

Loss of Control over Eating in Pre-adolescent Youth: The role of Attachment and
Self-esteem

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Abstract

Objective: The present study aimed to add to the limited literature on the role of self-esteem and attachment for the explanation of loss of control over eating (LC) among pre-adolescent boys and girls. **Method:** Self-report questionnaires were administered to a community sample of 555 children (8-11 years; 47% female). **Results:** Children reporting LC (17.6% of the sample) were characterized by a lower self-esteem and less secure attachment towards both of their parents. No gender differences emerged. Moreover, the relation between self-esteem and LC was fully mediated by attachment towards mother and partially mediated by attachment towards father. **Discussion:** The present study provides preliminary evidence for the idea that the influence of self-esteem on LC seems to operate through a third variable, that is an insecure relationship with the parents. Longitudinal research is needed to further elucidate the influence of interpersonal factors on the development of LC.

Keywords: binge eating; self-esteem; attachment; pre-adolescents

1.1.Introduction

Loss of control over eating (LC) can be considered as disordered eating behaviour characterized by the sense that one cannot stop eating, and it may be the most prominent criterion for the definition of binge eating (Goldschmidt, et al., 2008; Marcus & Kalarchian, 2003; Tanofsky - Kraff, Marcus, Yanovski, & Yanovski, 2008). The experience of LC, as opposed to the amount of food eaten, appears more salient for the identification of disordered eating behaviors (Marcus & Kalarchian, 2003; Morgan, et al., 2002; Tanofsky-Kraff, Faden, Yanovski, Wilfley, & Yanovski, 2005).

Research has shown that LC is prevalent in overweight children and adolescents seeking weight loss treatment with prevalence rates ranging up to 40% (Goossens, Braet, Van Vlierberghe, & Mels, 2009; Tanofsky-Kraff, et al., 2007). Moreover, recent studies indicate that LC is an eating disorder symptom that does not exclusively occur in clinical samples but it can be detected among community samples of youth as well. More specifically, up to 25% of adolescents from the general population seem to report this disordered eating behavior (Croll, Neumark-Sztainer, Story, & Ireland, 2002; Goossens, Soenens, & Braet, 2009). Although past research generally indicated that eating disorders disproportionately affect women (Klein & Walsh, 2003), recent studies in adolescents demonstrate that a substantial part of the boys also report LC. For example, in the study of Goossens, Soenens et al. (2009) 12.7% of the male adolescents reported LC. However, with 19.5% of the female adolescents reporting LC, girls still outnumbered their male peers. To date, little is known with regard to the prevalence of LC among preadolescent boys and girls in the community, nor are we able to pronounce upon its underlying mechanisms.

Studying mechanisms associated with LC may benefit clinical approaches. First, longitudinal studies have shown that LC involving large amounts of food increases weight (Field, et al., 2003; Tanofsky-Kraff, et al., 2006; Tanofsky-Kraff, et al., 2009) and predicts the

onset of obesity (Stice, Presnell, & Spangler, 2002). Second, LC is independently associated with depression, anxiety and behavioural problems (Tanofsky-Kraff, et al., 2004). Finally, LC may be a precursor of full-blown eating disorders (Stice, 2002).

In theoretical models, the presence of a disturbed self-image is often considered the core psychopathology of (binge) eating disorders (Fairburn, Cooper, & Shafran, 2003; Wilfley, Pike, & Striegel-Moore, 1997). Previous studies already found low self-esteem to be cross-sectionally (Goossens, Soenens, et al., 2009; Tanofsky-Kraff, et al., 2005) and longitudinally (Stice, et al., 2002) related to binge eating in adolescents, but other studies only found weak associations (Calam & Waller, 1998). In obese children (aged 8-12 years) a recent study also demonstrated a significant association between self-reported binge eating and low self-esteem (Wildes, et al., 2010). Littleton and Ollendick (2003) conclude from their review that low self-esteem and disordered eating behavior are related in children and adolescents. However, the true nature of the association between self-esteem and eating disorder pathology remains to be studied.

According to the Interpersonal Theory of eating disorders (Sullivan, 1953; Wilfley, et al., 1997), attachment and self-esteem play a basic role in the development and maintenance of binge eating. More specifically, the Interpersonal Theory states that a low self-esteem is constructed on the basis of insecure relationships with significant caregivers and it may trigger binge eating (LC) in an attempt to cope with negative emotions. From the attachment literature we already know that self-esteem is in a significant way interlaced with trust in the caregiver's availability (Bowlby, 1980; Griffin & Bartholomew, 1994). Secure attachment results from interactions in which caregivers successfully provide for the child's physical and emotional needs. Insecure attachment however derives from caregivers' inability to meet the child's needs (Bowlby, 1980). However, it remains unclear how attachment might be related to self-esteem and LC?

Even though the Interpersonal Theory acknowledges the importance of relationships with significant caregivers as well as the role of self-esteem, some issues still remain. First, this theory was constructed based on adult literature and takes little account of developmental considerations (Wilfley, et al., 1997). From a developmental psychology perspective however we know that the second half of elementary school (4th to 6th grade) is an important period in the development of positive perceptions of the self (Stipek & MacIver, 1989; Verschueren, Buyck, & Marcoen, 2001). A second issue with regard to the Interpersonal Theory is that it provides no concrete assumptions on why children with a low self-esteem may not be able to adequately regulate negative emotions (and may thus be more vulnerable for developing eating pathology)? Researchers (Gentzler, Kerns, & Keener, 2010) state that children with a low self-esteem who are faced with emotional situations, may call upon adaptive emotion regulation strategies if they can rely on secure base scripts (defined by Waters and Waters (2006) as an individual's history of secure base support). In case these children cannot rely on a secure base script, less adaptive emotion regulation strategies (e.g. avoiding, being overwhelmed) will be applied, thereby increasing the risk for eating- or psychopathology. Based on this finding we may assume that self-esteem will only have an effect on eating pathology through the presence or absence of secure base attachment scripts.

Previous studies in adult samples found direct associations between attachment insecurity and eating disorder symptoms, such as body dissatisfaction (Tasca, et al., 2006), dietary restraint (Brennan & Shaver, 1995) and general measures of eating disorder pathology (Kiang & Harter, 2006). In youngsters, results of one study showed that insecurely attached youngsters (10-14 years old) are characterized by more weight concerns compared to securely attached ones (Sharpe, et al., 1998). This study can add to our knowledge on why some children are more vulnerable to eating disorder pathology than others. Unfortunately, the study of Sharpe et al. (1998) exclusively examined girls so it remains to be investigated

whether identical effects arise among boys as well. Another study in a clinical sample of obese boys and girls (10-17 years old) demonstrated associations between insecure attachment towards both parents and concerns about weight and shape. Moreover, results of this latter study showed that attachment towards mother and attachment towards father were differently related to weight and shape concerns (Bosmans, Goossens, & Braet, 2009). Unfortunately, this study did not focus on LC.

Although previous studies in youngsters found significant relations between attachment and different features of eating disorder pathology, to date little is known regarding the association between attachment and LC. Also, the specific role of self-esteem versus attachment for explaining LC in youth remains to be examined. One study in Norwegian and American college students (Perry, Silvera, Neilands, Rosenvinge, & Hanssen, 2008) already found cross-sectional evidence for the relation between parental bonding (low care and over protectiveness), poor self-esteem and a general measure of eating disturbances.

It was the aim of the present study to add to the sparse literature on association between self-esteem, attachment and LC in preadolescent boys and girls. Preadolescence may be an intriguing phase to study these associations, not only with regard to the growing development of self-esteem (Stipek & MacIver, 1989), but also because in this period contextual (or parental) factors still play an important role in the child's development as well (Fiese, 1997). Based on previous research in adolescents (Goossens, Soenens, et al., 2009; Sharpe, et al., 1998), we first of all hypothesised that children reporting LC will be characterised by a lower self-esteem and a less secure attachment style towards both of their parents compared to those who do not report LC. Secondly, based on the findings of Gentzler et al. (2010) it was hypothesised that the association between self-esteem and LC will be mediated by attachment.

1.2.Method

1.2.1.Participants

Participants were 3rd to 5th grade children recruited from six elementary schools in the Dutch-speaking part of Belgium. Only schools were included who offer primary education in order to secure that children who need more specialized education would not be participating in the present study. In total, 555 children (47.2 % female) were recruited with a mean age of 9.02 years ($SD = .84$; range = 8-11 years). The sample consisted of 183 (33.0%) 8-year-olds, 187 (33.7%) 9-year-olds, 176 (31.7%) 10-year-olds and 9 (1.6%) 11-year-olds. The majority of the children's parents were married and still living together (73.6%), 6.2% were living together but not married, 19.2% were divorced and in 1.0% of the children one of the parents was deceased. Finally based on the parents' education level and career (Hollingshead, 1975), 0.6 % of the families could be categorized in the upper socio-economic class, 22.4% in the upper-middle class, 63.4% in the middle class, 12.6% in the lower-middle class and 1% in the lower class.

1.2.2.Procedure

Passive informed consent was obtained from parents. Parents received a letter that explained the purpose and method of the study ('A study about children's attitudes, thoughts and behaviors regarding eating') two weeks prior to the data collection and they were asked to fill out a form if they did not want their child to participate in the study. Approximately 11% of the parents did not allow their child to participate, mostly because they believed their child was already interrogated enough.

In case parents did give their permission, written assent was obtained from the children at the start of testing. Children received a form explaining the purpose and method of the study and were invited to sign this form if they were willing to participate in the study.

They were reassured that the questionnaires were anonymous and would be handled confidentially. Also, they were told that they could end the study at any time. All children agreed to participate. The questionnaires were administered in class (approximately 20 children per class) by trained students and research assistants. Children had approximately 60 minutes to complete the survey. The students and research assistants remained present during the entire period so that they could help the children understand the directions and answer their questions. This study was approved by the local research ethics committee.

1.2.3. Measures

Loss of Control over eating. To measure Loss of Control over eating, we used the Eating Disorder Examination Questionnaire (EDE-Q) of Fairburn and Beglin (1994), which is a self-report questionnaire that assesses the frequency of key eating disordered behaviors. The EDE-Q is the only self report questionnaire available that differentiates between the various forms of overeating and provides the determination of binge eating as defined in DSM-IV-TR (APA, 2000). It measures objective bulimic episodes (OBE; a sense of LC accompanied by eating a large amount of food that other people would also qualify as large) and subjective bulimic episodes (SBE; a sense of LC accompanied by eating a large amount of food according to the subject, but that other people would not qualify as unambiguously large). Both OBE and SBE fall under the coordinating term of LC (Marcus & Kalarchian, 2003). The items of the EDE-Q are derived from the Eating Disorder Examination interview (EDE), developed by Fairburn and Cooper (1993). In addition to providing measures for overeating, the EDE-Q has 22 items, distributed over four scales, that assess eating disordered behavior and attitudes (restraint, eating concern, shape concern and weight concern) using the same 7-point rating scale as the EDE-interview. Like the EDE, the EDE-Q has a 28-day time frame

for each of the subscales. Unlike the EDE, the diagnostic features are not assessed over a 3-month period, but over the same 28-day period.

In the current study, the Dutch version of the EDE-Q was used (Decaluwé & Braet, 1999). This version was designed for use in younger populations (see Decaluwé et al. (2004) for more information regarding this modification). Carter et al. (2001) confirmed the usefulness of the EDE-Q for assessing eating pathology among adolescent samples. Decaluwé and colleagues (2003) demonstrated the utility of the Dutch EDE-Q in examining the prevalence of binge eating in a sample of treatment seeking obese youngsters. In the present study, the children were explained the time frame (last month), the difference between weight and shape and the meaning of LC. Cronbach's alpha for the four subscales ranged from .76 to .87 thereby confirming the reliability of using this instrument in elementary school- aged children. Children were categorized as experiencing LC when they reported at least one episode of OBE or SBE during the last month. Youngsters who did not report SBE or OBE were categorized in the No Loss of Control over eating (NoLC) group (see Tanofsky-Kraff et al. (2004) for this procedure).

Self-esteem. Children completed the Harter's (1985) Self-Perception Profile for Children (SPPC). The SPPC assesses self-reports on different domains of the self-perception of children (8 to 12 years old). The domains define distinct factors that provide a differentiated and meaningful profile of children's self-esteem: school competency, social acceptance, athletic competency, physical appearance and behavioral conduct. A sixth scale provides an independent measure of global self-perception. Only this latter subscale was used in the present study. The Dutch adaptation of the SPPC, developed by Veerman, Straathof and Treffers (1994), was modified with respect to its item format. In the original format, participants are asked to make a choice between two items, each describing an adolescent with opposite characteristics. We used the less cumbersome item format proposed by

Wichstrom (1995), in which only one statement is used for each item. The internal consistency reliabilities of the subscales are quite acceptable (Veerman, et al., 1994). In the current sample, Cronbach's alpha was .60.

Attachment. To measure attachment towards mother and father, the Security Scale (Kerns, Klepac, & Cole, 1996) was administered. The Dutch version of this scale was used in the present study (Verschueren & Marcoen, 2002). The Security Scale (SS) is a self-report questionnaire designed for use with children during the period of middle childhood. It assesses children's perceptions of security in specific parent-child relationships during middle childhood. The scale provides a continuous measure of security, with items tapping the child's belief in the responsiveness and availability of the attachment figure, the child's use of the attachment figure as a safe haven, and the child's report of open communication with the attachment figure. Several researchers have found the SS to be internally consistent (Verschueren & Marcoen, 2002). The scale has also been found to be stable, with a test-retest correlation coefficient of 0.75 (Kerns, et al., 1996). In the present study, Cronbach's alpha was .79 for the SS Mother scale and .77 for the SS Father scale.

Physical Measurements. Each child's weight and height was measured by the research assistants using calibrated instruments. The Body Mass Index (BMI; $\text{weight}/\text{height}^2$) was determined for each youngster. In order to make BMI comparisons between overweight children of different ages and sex, this study uses the adjusted BMI [(actual BMI/ Percentile 50 of BMI for age and sex) x 100]. The 50th percentiles of the BMI for age and sex are based on normative data in a Dutch sample (Fredriks, van Buuren, Wit, & Verloove-Vanhorick, 2000). An adjusted BMI score equal to or greater than 120 % is considered as overweight (Van Winckel & Van Mil, 2001).

1.2.4. *Missing values*

Of the 555 initial participants, 482 (86.8%) reported on whether or not they experienced LC. Given that LC is a key variable in this study, we only used these 482 participants in all subsequent analyses. Among the final 482 participants, 2.9% of the SPPC, 17.8% of the SS Mother and 24.3% of the SS Father data were missing. Comparison of means and covariances of all questionnaire variables using Little (1988) MCAR test revealed that data were missing completely at random, $\chi^2(277) = 289.96, p = .28$. Therefore, it was decided to estimate missing values using maximum likelihood estimation and the expectation maximization algorithm available in SPSS (Schafer, 1997).

1.2.5. *Statistical analysis*

Analyses were conducted with SPSS for Windows 15.0. Results were expressed as a mean (*SD*) or percentage of the sample. Between-group (LC versus NoLC) comparisons were performed using one-way (ANOVA) and multi-way (MANOVA) analyses of variance for dimensional outcomes, and χ^2 analyses for categorical outcomes.

Next, a mediation model was tested on the entire sample ($n = 482$) following the recommendations of Baron and Kenny (1986). According to Baron and Kenny mediation is present when the following conditions are met: first of all, the independent variable (self-esteem) significantly predicts the proposed mediator (attachment); second, the independent variable (self-esteem) significantly predicts the dependent variable (LC). Third, the proposed mediator (attachment) significantly predicts the dependent variable (LC). Fourth, the relationship between the independent variable (self-esteem) and the dependent variable (LC) should be significantly reduced after controlling for the proposed mediator (attachment). If the significant path between the independent and dependent (second condition) is reduced to

non-significance after adding the mediator, it is referred to as complete mediation. If the path is reduced but still remains significant, it is referred to as partial mediation.

Following recent recommendations by MacKinnon, Lockwood and Williams (2004), a nonparametric resampling approach with bootstrapping procedure (Preacher & Hayes, 2008) was used to test a mediation model in which attachment security is hypothesised to mediate the relation between self-esteem and LC. This approach is superior to previous approaches as it additionally tests the significance of the indirect effect (the path linking self-esteem and LC over attachment). Moreover, bootstrap estimation is non sensitive to violations of normality in our data. We used this approach with 5000 resamples drawn with replacement from the original sample ($n = 482$) to derive the 95% confidence interval (CI) for the indirect effect. To that end, we used the SPSS Macro provided by Preacher & Hayes (2004).

1.3.Results

1.3.1. Sample characteristics

Of the 482 children, 17.6% reported LC. Episodes ranged from 1 to 20 episodes of LC over the last month. Regarding the type of LC episodes, 11.8% of the children reported SBEs, 9.5% reported OBEs and 3.7% reported both SBEs and OBEs. No significant differences were found between the LC and NoLC subsample with regard to gender, $\chi^2(1) = 1.45, p = .24$, age, $F(1,480) = .11, p = .74, \eta_p^2 = .00$, and Adjusted BMI, $F(1,480) = 1.33, p = .25, \eta_p^2 = .00$. Table 1 presents the general characteristics of the study sample.

1.3.2. Are children reporting LC characterised by lower self-esteem and a less secure attachment?

An ANOVA was run to examine whether the LC group differed significantly from the NoLC group in terms of self-esteem (SPPC score). Gender was also included as an

independent variable in this ANOVA. Results of this analysis revealed a significant effect of group (LC vs. NoLC) on the SPPC score, $F(1,478) = 5.69, p = .02, \eta_p^2 = .01$, with children in the LC group reporting lower self-esteem compared to NoLC group. There was no significant main effect of gender, $F(1, 478) = .08, p = .78, \eta_p^2 = .00$, neither was there a significant effect of the interaction between group and gender, $F(1, 478) = .25, p = .62, \eta_p^2 = .00$.

Next, a MANOVA was performed to examine whether the LC group differed significantly from the NoLC group in terms of attachment towards mother (SS Mother score) and towards father (SS Father score). Gender was also included as an independent variable in this MANOVA. An overall significant difference was obtained between the LC group and the NoLC group, $F(2,477) = 6.88, p = .00, \eta_p^2 = .03$, on the 2 attachment scales. Follow-up analyses revealed significant differences between both groups on each of the 2 attachment scales. Children in the LC group reported significantly less secure attachment towards Mother, $F(1,478) = 13.09, p = .00, \eta_p^2 = .03$, and less secure attachment towards Father, $F(1,478) = 10.12, p = .00, \eta_p^2 = .02$, compared to children in the NoLC group. There was no significant main effect of gender, $F(2, 477) = 1.45, p = .24, \eta_p^2 = .01$, neither was there a significant effect of the interaction between group and gender, $F(2, 477) = 1.09, p = .34, \eta_p^2 = .01$. Table 2 presents mean scores on the outcome variables for this previous set of analyses.

1.3.3.A mediating role of attachment?

1.3.3.1.Attachment towards mother as mediator between self-esteem and LC.

Consistent with Baron and Kenny's (1986) definition of mediation, adding in a logistic regression analysis the SS Mother variable as mediator of the link between SPPC score and LC, reduced the effect of self-esteem ($b = -.07, p = .09$, complete reduction). For mediation to occur, the indirect effect of SPPC score on LC via the hypothesised mediator (SS Mother score) has to be significant as well. The indirect effect of SS Mother score, expressed in

unstandardized regression weights, was estimated to lie between $-.06$ and $-.01$ ($SE = .01$) with 95% CI. Because zero is not in the 95% CI, we can conclude that the indirect effect of SS Mother score is significantly different from zero at $p = .01$ (two tailed), implying that this variable acts as a mediator (see Figure 1).

1.3.3.2. Attachment towards father as mediator between self-esteem and LC. Consistent with Baron and Kenny's (1986) definition of mediation, adding in a Logistic Regression analysis the SS Father variable as mediator of the link between SPPC score and LC, reduced the effect of self-esteem ($b = -.08$, $p = .03$, partial reduction). For partial mediation to occur, the indirect effect of SPPC score on LC via the hypothesised mediator (SS Father score) has to be significant as well. The indirect effect of SS Father score, expressed in unstandardized regression weights, was estimated to lie between $-.06$ and $-.002$ ($SE = .01$) with 95% CI. Because zero is not in the 95% CI, we can conclude that the indirect effect of SS Father score is significantly different from zero at $p = .04$ (two tailed), implying that this variable acts as a mediator (see Figure 2).¹ (insert Footnote 1)

1.4. Discussion

The present study examined loss of control over eating (LC) in 8 to 11 year old boys and girls. In total, 17.6% of the children reported having experienced at least one episode of LC over the past month. This prevalence rate is somewhat higher compared to American studies where it was found that between 2 and 13% of the children (aged 9-14 years) self-reported binge eating (Field, et al., 1999; Neumark-Sztainer & Hannan, 2000). A possible explanation for this difference might be that the former studies solely measured the presence of OBEs, whereas in the present study both OBEs and SBEs were assessed. Also, in contrast with other studies in adults (Spitzer, et al., 1993) and adolescents (Goossens, Soenens, et al.,

2009), no significant gender differences were found regarding the experience of LC in our study. Moreover, when looking at the percentages, an even higher percentage of boys (19.6%) seemed to report LC compared to girls (15.4%). A possible explanation may be that the female 'dominance' in prevalence of eating disorder pathology starts to reveal itself with the onset of puberty, and may therefore not be that pronounced in pre-adolescents. Also, this finding demonstrates the importance of examining eating disorder pathology in boys as well.

Furthermore, we aimed to investigate whether differences exist between children who reported LC and those who did not regarding self-esteem and attachment. In line with our expectations and with recent findings in overweight children (Tanofsky-Kraff, et al., 2005; Wildes, et al., 2010) and adolescents from the community (Goossens, Soenens, et al., 2009) we found that, after controlling for gender, the LC group was characterized by a lower self-esteem compared to the NoLC group. Also consistent with our hypotheses we found that children who reported LC were characterized by a less secure attachment towards their mother and father compared with children who did not report LC. This pattern was observed among both boys and girls and is in line with previous findings in adults that attachment is associated with eating disorder symptoms (Brennan & Shaver, 1995; Kiang & Harter, 2006; Tasca, et al., 2006).

A second aim of the present study was to investigate the assumption that attachment mediates the relationship between self-esteem and LC. Results of the mediation analyses showed that in children a lower self-esteem was related to a less secure attachment and a greater chance of experiencing LC. Moreover, concerning attachment towards mother, the association between self-esteem and LC was totally reduced after controlling for attachment. Concerning attachment towards father, the association between self-esteem and LC significantly decreased, but was not totally reduced. Based on these findings we may

conclude that attachment towards mother fully mediated the association between self-esteem and LC, whereas attachment towards father was only a partial mediator of this association.

First of all, these findings demonstrate that the association between disturbed self-esteem and LC seems having more to do with the quality of the present parent-child relationship (attachment representations) than it has to do with self-esteem alone. Or in other words, self-esteem appears to be a necessary but not a sufficient condition for explaining LC. Based on theory and research evidence, we could assume that secure attachment increases the chance that children in distress will rely on their secure base script to regulate emotions (Gentzler, et al., 2010; Waters & Waters, 2006). If they do not have such a script, they will seek other solutions which increases the chance of using more maladaptive emotion regulation strategies to handle stressful situations, like aberrant eating.

Second, results of the mediation analyses indicate that the quality of the mother-child relationship is slightly more important in explaining the association between self-esteem and LC compared to the quality of the father-child relationship. This is in line with other research where it was demonstrated that a child's self-esteem is more closely related with attachment towards mother than it is with attachment towards father (Verschueren & Marcoen, 1999) and that both parents may differently influence their children's eating attitudes and behaviour (Bosmans, et al., 2009; Ricciardelli, McCabe, & Banfield, 2000).

Strengths, limitations and implications for research and practice

The findings of the present study have some clinical implications. More specifically, since results show that LC is already reported by a substantial part of 8-11 year old boys and girls, it seems important to screen possible at risk groups and to develop prevention programs that appeal to elementary school-aged children of both sexes as well as their families.

Education or retraining a secure parent-child relationship and a healthy self-esteem might prevent these children to develop eating disorder symptoms later on.

Also with regard to treatment of LC in children, results of the present study demonstrate that it is important to pay attention to the influence of both individual (e.g. self-esteem) as well as familial (e.g. the quality of the parent-child relationship) characteristics. In patients with Bulimia Nervosa and Binge Eating Disorder, Interpersonal Psychotherapy has already proven its effectiveness (Agras, Walsh, Fairburn, Wilson, & Kraemer, 2000). Another alternative might be Attachment-Based Family Therapy where it is one of the central goals to improve the relationship with attachment figures. This treatment was found to be useful among depressive adolescents (Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002) and its techniques might be interesting to apply in insecurely attached youngsters with eating pathology as well.

The present study has several strengths. First of all, our sample consisted of children and parents from both sexes. Also, we used developmentally appropriate instruments such as the Children's Eating Disorder Examination Questionnaire (Decaluwé & Braet, 1999), which is adapted from the Children's Eating Disorder Examination interview (Bryant-Waugh, Cooper, Taylor, & Lask, 1996). Although we are aware that interview methodology can be considered the most valid way to assess the presence of eating disorder symptoms, our aim was to collect a large sample of children which causes practical problems in administering interviews. Since past research has demonstrated the reliability and validity of the ChEDE-Q (Decaluwe & Braet, 2004; Goossens & Braet, 2010), this questionnaire was considered to be the best approximation of the ChEDE interview. Finally, to our knowledge, this is the first study to investigate the mediating effect of attachment on the relationship between self-esteem and eating disorder pathology in children. Moreover, we believe that the results of the present study may add to those of a recent study of Elliot et al. (2010). These researchers

concluded that negative affect mediated the relationship between social problems and LC, thereby confirming the importance of considering interpersonal factors and emotion regulation for explaining LC in youth.

Like the study from Elliot et al. (2010), the present study was limited because of its cross-sectional nature. Therefore, we can only pronounce upon associations between the variables and we are unable to draw causal relationships. In future research longitudinal designs are needed to replicate these results and to elucidate whether an insecure attachment towards the parents is indeed a necessary factor in explaining the longitudinal relationship between low-self-esteem and LC. Next, keeping the assumptions of the IPT (Wilfley, et al., 1997) in mind, longitudinal studies should also further investigate the relationship between attachment, affect-regulation and LC. Finally, longitudinal research is planned to follow-up those children who reported LC in the present study. By investigating how their LC episodes further evolve, we might be able to detect which children are most vulnerable for developing more severe eating disorder pathology, such as LC-Eating disorder (Tanofsky - Kraff, et al., 2008) later on. As our sample consisted of primarily White children with a relatively high socio-economic background, future research should examine whether our findings can be generalized to samples with a more diverse ethnicity and socioeconomic background.

A final limitation was that not all youngsters of the original sample reported on whether or not they had experienced LC over the past month. Since LC was considered the most important variable, we decided to exclude youngsters with missing LC data from the study. This resulted in a loss of 13.2% of the original sample. Comparisons between those who did and who did not report on LC on the main study variables indicated that the study sample was representative of the original sample. However, it might be interesting to examine why some children neglected on reporting on LC (did they not understand the meaning of the concept? Were they scared to ask some more explanation to the research assistants?) and

whether they represent a distinct subgroup. As already mentioned above, because of practical reasons we used the ChEDE-Q to assess LC. In this questionnaire, LC is explained as ‘having the feeling that you cannot control what and how much you eat. In other words, feeling unable to stop eating (e.g. like a ball tumbling down a mountain, unable to stop)’. Despite the fact that the meaning of LC is explained to the children, relying exclusively on self-report data of LC in this young sample may still have hampered the validity of the results. Future studies may implement a two-step design, where questionnaires are used as screening tool and interview methodology is added in case of elevated scores.

To conclude, results of the present study demonstrate that children who experience LC are characterised by a lower self-esteem and a less secure attachment towards their parents. Also, the present study provides preliminary evidence for the idea that the influence of self-esteem on LC seems to operate through a third variable, more specifically the present insecure relationship with the parents.

1.5. Footnotes

1. Since the Interpersonal Theory (Sullivan, 1953) proposes that self-esteem is constructed on the basis of interpersonal experiences, we also tested an alternative model where self-esteem was considered the mediator between attachment and LC. However, no significant indirect effect was found ($p > .05$), allowing us to conclude that self-esteem did not mediate the relation between attachment and LC. With this latter finding it is certainly not our aim to refute the main assumptions of the IPT. It only indicates that attachment does not exclusively affect LC through self-esteem, thereby confirming the ideas of other researchers that different (both direct and indirect) paths may relate attachment to eating disorder symptoms (Zachrisson & Skarderud, 2010). Furthermore to exclude the presence of a moderational model, we also tested whether attachment moderated the relation between self-esteem and LC, but again, no significant effect was found ($p > .05$).

1.6. References

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Tables

Table 1

Characteristics of the total sample and of the LC and NoLC subsamples

	Total sample (n = 482)		LC (n = 85, 17.6%)		NoLC (n = 397, 82.4%)		<i>F/χ²</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Age (years)	9.10	.84	9.13	.84	9.10	.84	.11 (n.s.)
Sex ratio M/F	1.1/1		1.4/1		1.1/1		1.45 (n.s.)
% M/F of LC subsample			59/41		52/48		
% M/F of total sample			10.4/7.2		42.6/39.8		
% M/F of gender			19.6/15.4		80.4/84.6		
Adjusted BMI	104.04	15.13	105.75	16.51	103.67	14.81	1.33 (n.s.)

Note. M = male; F = Female; LC = loss of control over eating; BMI = Body Mass Index; n.s.

= non significant result

Table 2

Mean scores on the self-esteem and attachment variables for children (n = 482) with and without LC after controlling for gender

	LC		NoLC		F
	M	SD	M	SD	
Self-esteem					
Group (SPPC score)	21.04	2.96	22.02	3.42	5.69*
Gender					.08 (n.s.)
Group x Gender					.25 (n.s.)
Attachment					
Group					6.88***
SS Mother score	44.69	6.80	47.66	6.75	13.09***
SS Father score	44.51	7.74	47.11	6.99	10.12**
Gender					1.45 (n.s.)
Group x Gender					1.09 (n.s.)

Note. LC = loss of control over eating; SPPC = Self Perception Profile for Children; higher SPPC scores represent a more positive self-esteem; SS = Security Scale; higher SS scores represent a more secure attachment style

* $p < .05$; ** $p < .01$; *** $p \leq .001$; n.s. = non significant result

Figures

Figure 1

Attachment towards mother (SS Mother) as mediator between self-esteem (SPPC) and loss of control over eating (LC)

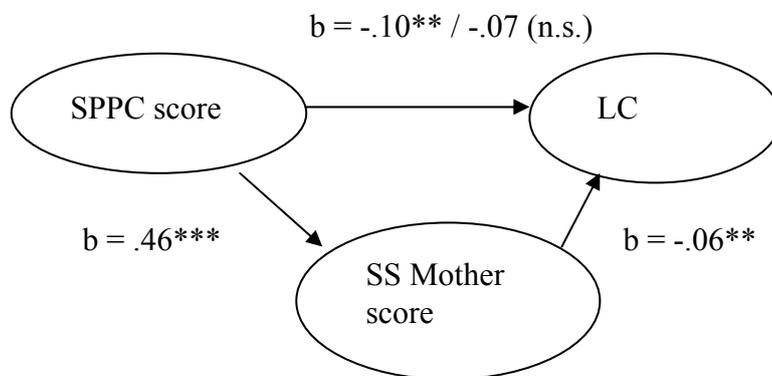


Figure 2

Attachment towards father (SS Father) as mediator between self-esteem (SPPC) and loss of control over eating (LC)

