grusec, J. E., & Gencoz, T. (2013). Warm and harsh parenting as mediators of the relation between maternal and adolescent emotion regulation. *Journal of Adolescence*, 36, 1093-1101. doi: 10.1016/j.adolescence.2013.08.015
- Schutz, H. K., & Paxton, S. J. (2007). Friendship quality, body dissatisfaction, dieting and disordered eating in adolescent girls. *British Journal of Clinical Psychology*, 46, 67-83. doi: 10.1348/014466506x115993
- Shapiro, J. R., Woolson, S. L., Hamer, R. M., Kalarchian, M. A., Marcus, M. D., & Bulik, C. M. (2007). Evaluating binge eating disorder in children: Development of the Children's Binge Eating Disorder Scale (C-BEDS). *International Journal of Eating Disorders*, 40, 82-89. doi: 10.1002/eat.20318

- Spoor, S. T. P., Bekker, M. H., Van Strien, T., & van Heck, G. L. (2007). Relations between negative affect, coping, and emotional eating. *Appetite, 48*, 368-376. doi: 10.1016/j.appet.2006.10.005
- Stice, E., Killen, J. D., Hayward, C., & Taylor, C. B. (1998). Age of onset for binge eating and purging during late adolescence: A 4-year survival analysis. *Journal of Abnormal Psychology, 107*, 671-675. doi: 10.1037/0021-843x.107.4.671
- Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology, 21*, 131-138. doi: 10.1037//0278-6133.21.2.131
- Taube-Schiff, M., Van Exan, J., Tanaka, R., Wnuk, S., Hawa, R., & Sockalingam, S. (2015). Attachment style and emotional eating in bariatric surgery candidates: The mediating role of difficulties in emotion regulation. *Eating Behaviors, 18*, 36-40. doi: 10.1016/j.eatbeh.2015.03.011
- Telch, C. F. (1997). Skills training treatment for adaptive affect regulation in a woman with binge-eating disorder. *International Journal of Eating Disorders, 22*, 77-81. doi: 10.1002/(sici)1098-108x(199707)22:1<77::aid-eat10>3.0.co;2-f
- van Strien, T., Engels, R., Van Leeuwe, J., & Snoek, H. A. (2005). The Stice model of overeating: Tests in clinical and non-clinical samples. *Appetite, 45*, 205-213. doi: 10.1016/j.appet.2005.08.004
- van Strien, T., & Oosterveld, P. (2008). The children's DEBQ for assessment of restrained, emotional, and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders, 41*, 72-81. doi: 10.1002/eat.20424
- van Strien, T., van de Laar, F. A., van Leeuwe, J. F. J., Lucassen, P., van den Hoogen, H. J. M., Rutten, G., & van Weel, C. (2007). The dieting dilemma in patients with newly diagnosed type 2 diabetes:

- Does dietary restraint predict weight gain 4 years after diagnosis?
Health Psychology, 26, 105-112. doi: 10.1037/0278-6133.26.1.105
- van Strien, T., van der Zwaluw, C. S., & Engels, R. (2010). Emotional eating in adolescents A gene (SLC6A4/5-HTT) - Depressive feelings interaction analysis. *Journal of Psychiatric Research, 44*, 1035-1042. doi: 10.1016/j.jpsychires.2010.03.012
- Wagner, B. M., Cohen, P., & Brook, J. S. (1996). Parent/adolescent relationships: Moderators of the effects of stressful life events. *Journal of Adolescent Research, 11*, 347-374. doi: 10.1177/0743554896113005
- Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. (2001). Development of the children's eating behaviour questionnaire. *Journal of Child Psychology and Psychiatry, 42*, 963-970. doi: 10.1111/1469-7610.00792

Data Storage Fact Sheets

Data Storage Fact Sheet

Name/identifier study: IJoO paper (Chapter 2 PhD Julie Vandewalle)

Author: Julie Vandewalle

Date: 05/09/2016

1. Contact details

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If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

* Reference of the publication in which the datasets are reported:

Vandewalle, J., Moens, E., & Braet, C. (2014). Comprehending emotional eating in obese youngsters: the role of parental rejection and emotion regulation. *International Journal of Obesity*, 1-6.

doi:10.1038/ijo.2013.233.

* Which datasets in that publication does this sheet apply to?: The sheet applies to all the data used in the publication.

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- research group file server
- other (specify): ...

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP

-
- all members of the research group
 - all members of UGent
 - other (specify): IT worker Steven Vandenhole

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results.
Specify: ...

- file(s) containing processed data. Specify: scale scores.

- file(s) containing analyses. Specify: Syntaxes files (SPSS).

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Data Storage Fact Sheet

Name/identifier study: PaH paper (Chapter 3 PhD Julie Vandewalle)

Author: Julie Vandewalle

Date: 05/09/2016

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2. Information about the datasets to which this sheet applies

* Reference of the publication in which the datasets are reported:
Vandewalle, J., Moens, E., Beyers, W., & Braet, C. (2016). Can we link emotional eating with the emotion regulation skills of adolescents? *Psychology and Health*. doi: 10.1080/08870446.2016.1149586

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- other (specify): ...

* Who has direct access to the raw data (i.e., without intervention of another person)?

- main researcher
- responsible ZAP
- all members of the research group

- all members of UGent
- other (specify): IT worker Steven Vandenhole, Prof. dr. Wim Beyers

3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results.
Specify: ...

- file(s) containing processed data. Specify: scale scores.

- file(s) containing analyses. Specify: Input and output files (Mplus) and syntax files (SPSS)

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- other files. Specify: SPSS syntaxes describing the transition from the raw data to the processed data.

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Name/identifier study: Laboratory-based study (Chapter 4 PhD Julie Vandewalle)

Author: Julie Vandewalle

Date: 05/09/2016

1. Contact details

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2. Information about the datasets to which this sheet applies

* Reference of the publication in which the datasets are reported: Vandewalle, J., Moens, E., Bosmans, G., & Braet, C. (under review). The effect of parental rejection on the emotional eating behaviour of youngsters: a laboratory-based study. *Appetite*.

* Which datasets in that publication does this sheet apply to?: The sheet applies to all the data used in the publication.

3. Information about the files that have been stored

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If NO, please justify:

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- other (specify): ...

* Who has direct access to the raw data (i.e., without intervention of another person)?

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3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results.
Specify: ...
- file(s) containing processed data. Specify: scale scores.
- file(s) containing analyses. Specify: Syntaxes and output files (SPSS).
- files(s) containing information about informed consent (blank copy of the informed consent form)
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Data Storage Fact Sheet

Name/identifier study: diary study (Chapter 5 PhD Julie Vandewalle)

Author: Julie Vandewalle

Date: 05/09/2016

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2. Information about the datasets to which this sheet applies

* Reference of the publication in which the datasets are reported:
Vandewalle, J., Mabbe, E., Braet, C., & Moens, E. (submitted). The daily relation between parental rejection, peer rejection and emotional eating in youngsters: A diary study. Submitted for publication

* Which datasets in that publication does this sheet apply to?: The sheet applies to all the data used in the publication.

3. Information about the files that have been stored

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO
If NO, please justify:

* On which platform are the raw data stored?

- researcher PC
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- other (specify): ...

* Who has direct access to the raw data (i.e., without intervention of another person)?

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3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results.
Specify: ...
- file(s) containing processed data. Specify: scale scores.
- file(s) containing analyses. Specify: Output files (MLwiN)
- files(s) containing information about informed consent (blank copy of the informed consent form)
- a file specifying legal and ethical provisions:
- file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- other files. Specify: SPSS syntaxes describing the transition from the raw data to the processed data.

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Data Storage Fact Sheet

Name/identifier study: inpatient weight loss treatment study (Chapter 6 PhD Julie Vandewalle)

Author: Julie Vandewalle

Date: 05/09/2016

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* Reference of the publication in which the datasets are reported:
Vandewalle, J., Moens, E., Tanghe, A., De Guchtenaere, A., & Braet, C.
(submitted). Parental rejection as a predictor of emotional eating after
inpatient weight loss treatment for youngsters. Manuscript submitted for
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3. Information about the files that have been stored

3a. Raw data

* Have the raw data been stored by the main researcher? YES / NO

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3b. Other files

* Which other files have been stored?

- file(s) describing the transition from raw data to reported results.
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- file(s) containing analyses. Specify: Syntaxes and output files (SPSS).

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