The role of attachment and emotion regulation in the development of eating pathology in adolescents

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Kim Van Durme, September 2016

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Chapter 1

Eating pathology in adolescence: An introduction

This chapter provides an overview of what is currently known with regard to clinical eating disorders as well as subclinical disordered eating attitudes and behaviours in adolescents. In a first section of this chapter, an overall picture is presented of the classification, prevalence, assessment, consequences and prognosis of eating pathology, with special attention to elite female adolescent ballet dancers, who are seen as a group at high risk for developing eating pathology compared to female adolescents from the general population.

In a second section of this chapter, some important theoretical models are outlined that are often used to explain the development and maintenance of eating pathology, with a main focus on the role of insecure attachment dimensions and maladaptive emotion regulation strategies. In a final part of this chapter, an overview is presented of the empirical studies in the present doctoral dissertation.

Eating Pathology

Eating pathology refers to a broad spectrum of problems, including both clinical eating disorders as well as subclinical disordered eating attitudes and behaviours. In the following paragraphs an overview will be provided with regard to the classification, prevalence, assessment, consequences and prognosis of eating pathology.

The Classification of Eating Pathology

Eating disorders. Eating disorders are psychiatric disorders that can be defined as "a persistent disturbance of eating behaviour or behaviour intended to control weight, which significantly impairs physical health or psychosocial functioning and are not secondary to any recognized general medical or other psychiatric disorder (Walsh & Fairburn, 2002)". In the current American Psychiatric Association's Diagnostic and Statistical Manual - 5th edition (DSM-5; APA, 2013), eating disorders are part of the 'feeding and eating disorders category'. However, eating disorders differ from feeding disorders, i.e. pica, rumination and avoidant/restrictive food intake disorder, in such a way that they are characterised by a dysfunctional system of self-evaluation whereas feeding disorders are not (Fairburn, Cooper, & Shafran, 2003). The self-evaluation of eating disordered patients is mainly and almost solely based on body shape, weight, eating and the control over these domains. The most widely recognized eating disorders are Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Binge Eating Disorder (BED).

According to the DSM-5 (APA, 2013), the core feature of AN is the restriction of energy intake relative to requirements leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. Significantly low body weight is defined as a weight that is less than minimally normal or, for children and

adolescents, less than minimally expected. An intense fear of gaining weight or becoming fat, or persistent behaviour that interferes with weight gain, even though a significantly low weight, can be distinguished as a second criterion. Thirdly, a disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight needs to be present. This latter criterion refers to the presence of a dysfunctional system of self-evaluation (Fairburn et al., 2003). Additionally, the DSM-5 distinguishes between two subtypes of AN, i.e. the restricting and the binge-eating/purging type. In the latter type, regular episodes of binge eating or purging behaviour (i.e. self-induced vomiting, or the misuse of laxatives, diuretics or enemas) are reported during the past three months of AN whereas this is absent in the restricting type. In the restricting type, weight loss is accomplished solely through dieting, fasting and/or excessive exercise.

BN (APA, 2013) is characterized by recurrent episodes of binge eating. Binge eating reflects the intake of a large amount of food within a short time period, larger than what most individuals would eat under similar circumstances, accompanied by a sense of loss of control over eating. Although the food intake during a binge may vary from 1000 to 7000 kcal, the average food intake is estimated to be about 2482 kcal (Forbush & Hunt, 2014; Wolfe, Baker, Smith, & Kelly-Weeder, 2009). Furthermore, the binge eating episodes are followed by recurrent inappropriate compensatory strategies to prevent weight gain such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; or excessive exercise. The binge eating episodes and compensatory behaviours occur at least once a week for 3 months and as in AN, the self-evaluation is unduly influenced by body shape and weight (APA, 2013). Although BN patients generally tend to have a normal

weight, it often fluctuates over time due to the variation in energy intake across days (Hudson, Hiripi, Pope, & Kessler, 2007).

Binge-eating disorder (BED) (APA, 2013) is characterized by recurrent episodes of binge eating in absence of consequent compensatory strategies. The binge-eating episodes are associated with three or more of the following characteristics: a) eating much more rapidly than normal, b) eating until feeling uncomfortably full, c) eating large amounts of food when not feeling physically hungry, d) eating alone due to feelings of embarrassment by how much one is eating and e) feeling disgusted with oneself, depressed or very guilty afterwards. The binge eating episodes need to occur at least once a week for 3 months, and marked distress regarding the binge eating episodes has to be present. BED patients often tend to have overweight (Forbush & Hunt, 2014).

Next to AN, BN and BED, the DSM-5 also includes Other Specified Feeding or Eating Disorders (OSFED) as well as Unspecified Feeding or Eating Disorders (UFED). Both categories entail symptoms characteristic of a feeding or eating disorder that cause clinically significant distress or impairment in social, occupational or other areas of functioning, but do not fully meet the criteria for any of the specific disorders in the feeding and eating disorder diagnostic class. In the specified disorders, the clinician chooses to communicate the specific reason why the presentation does not meet the criteria for any disorder, i.e. atypical AN; BN or BED of low frequency and/or limited duration; purging disorder; and night eating syndrome, while in the unspecified disorders, the reason is not specified and presentations in which there is insufficient information to make a more specific diagnosis are included.

Disordered eating attitudes and behaviours. Disordered eating attitudes and behaviours can be defined as "behaviour and attitudes toward body perception, eating habits, weight regulation and self-evaluation that

increase the risk of developing clinical eating disorders as well as the risk of developing physical health problems" (Waaddegaard, Thoning, & Petersson, 2003, p. 434). Based on this definition, attitudes such as concerns about weight, shape, and eating; as well as behaviours such as dieting, binge eating, and compensatory behaviour are included. Whereas the use of the DSM-5 reflects a categorical approach, focus on disordered eating attitudes and behaviour reflects a more dimensional approach. The transdiagnostic model of Fairburn et al. (2003) (see Figure 1) is an interesting framework to validate this dimensional approach. Within this transdiagnostic model of eating pathology, an insight is given on the different disordered eating attitudes and behaviours, their relations and how they might evolve and maintain over time. Concerns about weight, shape, and eating and their control (cf. the abovementioned *disordered eating attitudes*), are considered to be the core pathology which contribute to the development of a dysfunctional system of self-evaluation, which in turn leads to the development of more extreme eating pathology symptoms and weight control methods (cf. *disordered eating behaviours*). More specifically, concerns may trigger the start of restrained eating/dieting, which in turn may cause more extreme features to develop, such as objective binge eating and compensatory behaviour. Each disordered eating attitude and behaviour can be considered dimensionally and can be present separately without necessarily fulfilling an ED diagnosis. In contrast, when a specific combination of features is present, this may lead to a clinical eating disorder diagnosis, such as AN, BN and BED. Hence, the transdiagnostic model entails both dimensional and categorical approaches. In adolescence, initial presentations of disordered eating attitudes and behaviour are often subclinical without fulfilling the criteria of a DSM- diagnosis (Bravender et al., 2007; Bravender et al., 2010),

justifying the use of both a dimensional and categorical approach in the current doctoral dissertation.

The Prevalence of Eating Pathology in Adolescence

      Prevalence of eating disorders. Eating disorders are relatively common in adolescent girls and young women, with a peak during adolescence (Gonzalez, Kohn, & Clarke, 2007; Klein & Walsh, 2003). More specifically, the risk of developing an eating disorder seems to be the greatest in the last years of childhood and the first years of adolescence. Adolescence is an important risk period to develop eating pathology as puberty is related to physical changes, which are often related to concerns about body shape and weight (Klein & Walsh, 2003). Furthermore, adolescence might cause additional psychological stress in youngsters, as it is characterised by a number of developmental challenges that have to be completed, such as identity and autonomy. Whether or not these tasks are successfully completed is strongly related to self-esteem and self-evaluation, which might also put adolescents at risk to develop eating pathology. In this period, adolescent are also sensitive and affected by diverse socio-cultural influences, which might also put them at risk (Gowers & Shore, 2001).

      Alonso, Rodriguez, Alonso, Carretero and Martin (2005) showed that 7.8% of the students at a secondary school (12-18 years) were at risk of developing an eating disorder, with a higher risk for girls than boys. Based on the DSM-5 criteria, the prevalence for an eating disorder appears to be 5.7% for female adolescents compared to 1.2% for male adolescents (Smink, van Hoeken, Oldehinkel, & Hoek, 2014; Smink, van Hoeken, & Hoek, 2013). This is consistent with research finding higher prevalence rates of eating disorders in females compared to males. In AN and BN, the female: male ratio is about 10: 1 to 9: 1 whereas this ratio is less

disproportionate in BED. In BED the female: male ratio is about 3: 2 to 3: 1 (APA, 2013).

When looking at eating disorder-specific numbers for female adolescents, the life time prevalence for female adolescent girls appears to be 0.8% for AN, 2.6 for BN and 3% for BED by the age of 20, based on the DSM-5 criteria (Stice, Marti, & Rohde, 2013). Although the current DSM-5 changed the diagnostic criteria of AN and BN in order to make them more transparent and developmentally appropriate and also added the BED diagnosis with as goal to reduce the rest category in the DSM-IV, i.e. the Eating Disorder Not Otherwise Specified category (EDNOS), research using the DSM-5 still showed that most patients are classified in the OSFED and UFED categories. Recent studies in adolescent population (cohort of female twins) showed that almost 10% of these adolescents was situated in the OSFED or UFED category (Fairweather-Schmidt & Wade, 2014; Wade & O'Shea, 2015).

When looking specifically at Flanders, 94% of the patients treated in specialised eating disorder clinics are female ($n = 624$). The age of the patients varies between 8 and 65 years old, with most patients aged between 15 and 20 (44%) and a significant group of patients under the age of 15 (12.5%). Patients with BED were significantly older than patients with AN or BN. Most patients receiving treatment in these clinics were diagnosed with AN of the restricting type (39.5%), followed by the eating disorder not otherwise specified (OSFED or UFED in the current DSM-5) (18.8%). As concerns the other diagnoses, 18% suffered from BN, 13.6% suffered from AN of the purging type and about 10% suffered from BED. Of the patient group, 37% received an additional comorbid diagnosis next to their eating disorder. The patients suffered on average about 5 years and 6 months from their eating disorder. However, in 20% of the patients, the eating disorder lasted for at least 8 years (chronic eating disorder)

(Janssens, 2014). This Flemish study shows that adolescence is an important risk period to develop eating disorders, especially for girls. Although adolescent girls are at risk, research further shows that certain female adolescent groups are even more at risk compared than others, such as elite female adolescent athletes.

Elite athletes seem to have an enhanced risk to develop eating disorders. However, the prevalence rate of eating disorders in athlete populations varies greatly in previous research (Beals & Meyer, 2007; Sundgot-Borgen, 1993, 1994; Sundgot-Borgen & Torstveit, 2004, 2010). One study of Sundgot-Borgen and Torstveit (2004) found that 13.5% of elite Norwegian athletes had a clinical or subclinical (OFSED or UFED in current DSM-5) eating disorder in contrast to 4.6% of the control group. This is somewhat in line with the study of Martinsen and Sundgot-Borgen (2013), who found that 14% of female adolescent athletes suffered from an eating disorder compared to 3.2% of male adolescent athletes. However, this is in contrast to another study that found much higher numbers, i.e. 32.3% of the female athletes suffered from an eating disorder in this study. More specifically, 6.7% suffered from AN, 12.1% from BN and 13.4% from BED, OSFED or UFED. Of the male elite athletes, 17.2% suffered from an eating disorder, of which 7.5% suffered from BN and 9.7% from BED, OSFED or UFED (Dosil, González-Oya, & Dosil, 2008; Torstveit, Rosenvinge, & Sundgot-Borgen, 2008).

This variation in prevalence rates might be due to differences in assessment tools (different questionnaires or interviews used for assessment), athlete sample characteristics (gender, sport discipline, sport levels) and definitions of eating pathology (subclinical or clinical). Even though the prevalence rate varies greatly in previous research, some trends can be distinguished. Eating pathology seems to be more prevalent in (a) athletes compared to non-athletes, particularly in those with a high sport

level, (b) female compared to male athletes and (c) leanness- and weight-dependent sports compared to other sports (Beals & Meyer, 2007; Sundgot-Borgen, 1993, 1994; Sundgot-Borgen & Torstveit, 2004, 2010). In leanness- and weight-dependent sports, low body weight/fat percentage is promoted in order to enable a high strength-to-weight ratio to enhance athletic performance (Byrne & McLean, 2001; de Bruin, Oudejans, & Bakker, 2007; Sundgot-Borgen, 1994; Sundgot-Borgen & Torstveit, 2010). In literature, three such leanness and weight-dependent sports categories are put forward, i.e., endurance sports, sports that specifically work with weight categories and aesthetic sports. Within the aesthetic sports, ballet seems to be a leanness- and weight- dependent sport with a particularly high risk to develop eating pathology (Bachner-Melman, Zohar, Ebstein, Elizur, & Constantini, 2006; Kong & Harris, 2015; Ringham et al., 2006; Sundgot-Borgen & Torstveit, 2004). Therefore, the current dissertation will entail two chapters conducting research in this at risk group of elite aesthetic athletes.

Next to research on eating disorders, it is also important to study disordered eating attitudes and behaviours in community groups as these are often precursors of eating disorders. Knowledge on the prevalence and aetiology of these problems might enhance early detection as well as prevent the development/transition to full-blown eating disorders. In the following paragraph, more information will be provided on the prevalence of disordered eating attitudes and behaviours.

Prevalence of disordered eating attitudes and behaviours. Disordered eating attitudes and behaviours are already observable from the age of 10 (Kaneko, Kiriike, Ikenaga, Miyawaki, & Yamagami, 1999) and gradually expand throughout adolescence. Research suggests higher levels of disordered eating attitudes and behaviours in adolescent girls compared to boys (Klein & Walsh, 2003). However, gender differences in younger

adolescents (*M*age = 11.6 years) are somewhat less profound compared with the gender differences in older adolescents (*M*age = 15.6 years). This is empirically shown in previous research as 34% of boys and 43.5% of girls between 9 and 14 years old reported at least one disordered eating attitude or behaviour, such as restrictive energy intake, skipping mails, binge eating episodes, self-induced vomiting or the use of diet pills, while in an older age group (14- 15 years), 56% of girls and 28% of the boys reported at least one disordered eating attitude or behaviour (Ackard, Fulkerson, & Neumark-Sztainer, 2007).

In a community study of Carter, Stewart, and Fairburn (2001), 13% of the girls (aged 12-14) had weight concerns, 20% had shape concerns, and 24% of the girls restrained their eating to influence weight or body shape on at least half of the days during the past month. Furthermore, objective binge eating (eating an objectively large amount of food in a limited amount of time accompanied with experiencing loss of control) was reported by 21% of the girls, self-induced vomiting by 4%, and use of laxatives and/or diuretics by 1.4% at least once during the past month. A study of Goossens, Soenens, and Braet (2009) showed that binge eating is also observable in Flemish adolescents (*M* age = 14, *n* = 708): 9.3% of the adolescents showed subjective binge eating (eating a subjectively large amount of food accompanied with a feeling of loss of control), 4.8% showed objective binge eating and 2.6% showed both objective and subjective binge eating.

Elite athletes have an even greater risk to develop disordered eating attitudes and behaviours. Again, the prevalence rate of disordered eating attitudes and behaviours varies greatly in previous research (Beals & Meyer, 2007; Sundgot-Borgen, 1993, 1994; Sundgot-Borgen & Torstveit, 2004, 2010). According to Sundgot-Borgen and Torstveit (2004), up to 62% of the female athletes report disordered eating attitudes and/or

behaviours compared to 0 to 33% in male athletes. In female ballet dancers, a group particularly at risk, 29.2% reported extreme dieting, 9.6% self-induced vomiting and 4.5% the use of laxatives (Thomas, Keel, & Heatherton, 2011). The great range in prevalence rates throughout previous research calls for more specific research on the prevalence of disordered eating attitudes and behaviour in well-described athlete samples.

All studies of the current doctoral dissertation will perform research on disordered eating attitudes and behaviours in adolescents and this by investigating different study samples, i.e. community studies, studies on a specific risk group of adolescent aesthetic athletes, and a study on adolescent patients with a clinical diagnosis of AN of the restricting type. As eating pathology often leads to devastating physical and psychological consequences, this will be discussed in the following paragraph.

Prognosis and Consequences of Eating Pathology

Prognosis and consequences of eating disorders. Since all eating disorders share the same core pathology, i.e. a dysfunctional system of self-evaluation, diagnostic crossover is quite common. Longitudinal studies show that 51.5% of the AN patients of the restricting type transfer to AN of the purging type after a 5 year time period and 33% of the AN patients (mainly AN purging type) transfer to BN (Eddy et al., 2008; Eddy et al., 2002; Steinhausen, 2009). Eating disorders are further often accompanied by comorbid psychiatric problems such as mood disorders, anxiety disorders, and obsessive-compulsive disorders (Campbell & Peebles, 2014; Fichter, Quadflieg, & Hedlund, 2006). In more than half of the AN patients, 94% of the BN patients and 80% of the BED patients, at least one comorbid psychiatric diagnosis can be distinguished (Hudson et

al., 2007). In BN patients, substance abuse and non-suicidal self-injury are also often reported (Bulik, Sullivan, Carter, & Joyce, 1997).

Furthermore, only a minority of eating disordered patients seeks medical and/or psychological treatment, i.e. only 33% of AN patients and 6% of BN patients gets psychological treatment (Hoek & van Hoeken, 2003). Of those who get treatment, full recovery is not always obtained. Less of half the patients with AN recovers completely, 33% still shows subclinical disordered eating attitudes and behaviours, 20% still fulfils the diagnosis of AN (chronic AN) and 5% of the patients dies due to medical complications or suicide (Arcelus, Mitchell, Wales, & Nielsen, 2011; Berkman, Lohr, & Bulik, 2007; Hoek, 2006; Steinhausen, 2002). Short-time treatment for BN seems to be effective and long term prognosis is slightly better than the prognosis for AN : 50% of the patients achieve full recovery, 20% continue to meet full criteria and 30% experience relapse into bulimic symptoms. Furthermore, the mortality rate is five times lower compared to AN (Arcelus et al., 2011; Steinhausen, 2002, 2009; Stice et al., 2013). In general, an early intervention and treatment is related to better prognostic outcomes.

Next to the detrimental effects of eating disorders on the individuals' quality of life, as reflected in psychosocial consequences such as social isolation, decrease of school results, etc. (Klein & Walsh, 2003), physical health is also affected. Eating disorders may have serious medical complications, which are mainly related to extreme energy restriction and/or binge/purge episodes. Extreme energy restriction may lead to the loss of menstruation, which may lead to infertility and osteoporosis. Especially in adolescents, this may have devastating effects as growth, pubertal development, bone density and cognitive functioning may be affected. Hypotension and bradycardia are also common complications of energy restriction, as well as changes in the metabolic functions, i.e. body

temperature will drop and patients will often experience cold and bleu hand and feet. Other symptoms that may occur are hair loss, dry skin, anaemia and misbalance in minerals and vitamins. Binge eating and/or purging episodes may also cause hypotension as well as serious deficits in the electrolyte-balance, which may lead to kidney, liver and hear problems. Recurrent self-induced vomiting may affect the oesophagus, teeth and throat leading to long term sore throat and hoarseness (Bravender et al., 2007; Gonzalez et al., 2007; Herpertz-Dahlmann et al., 2015; Klein & Walsh, 2003; Mond & Hay, 2007).

Prognosis and consequences of disordered eating attitudes and behaviours. Although the presence of disordered eating attitudes and behaviours like eating pathology concerns, restraint, binge eating and compensatory behaviour (without fulfilling a DSM-5 diagnoses) may have a similar impact on physical and psychosocial functioning, this impact is on average less severe compared to full-blown eating disorders. However, it needs to be noted that eating pathology and the related medical complications may lead to more severe and irreversible problems during puberty compared to other age groups, stressing the importance of early detection and treatment in children and youngsters (Bravender et al., 2010).

Furthermore, longitudinal studies have found disordered eating attitudes and behaviours in children and adolescents to be stable for a 6-month time period (Matton, Goossens, Braet, & Van Durme, 2013) as well as predictive for the development of full-blown eating disorders (Neumark-Sztainer et al., 2006) and obesity later in life (Kotler, Cohen, Davies, Pine, & Walsh, 2001). Consequently, as disordered eating attitudes and behaviours are often the precursor of eating disorders, research on the development and maintenance of these problems will be important in order to enhance early detection as well as to prevent the

development/transition to full blown eating disorders with devastating physical and psychological impairment as consequence. In what follows, we will first discuss the detection/assessment of eating pathology.

Assessment of Eating Pathology[1]

Currently, the 'Eating Disorder Examination' (EDE; Cooper & Fairburn, 1987), a semi-structured clinical interview, is still considered as the golden standard for diagnosing eating disorder pathology in adults as it adequately assesses the core pathology of eating disorders following the transdiagnostic model of Fairburn et al. (2003). The following disordered eating attitudes and behaviours are measured: weight concern, shape concern and eating concerns *(attitudes)* as well as restraint, binge eating and compensatory behaviour *(behaviours)*. Within the EDE, the interviewer has the ability to explain complex concepts, such as binge eating and loss of control and to adjust the questions to the cognitive abilities of the interviewee to ensure correct scoring (BryantWaugh, Cooper, Taylor, & Lask, 1996). Due to the training requirement and time costs of the EDE, the 'Eating Disorder Examination-Questionnaire' (EDE-Q; Fairburn & Beglin, 1994) has been proposed as a possible alternative. This self-report questionnaire can be administered in group, which guarantees the anonymity of the respondent, making it less time- and cost-consuming. To ensure whether the questionnaire may be used as a screening tool, it is important to investigate the convergence between the interview and the questionnaire in order to optimise the quality of assessment and enhance early detection (Berg, Peterson, Frazier, & Crow, 2011).

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[1] Part of this paragraph is based on: Van Durme, K., Craeynest, E., Braet, C., & Goossens, L. (2015). The detection of eating disorder symptoms in adolescence: A comparison between the Children's Eating Disorder Examination and the Children's Eating Disorder Examination Questionnaire. Behaviour Change, 32, 190-201

The convergence between the EDE and the EDE-Q was first investigated in several studies with adults (e.g.; Carter et al., 2001; Fairburn & Beglin, 1994). The results were generally consistent and showed a strong correlation between the subscales of the interview and the questionnaire, i.e. restraint, weight concern, shape concern and eating concern. Nevertheless, the scores on each of the subscales of the EDE-Q were higher than those on the EDE. More specifically, the agreement between the EDE and the EDE-Q was the strongest for unambiguous features like restraint, self-induced vomiting and laxative abuse. Larger differences were found between the interview and the questionnaire if more ambiguous concepts such as binge eating were reported. More recently, some studies also investigated the convergence between the EDE and the EDE-Q in adolescents with subclinical and clinical forms of AN and BN (Binford, Le Grange, & Jellar, 2005; Passi, Bryson, & Lock, 2003). The results were generally consistent with the findings in adults. However, in these studies, adolescents with eating disorders scored lower on the EDE and the EDE-Q than adults with the same diagnosis. This might be due to the nature of the assessment tools, which do not take into account specific developmental aspects, thereby questioning the usefulness of the adult EDE and the EDE-Q in adolescents. The fact that adolescents do not have the same cognitive and emotional skills as adults, ensures that the abnormal eating behaviour they show is often less explicitly present. Furthermore, adolescents often underestimate or minimize the severity of the eating disorder symptoms, making it difficult to detect and diagnose them (e.g., BryantWaugh et al., 1996). In addition, the assessment tool itself can influence the reporting behaviour of adolescents: the shorter duration of the questionnaire and the increased sense of anonymity on the EDE-Q could possibly be more desirable in adolescents with reduced reporting behaviour on the interview as result

(Passi et al., 2003). For the above-mentioned diagnostic problems, child versions of the interview and the questionnaire were developed, namely the 'Child Eating Disorder Examination' (ChEDE; BryantWaugh et al., 1996; Decaluwé & Braet, 1999b) and the 'Child Eating Disorder Examination-Questionnaire' (ChEDE-Q; Decaluwé & Braet, 1999a).

To justify the use of the child version of the questionnaire, the ChEDE-Q, in this doctoral thesis, there needs to be evidence for good reliability as well as for good convergence between the ChEDE and the ChEDE-Q in adolescents. This in order to confirm the utility of the ChEDE-Q for the detection of disordered eating attitudes and behaviours in youngsters from the general population (Berg et al., 2011). Therefore, a recent study of Van Durme, Craeynest, Braet, and Goossens (2015) administered both the ChEDE and ChEDE-Q in a group of adolescents from the general population (N = 57; Mage = 13.4). As concerns the questionnaire, a sufficient internal consistency was found for the various subscales, i.e. restraint, weight concerns, shape concerns and eating concerns (α = .78 to α = .95), which seems to be in accordance with the study by Goossens and Braet (2010) in overweight youngsters. As concerns the convergence between the ChEDE and the ChEDE-Q, a significant correlation was found for each of the four subscales of the interview and the questionnaire with partial correlation coefficients ranging from r = .63 to r = .87 which is in line with previous research in adults and overweight youngsters (Berg et al., 2011; Decaluwé & Braet, 2004; Goossens & Braet, 2010). Furthermore, no significant differences were found between the mean scores of the questionnaire and the interview. This high degree of agreement implies that the adolescents in this sample reported as accurate on the interview as on the self-report questionnaire. Moreover, this might indicate that the questionnaire is as reliable as the interview to detect eating disorder symptoms in adolescents

meaning that the questionnaire maybe particularly useful as a screening tool for eating disorder symptoms in the general population, as the four continuous subscales allow to assess concerns about weight, shape and eating (*disordered eating attitudes*) and dieting (*disordered eating behaviour*). Other disordered eating behaviours, i.e. binge eating and compensatory behaviour, can also be assessed by the ChEDE-Q by using the additional categorical items. The structure of the ChEDE-Q is therefore highly convergent with the conceptualisation of eating pathology in the current doctoral dissertation (see above-mentioned part on definition of eating pathology).

Aetiology of Eating Pathology

Research on the development and maintenance of eating pathology is important in order to develop adequate detection, prevention and treatment programs. In this part on the aetiology of eating pathology, we will start with the discussion of some theoretical approaches. First, some general information on the multi-causal model of eating disorders from a biopsychosocial view will be provided. Next, focus will be narrowed down to the proposed relationship between insecure attachment and eating pathology and the possible underlying role of emotion regulation by discussing the Interpersonal Vulnerability Model (IPV-model; Rieger et al., 2010; Wilfley, Pike, & Striegel-Moore, 1997), the attachment theory (Bowlby, 1973, 1982) and the Emotion Regulation model of attachment (ER-model; Shaver & Mikulincer, 2002). These models are highly related as they all point to insecure attachment as risk factor of psychopathology/eating pathology as well as to the possible intervening role of maladaptive emotion regulation. The difference lies in the fact that the IPV-model makes no distinction between different attachment dimensions and emotion regulation strategies, in contrast to the ER-model

of attachment. Hence, the inclusion of separate paragraphs on each model is somewhat arbitrary as they show overlap. Next to the discussion of the theoretical approaches, the current empirical evidence will be provided.

Theoretical Approaches

Multi-causal model. The multi-causal model has been generally accepted and still figures as the most important aetiological model in the eating disorders literature (e.g.; Jansen, 2001). The model consists of an abstraction of causal and maintenance factors. This model also encompasses the biopsychosocial view where biological, psychological, and social levels of explanation can be distinguished within a number of predisposing, eliciting, and maintenance factors (see Figure 2). Hence, eating pathology is generally considered to be the result of an interaction between several biological, cultural, personality and family factors (Klein & Walsh, 2003; Polivy & Herman, 2002). Surprisingly, despite the fact that developmental psychopathology acknowledges the existence of several developmental pathways; research on the aetiology of eating pathology is still evolving (Prins & Braet, 2008).

The multi-causal model can be fitted within the diathesis–stress model, a psychological theory that attempts to explain psychopathology as the consequence of a predispositional vulnerability together with stress from life experiences (Ingram & Luxton, 2005). This diathesis can take the form of genetic, psychological, biological, or situational factors. Although in psychology, genetic, biological and social factors are acknowledged as vulnerabilities, psychological mechanisms are seen as the most important diatheses to study. The current dissertation wants to investigate whether insecure attachment might be seen as one such vulnerability for the development of psychopathology (disordered eating attitudes and behaviours). In the next paragraphs, three important theories that

emphasize insecure attachment as a diathesis will be further explained in detail, i.e. the interpersonal vulnerability model, the attachment theory and the emotion regulation model of attachment.

Interpersonal Vulnerability Model. According to the IPV-model (Rieger et al., 2010; Wilfley et al., 1997), disturbances in the early parent-child relationship lead to insecure attachment. This in turn leads to a low self-esteem and social self-disturbance that then may lead to an increase of negative affect combined with less coping skills for emotion regulation. This may ultimately result in eating pathology (or other dysfunctional emotion regulatory behaviour) (Wilfley et al., 2007). So, it is assumed that inadequate attachment is related to a lack in functional emotion regulatory behaviour, i.e. one would fail to deal with emotions or stress in an appropriate manner and mechanisms would emerge that temporarily reduce, compensate or neutralize the experienced emotions such as extreme dieting, binge eating, self-induced vomiting, excessive exercise or self-injurious behaviour. Although the IPV-model (Rieger et al., 2010; Wilfley et al., 1997) points to maladaptive emotion regulation as an intervening factor in the relationship between insecure attachment and eating pathology, this model makes no distinction between different insecure attachment dimensions or emotion regulation strategies. Hence, no assumption on differential relationships can be distinguished. To get more specific hypotheses on possible specific and differential relationships between attachment, emotion regulation and eating pathology, the attachment theory (Bowlby, 1973, 1982) and the emotion regulation model of attachment (Shaver & Mikulincer, 2002) need to be thoroughly discussed.

Attachment theory. According to the attachment theory (Bowlby, 1973, 1982), attachment is viewed as a behavioural system that stimulates both safety and exploratory behaviour, which in turn leads to the

development of adaptive social skills and adequate emotion regulation (facilitates socialisation). The goal of the system for a child is to feel secure by pursuing proximity towards attachment figures in times of actual or symbolic threat. Early experiences with primary caregivers in childhood lead to the development of an internal working model (cognitive schema) which consists of two representations. Firstly, it contains expectations about the caregiver's availability in times of need (safe haven). Secondly, it entails a representation of the self as being (or not being) worthy of taking care for. This internal working model (based on early childhood experiences) determines whether or not secure attachment patterns will be established and influences social interactions further in life. Secure attachment can therefore only be obtained when attachment figures are/were available and responsive to a child in times of need.

When attachment figures are not available and responsive, no sense of security can be obtained and insecure attachment patterns will emerge. Although a dimensional view on attachment is widely accepted and used within the general attachment domain (Brennan, Clark, & Shaver, 1998; Mikulincer & Shaver, 2007a), it has rarely been adopted within EP research even though it might help to draw conclusions on more specific relationships. According to this dimensional view on attachment, two dimensions can be distinguished, attachment anxiety and attachment avoidance. Attachment anxiety develops when primary caregivers are inconsistently available and responsive during childhood and refers to a strong need for closeness, worries about relationships and others not being available and fear of being rejected. Attachment avoidance develops when primary caregivers are not at all available and responsive during childhood and refers to distrusting others, striving to independence and emotional distancing from others (Brennan et al., 1998). The attachment theory is seen as a general model to understand developmental pathways leading to

psychopathology (Mikulincer & Shaver, 2007b). Additionally, the attachment theory refers to a mechanism that could enhance the comprehension of these developmental pathways, namely emotion regulation.

Hence, the different attachment dimensions are not only reflected in different attachment behaviours but also in different emotion regulatory behaviour. Emotion regulation is a multidimensional concept and can be defined as 'all the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goal'(Thompson, 1994, p.27). Maladaptive emotion regulation might then be understood as deficits in the ability to adequately cope with challenging emotions, a factor that has repeatedly been linked to different psychological problems, including eating pathology (Berking & Wupperman, 2012).

Emotion regulation model of attachment. The emotion regulation model of attachment (Mikulincer, Shaver, & Pereg, 2003; Shaver & Mikulincer, 2002) is congruent with the abovementioned theoretical assumptions of the attachment theory and explains how people adopt different strategies to regulate emotional distress based on their quality of attachment (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002) (see Figure 3). Securely attached children more likely use proximity and support seeking, which facilitates adaptive emotion regulation strategies (also defined as the primary emotion regulation strategy), due to its effectiveness in the past. However, insecurely attached children will less likely seek proximity and support to relieve distress (Dujardin et al., 2016), but instead will develop alternative, secondary emotion regulation strategies (strategies other than proximity seeking) (Brumariu, 2015). These alternative emotion regulation strategies refer to deficits in the ability to adequately cope with challenging emotions

and are therefore defined as maladaptive (Berking & Wupperman, 2012). According to the emotion regulation model of attachment, individuals high on attachment anxiety are characterized by their frequent use of hyperactivating strategies whereas those high on attachment avoidance frequently use deactivating strategies. Hyperactivation refers to recurrent frustrating attempts to minimize distance from attachment figures and entails: eliciting attention through clingy and controlling responses, an enhanced focus on attachment figures and relationships, enhanced activation of negative emotions and thoughts and failure to detach from psychological pain, all leading to a heightened mental rumination on threat-related concerns. Deactivation on the other hand refers to recurrent attempts to maximize distance from attachment figures and entails: avoidance of interdependence, strive for self-reliance and control leading to suppression of distressing thoughts and suppression of painful memories (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002).

Both hyperactivation and deactivation may be adaptive for a short time period by reducing negative feelings towards primary caregivers who have been unavailable or unresponsive. However, continued use of these hyperactivating or deactivating ER strategies throughout life appears to be maladaptive and is associated with psychological problems (Mikulincer et al., 2003). Hence, this ER-model of attachment assigns an intervening role to hyperactivating or deactivating ER strategies in the relationship between the insecure attachment dimensions and psychopathology.

In sum, the attachment system develops in early childhood but remains of importance during one's whole life. However, it needs to be noted that subtle changes in the attachment configuration may occur throughout life, and this depending upon the context and attachment related experiences with different attachment figures (Bowlby, 1973,

1988; Waters et al., 2000). Secure attachment patterns enhance mental health, interpersonal functioning and psychological growth. Insecure attachment, on the contrary, has frequently been identified as a risk factor in all age groups and this for various forms of psychopathology, such as depression, anxiety disorders and eating disorders (Bowlby, 1982; Mikulincer & Shaver, 2007a, 2007b).

Empirical Evidence.

   Insecure attachment and eating pathology. Although family factors have received a lot of attention in eating pathology research and evidence for a link between insecure attachment and eating pathology has only been established since 1989 by research of Armstrong and Roth, recent research is still trying to entangle the specific role of attachment in the development and maintenance of eating pathology. In what follows, we will start with the discussion of the link between attachment and eating pathology in adults to end with the research performed in adolescents.

   Several studies found a higher prevalence of insecure attachment in an adult eating disordered population compared to adult non-clinical samples (Okearney, 1996; Tasca & Balfour, 2014; Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000; Zachrisson & Skarderud, 2010), as well as cross-sectional associations between insecure attachment and eating pathology in both adult clinical (Broberg, Hjalmers, & Nevonen, 2001; Troisi et al., 2006) and non-clinical samples (Kiang & Harter, 2006). Although across studies different measures of attachment style were used (with a categorical view), i.e. self-report measures or interview-based measures, similar results were found. However, most of the above-mentioned research is focused on romantic attachment and to lesser extent on parental attachment. Furthermore, although some research is also performed in late adolescence (e.g. Pace,

Cacioppo, & Schimmenti, 2012), research on parental attachment and eating pathology in pre and early adolescence is scarce according to a recent review of Jewell et al. (2016). This reflects a gap in the literature, which is surprising, since –as already mentioned - early adolescents are a group particularly at risk for eating pathology (Klein & Walsh, 2003) and parental factors still having great influence on the development of early adolescents (Fiese, 1997; Soenens et al., 2008). Furthermore, research seems to suggest that the parent–child relationship in early adolescence is predictive for a general vulnerability for psychopathology toward adolescence (Mezulis, Hyde, & Abramson, 2006).Therefore, parental attachment might be an important factor to take into account in eating pathology research in this age group.

The few available studies on parental attachment and disordered eating attitudes and behaviours in pre and early adolescents were conducted in both the general population and overweight youngsters. These studies found associations between insecure attachment towards the mother and the presence of weight and shape concerns in pre-adolescent girls, aged 9 to 12, (Sharpe et al., 1998;), and overweight boys and girls aged 10 to 17. Further, insecure attachment towards father was uniquely linked with weight concerns (Bosmans et al., 2009). Both studies included attachment styles (categorical view). A recent, and to our knowledge first, longitudinal study of Goossens, Braet, Van Durme, Decaluwé, and Bosmans (2012) provided preliminary evidence for a prospective association between insecure attachment towards mother and dietary restraint, eating concerns, weight concerns, shape concerns, and adjusted BMI in children (8-11 years) from the general population. Insecure attachment towards father was predictive for persistence in children's subjective binge eating episodes. Although the father-child relationship may have a differential impact on eating pathology compared to the

mother-child relationship, research demonstrates that the relationship with mother is more strongly associated with children's eating pathology and weight status compared to the relationship with the father (Goossens et al., 2012). This might be developmentally explained by the fact that the mother is mainly considered the primary caregiver with most responsibility and influence on the eating attitudes and behaviours (Winnicott, 1957). This explains why the current doctoral dissertation focuses on parental attachment towards mother to investigate the link with eating pathology in adolescents. The available studies on parental attachment and disordered eating attitudes and behaviours in pre and early adolescents further showed a lack of research in both at-risk and clinical groups, leading the current doctoral dissertation to not only conduct research in community samples both also in elite female ballet dancers and female eating disordered adolescents.

Although previous research is consistent in finding an association between insecure attachment and eating pathology in children, adolescents and adults (Jewell et al., 2016), research results are often difficult to compare due to different conceptualisations and operationalisations of both the attachment and eating pathology concept. As concerns attachment, the categorical view is most often applied in EP research. However, there is little convergence in a) the measurement of attachment, i.e. self-report measures (e.g. the relationship questionnaire (Bartholomew and Horowitz, 1991)) or interview-based measures (e.g. the Adult Attachment Interview (George, Kaplan & Main, 1984)), and b) the attachment figure on which the study is focused, i.e. romantic attachment or parental attachment across studies. As concerns eating pathology, little convergence can be found in a) the definition of disordered eating attitudes and behaviours and b) the measurement of eating pathology, i.e. self-report questionnaires (e.g. the Eating Disorder Inventory (Garner et al.,

1983)) or interview-based measures (e.g. ChEDE (Bryan-Waugh et al., 1996)).

Furthermore, little convergence can be found concerning the association between the specific attachment styles (categorical view) and the different disordered eating attitudes and behaviours. Although some studies found both anxious and avoidant attachment to be related to different kinds of eating pathology (e.g. Ward et al., 2000); others did found specific associations. Some found anxious attachment (e.g. Eggert, Levendosky, & Klump, 2007); others found avoidant attachment to be more related to eating pathology in general (e.g. ColeDetke & Kobak, 1996). Still others found dismissive attachment styles to be associated with symptoms of anorexia nervosa of the restricting type and preoccupied attachment styles with symptoms of anorexia nervosa of the purging type and bulimia (Candelori & Ciocca, 1998). However, in general, associations between anxious attachment and disordered eating attitudes and behaviour seem to be more consistent in previous research (Cash, Theriault, & Annis, 2004; Eggert et al., 2007; Zachrisson & Skarderud, 2010), while regarding the role of attachment avoidance, studies have yielded mixed results (Cash et al., 2004; Kiang & Harter, 2006). Due to these inconsistencies, no decisive conclusions can be drawn about possible specific effects of attachment. Additionally, even though a dimensional view on parental attachment is widely accepted and used within the general attachment domain (Mikulincer & Shaver, 2007b), this view has rarely been adopted within EP research. This is somewhat inconsistent with the research of Fraley and Waller (1998) showing that there is no evidence for a true attachment typology. The attachment styles are better conceptualised as regions in a two-dimensional space. Precision is lost whenever you use the categorical measures instead of the continuous scales. To our knowledge, only one study of Shanmugam, Jowett, and

Meyer (2012) in adult athletes used this two-dimensional view and found both attachment anxiety and attachment avoidance to be related to elevated levels of eating pathology.

Underlying role of emotion regulation? The existence of an association between attachment and eating pathology does not tell how attachment is theoretically and empirically linked to eating pathology. In their review, Zachrisson and Skarderud (2010) posit theoretical hypotheses to explain the relationship between insecure attachment and eating pathology, of which the existence of an indirect effect is considered most plausible. This view acknowledges that attachment might be of importance but perhaps acts as a more distal factor and affects eating pathology through possible mediating factors. Based on the theoretical propositions of both the IPV- model (Wilfley et al., 1997) and the emotion regulation model of attachment (Shaver & Mikulincer, 2002), our central statement is that emotion regulation may act as a possible intervening variable in the relationship between the insecure attachment dimensions and eating pathology. In general, maladaptive emotion regulation has been empirically linked to eating pathology in both adolescents and adults (Aldao & Nolen-Hoeksema, 2010; Ball & Lee, 2000; Sim & Zeman, 2005). Most research so far found eating disordered individuals to score higher on maladaptive coping/emotion regulation strategies compared to healthy controls. Moreover, it was found that they use more maladaptive emotion-focused (way of regulating emotions, aimed to ameliorate the negative emotions resulting from stressful situations) and avoidance-focused coping (strategies avoiding stressful situations or escaping negative affect) and less adaptive problem-focused coping (efforts directly trying to alter the stressful situation) than controls (Ball & Lee, 2000; Sim & Zeman, 2005). Emotion- and avoidant- focused coping were not only examined in clinical eating disordered samples but also in the general

population, where they have been related to several disordered eating attitudes and behaviours such as dieting, binge eating and disordered eating attitudes (Ball & Lee, 2002; Freeman & Gil, 2004). Research further shows that maladaptive emotion regulation is more strongly linked to eating pathology compared to the non-use of adaptive emotion regulation strategies in both pre adolescents and adults (Aldao & Nolen-Hoeksema, 2010; Czaja, Rief, & Hilbert, 2009). More specifically, Aldao and Nolen-Hoeksema (2010) found the use of the maladaptive strategies of rumination and suppression (of distressing thoughts) to be more strongly associated with eating disorders in adults than the non-use of the adaptive strategies of reappraisal and problem solving. Based on the ER-model of attachment, rumination and suppression can be defined as hyperactivating and deactivating ER strategies. Further, several researchers (e.g. Ball & Lee, 2000; Polivy & Herman, 2002) suggest that disordered eating attitudes and behaviours such as dieting, fasting, binge eating, vomiting can possibly be used to regulate and manage painful emotional states (by leading to temporary relief from negative affect) or to escape self-awareness, i.e. negative self-evaluations, and related distress (Heatherton & Baumeister, 1991; Stice, 2001).

In sum, although both insecure attachment and maladaptive emotion regulation have been directly associated with eating pathology in several empirical studies, only few studies have been investigating the possibility of the assumed mediation effects proposed by the interpersonal vulnerability model and the emotion regulation model of attachment in the eating disorder domain, which is in contrast to research on other psychological problems, where the emotion regulation model of attachment has already been cross-sectionally and longitudinally confirmed for negative mood, interpersonal problems and depression in

both adolescents and adults (e.g. Brenning, Soenens, Braet, & Bosmans, 2012; Wei, Vogel, Ku, & Zakalik, 2005).

As concerns the eating disorder domain, Ty and Francis (2013) found the relationship between insecure attachment and disordered eating to be mediated by emotion dysregulation and social comparison in adult women (n = 247), while Tasca et al. (2006) found a mediation model in which attachment insecurity may lead to both negative affect and body dissatisfaction, both of which in turn may lead to restrained eating among women with eating disorders. However, the cross-sectional studies of both Ty and Francis (2013) and Tasca et al. (2006) made no differentiation between different attachment dimension and maladaptive emotion regulation strategies making it difficult to confirm the theoretical propositions of the emotion regulation model of attachment. To our knowledge, only one empirical study of Tasca et al. (2009) investigated the emotion regulation model of attachment, and this in a cross-sectional study in adult female eating disordered patients. They found partial evidence for the model is such a way that attachment anxiety contributed to eating pathology symptoms through hyperactivating emotion regulation strategies, while attachment avoidance was only directly linked to eating disorder symptoms. The results of this study are promising but ask for replication and it needs to be investigated whether this model also holds for younger age groups as well as for diverse samples (i.e., community samples, at risk groups and clinical groups).

Research Questions and Overview of the Empirical Studies

Based on the findings that were presented above, we may conclude that empirical research regarding the applicability of the interpersonal vulnerability model and the emotion regulation model in the eating disorder domain is promising but still scarce, especially in adolescents. Nevertheless, studying the relationships between insecure attachment dimensions, maladaptive emotion regulation strategies and disordered eating attitudes and behaviour in adolescence may be of theoretical and clinical relevance. Theoretically, increased evidence on the interpersonal vulnerability model and the emotion regulation model in the eating disorder domain may increase aetiological knowledge and may provide guidelines for the development of more comprehensive aetiological models for eating pathology. Hence, it may provide insights in the development and underlying mechanisms of disordered eating attitudes and behaviours. Clinically, the insights of this research may have implications for future prevention programs as well as treatment protocols for eating pathology as both attachment and emotion regulation processes may need to be targeted. Additionally, studying adolescents, a group specifically at risk for eating disorders, as well as specific at-risk groups and a clinical group of eating disordered adolescents, may enhance the early detection of disordered eating attitudes and behaviours, decreasing the risk of transitioning to full-blown eating disorders.

Based on the abovementioned gaps in literature, **two main research questions** were investigated throughout the current dissertation: 1) Can we find the hypothesized association between insecure attachment and disordered eating attitudes and behaviours in adolescents and 2) Can we demonstrate that maladaptive emotion regulation might function as an underlying mechanism within this association?

This doctoral dissertation consists of eight chapters, including an introduction, six empirical studies and a general discussion, all of which are intended to answer these questions with different rigorous designs and samples. First, the research questions will be exploratory investigated in a cross-sectional community-based sample (chapter 2). Next, in order to test whether insecure attachment and maladaptive emotion regulation are related to increases in eating pathology over a one-year team period, the research questions will be longitudinally tested in a community-based sample of adolescents (chapter 3) and an at-risk group of elite female ballet dancers (chapter 4 and 5). Hence, both studies may provide aetiological information on the development of disordered eating attitudes and behaviours and may thereby provide clinical guidelines for prevention programs. These guidelines may turn out to be sample-specific depending on the similarity of results of both studies. Consequently, chapter 6 wants to investigate whether the same relationships hold for a clinical group of adolescents with Anorexia Nervosa of the Restricting type, as this may hold specific implications regarding the treatment of these patients. In the last chapter (chapter 7), a more rigorous, experimental, design will be used to investigate whether the association between insecure attachment and disordered eating attitudes may be explained by (moderated by) changes in affect after stress induction.

In what follows, a brief overview is provided of the specific goals of the six empirical studies and their added value to the research on the role of insecure attachment and maladaptive emotion regulation in the development and maintenance of eating pathology in adolescents. As part of Table 1, a concise overview is provided of the several samples that were recruited in each of the empirical chapters.

Chapter 2: Insecure Attachment and Eating Pathology in Early Adolescence: Role of Emotion Regulation

As already stated in the introduction, disordered eating attitudes and behaviours are already observable at the age of 10 (Kaneko et al., 1999) and seem to be predictive for the development of full-blown eating disorders (Neumark-Sztainer et al., 2006; Stice, 2002) and obesity later in life (Kotler et al., 2001). Although insecure attachment was already related to disordered eating attitudes and behaviours (eg. Zachrisson & Skarderud, 2010), research was mainly conducted in adult samples. Also, research using a dimensional view on parental attachment is scarce as well as research looking at the possible intervening role of maladaptive emotion regulation, making it difficult to empirically test the theoretical assumptions of the IPV-model (Wilfley et al., 1997).

Chapter 2 aimed to add to the limited research on this topic by investigating the IPV-model in a cross-sectional community-based study of early adolescents from 10 to 15 years old (n= 952, 54.6% female). Before examining the proposed model, we first looked at the occurrence of disordered eating attitudes and behaviours in the current sample. Four types of disordered eating attitudes and behaviours were measured using the 'Child Eating Disorder Examination-Questionnaire' (ChEDE-Q; Decaluwé & Braet, 1999b), namely concerns (about eating, weight and shape), restraint, objective binge eating and purging. We opted to use the ChEDE-Q (Decaluwé & Braet, 1999b) as it is a valid and reliable instrument that offers a worthy alternative for the EDE interview, especially when assessing eating pathology in community samples, as was also mentioned in the introduction of the present dissertation (Van Durme et al., 2015).

A second aim of this chapter was to investigate the association between insecure attachment and disordered eating attitudes and

behaviours in early adolescents using a dimensional view on parental attachment by administering the Experiences of Close Relationships-Revised-Child Version (ECR-R-C; Brenning, Soenens, Braet, & Bosmans, 2011) and to investigate whether maladaptive emotion regulation may function as a intervening variable by using the Questionnaire to Assess Children's and Adolescents' Emotion Regulation strategies (FEEL-KJ; Braet, Cracco, & Theuwis, 2013; Cracco, Van Durme, & Braet, 2015; Grob & Smolenski, 2005). Based on the theoretical assumptions of the IPV-model (Wilfley et al., 1997) and based on preliminary empirical evidence in adult eating disordered patients (Tasca et al., 2009), **we hypothesized that the relationships between the attachment dimensions (attachment anxiety and attachment avoidance) and the different disordered eating attitudes and behaviours would be, at least partially, mediated by maladaptive emotion regulation strategies.**

Chapter 3: The role of Attachment and Maladaptive Emotion Regulation Strategies in the Development of Bulimic Symptoms in Adolescents

Due to the scarcity of research using a dimensional view on parental attachment in the eating disorder domain and research looking at the possible mediating role of maladaptive emotion regulation, Chapter 2 cross-sectionally tested the theoretical assumptions of the IPV-model in a community sample of early adolescents. Although the IPV-model (Rieger et al., 2010; Wilfley et al., 1997) points to maladaptive emotion regulation as a mediating factor in the relationship between insecure attachment and eating pathology, this model makes no distinction between different insecure attachment dimensions or emotion regulation strategies. To test hypotheses on possible specific and differential relationships between attachment, emotion regulation and eating pathology, the emotion

regulation model of attachment (Shaver & Mikulincer, 2002) may be used as theoretical framework. According to this model, people adopt different strategies to regulate emotional distress based on their quality of attachment. Securely attached individuals more likely use proximity and support seeking as emotion regulation strategy, while insecurely attached individuals will less likely seek proximity and support to relieve distress (Dujardin et al., 2016), but instead will develop alternative, maladaptive secondary emotion regulation strategies (Brumariu, 2015). According to the emotion regulation model of attachment, individuals high on attachment anxiety are characterized by their frequent use of hyperactivating strategies whereas those high on attachment avoidance frequently use deactivating strategies. Continued use of these hyperactivating or deactivating emotion regulation strategies throughout life appears to be maladaptive and is associated with psychological problems (Mikulincer et al., 2003).

Although this model has already been empirically confirmed for negative mood, interpersonal problems and depression (e.g. Brenning et al., 2012; Wei et al., 2005), only few, cross-sectional, studies have empirically investigated the possibility of the assumed intervening effects in the eating disorder domain (e.g. Tasca et al., 2009). However, this might be of importance as finding a differential prospective relationship between the attachment dimensions and specific maladaptive ER strategies may have theoretical implications as well as clinical implication for the prevention of bulimic symptoms. Moreover, when people adopt different emotion regulation strategies based on their attachment configuration, this difference should be reflected in a different approach when working on emotion regulation.

Therefore, chapter 3 aimed to add to the research on this topic by investigating the emotion regulation model of attachment in a longitudinal

study in a community-based sample of adolescents (Mage $= 14.02$; $n= 397$, 62.7% female). Following the theoretical propositions of the emotion regulation model of attachment (Mikulincer et al., 2003; Shaver & Mikulincer, 2002), together with the lack of empirical prospective research on this model for bulimic symptoms, chapter 3 wants to investigate whether the two attachment dimensions have a differential longitudinal relationship with bulimic symptoms through specific maladaptive emotion regulation strategies. **It was hypothesized that higher levels of attachment anxiety would be related to more bulimic symptoms one year later through hyperactivating emotion regulation strategies, whereas higher levels of attachment avoidance was expected to be related to more bulimic symptoms one year later through deactivating strategies.**

Chapter 4: Adolescent Aesthetic Athletes: A Group at Risk for Eating Pathology?

As stated in the introduction, female athletes in aesthetic sports, i.e. a leanness and weight-dependent sport category, generally seem to have an enhanced risk to develop eating pathology (eg. Sundgot-Borgen & Torstveit, 2010; De Bruin, 2007; Kong & Harris, 2015). However, when comparing different studies on eating pathology in athlete groups, the prevalence rate of disordered eating attitudes and behaviours in athlete populations varies greatly, which might be due to differences in assessment tools, athlete sample characteristics and definitions of eating pathology making it difficult to retract conclusions (Beals & Meyer, 2007; Sundgot-Borgen, 1999, 2002, 2004; Sundgot-Borgen & Torstveit, 2004). Furthermore, information on disordered eating attitudes and behaviours in Flemish aesthetic athletes and whether or not they confer a great risk are, to our knowledge, non-existent.

Chapter 4 adds to this gap in the literature by investigating, as first aim, whether male and female elite adolescent aesthetic athletes (n=68, M=14.6 years) in Flanders, particularly ballet dancers and figure skaters, exhibit more disordered eating attitudes and behaviours compared to normative data of adolescents from the general population. Based on previous research, **we hypothesized that especially female adolescent aesthetic athletes will report more concerns, restraint, binge eating and compensatory behaviour compared to female adolescents from the general population.**

The second goal of the current study was to investigate whether sport-related factors like sport-level (hours of sport per week) and competition anxiety (both as trait and state) explain aesthetic athletes' dieting behaviour, as well as the additional explanatory value of more general risk factors. The general risk factors are depicted from the transdiagnostic model of Fairburn et al. (2003). Both the assumed preceding (weight concern, shape concern and eating concern) and sustaining factors (perfectionism, low self-esteem, emotional intolerance and interpersonal difficulties) of eating pathology were examined. Based on general aetiological knowledge of eating pathology and the finding that enhancement of performance is the primary reason to lose weight in elite athletes (Martinsen, Bratland-Sanda, Erikson, and Sundgot-Borgen, 2010), **it was hypothesized that both sport-related and general risk factors will have an impact on aesthetic athletes' dieting behaviour.** Finding an effect of the sustaining factors emotional intolerance and interpersonal difficulties can provide preliminary evidence for the role of attachment and emotion regulation in the development and maintenance of aesthetic athletes' dieting behaviour.

Chapter 5: Attachment and Bulimic Symptoms in Elite Female Adolescent Ballet Dancers: An Intervening Role of Maladaptive Emotion Regulation?

Chapter 5 wants to extend the research of chapter 4 by conducting longitudinal aetiological research in a group only consisting of elite female adolescent ballet dancers. Research already investigated the role of certain sport specific risk factors, i.e. sport discipline, sport level, and the impact of the coach. However, not all of these at risk athletes develop disordered eating attitudes and behaviours, leading to the belief that certain athletes may be more vulnerable to be influenced by the abovementioned sport specific factors. More detailed research on more general risk factors for disordered eating attitudes and behaviours may therefore be useful to develop 'two-pathway' etiological models for athletes, including both sport specific and general risk factors, which might also lead to the development of more adequate prevention and treatment programs.

Chapter 5 adds to this research by investigating the role of attachment and emotion regulation for the development of bulimic symptoms in elite female adolescent ballet dancers. Therefore, the goal of the current prospective study is to investigate whether the emotion regulation model of attachment can be replicated in this group. In sum, the current study wants to investigate whether the two attachment dimensions have a differential longitudinal relationship with bulimic symptoms through specific maladaptive emotion regulation strategies. Following the theoretical propositions of the emotion regulation model of attachment, **we expect that hyperactivating emotion regulation strategies serve as a intervening variable in the relationship between attachment anxiety and bulimic symptoms one year later but not in the relationship between attachment avoidance and bulimic symptoms. On the other hand, we expect that deactivation emotion**

regulation strategies serve as a intervening variable in the relationship between attachment avoidance and bulimic symptoms one year later but not in the relationship between attachment anxiety and bulimic symptoms.

Chapter 6: The Relationship Between Attachment, Emotion Regulation and Eating Disorder Symptoms in Adolescents with Restrictive Anorexia Nervosa?

Previous chapters are intended to provide insights on the role of insecure attachment and maladaptive emotion regulation in explaining increases in disordered eating attitudes and behaviours, without necessarily fulfilling the criteria of a clinical eating disorder. However, the question remains whether the theoretical assumptions of the emotion regulation model of attachment will hold for a clinical group of adolescent patients, as this may have clinical implications for treatment. More specifically, chapter 6 will conduct research on female adolescents with Anorexia Nervosa of the restricting type (AN-R) due to several reasons. First of all, Anorexia Nervosa of the restricting type is the most diagnosed eating disorder (39.5%) in specialised eating disorder clinics in Belgium with most patients being aged under 20 (62.5%) (Janssens, 2014). Secondly, the female : male ratio for AN-R is about 10 : 1 (APA, 2013) and finally, AN-R has serious medical complications related to extreme energy restriction, which are often more severe and irreversible during puberty compared to other age groups (Bravender et al., 2007). These findings, in combination with the low recovery rates for AN-R, stress the importance of better aetiological knowledge for AN-R in adolescence in order to conduct more sufficient treatment programs to enhance prognostic outcomes.

Chapter 6 adds to current dissertation as it investigates the associations between insecure attachment, maladaptive emotion regulation and the core eating pathology features of AN-R (concerns and dieting) in female adolescents diagnosed with AN-R. This fills a gap in literature, as only few studies have empirically investigated the theoretical assumptions of the emotion regulation model of attachment in a clinical group of patients. Tasca et al. (2009) performed a cross-sectional study in adult female eating disordered patients and found partial evidence for the emotion regulation model of attachment in such a way that attachment anxiety to be indirectly contributing to eating disorder symptoms through hyperactivating emotion regulation strategies, while attachment avoidance was only directly linked to symptoms. However, studies on the emotion regulation model of attachment in adolescent patients are lacking and research is scarce, even though this may provide proper guidelines to enhance treatment programs in such a way that differential techniques may have to be applied depending on the individual's score on the attachment dimension and/or emotion regulation strategies.

Therefore, the current study aims to provide insights in the explanation of AN-R by testing the theoretical assumptions of the emotion regulation model of attachment. Following the model, **it is hypothesized that attachment anxiety will be related to the two AN-R pathology outcomes (concerns and dieting) through hyperactivating ER strategies (rumination) while attachment avoidance might be related to AN pathology through deactivating strategies (emotional control)**. However, it needs to be noted that some discrepancies can be found in previous research in such a way that in some studies both anxious and avoidant attachment were related to different kinds of disordered eating attitudes and behaviours such as dieting and binge eating (e.g. Ward, et al., 2000; Shanmugam et al., 2012); where others found specific associations.

Moreover, some found avoidant attachment to be associated with symptoms of anorexia nervosa of the restricting type and anxious attachment with symptoms of anorexia nervosa of the purging type and bulimia (Candelori & Ciocca, 1998).

Chapter 7: Do Changes in Affect Moderate the Association Between Attachment Anxiety and Body Dissatisfaction in Children? An Experimental Study by means of the Trier Social Stress Test.

All previous chapters use self-reported emotion regulation to investigate its role in the association between insecure attachment and eating pathology features, and focus on cross-sectional and longitudinal study designs. To our knowledge, no experimental studies have examined whether the association between insecure attachment and disordered eating attitudes may be explained by changes in affect.

Previous studies already found that higher levels of insecure attachment are both cross-sectionally and longitudinally associated with more negative affect/depressive symptoms in children and adolescents (Dujardin et al., 2016). Moreover, a recent study in undergraduates found that elevated levels of attachment anxiety were not only associated with higher levels of state negative affect, but also with less state positive affect (Schiffrin, 2014). Also, increased negative affect has been found as a robust predictor of body dissatisfaction in adolescents (Presnell, Bearman, & Stice, 2004), whereas decreased positive affect has been related to poorer social, physical, and psychological outcomes in cross-sectional studies (Schiffrin, 2014). However, to our knowledge no experimental studies have examined whether changes in negative and/or positive affect moderate the association between insecure attachment and body dissatisfaction in children and early adolescents.

Therefore, chapter 7 aims to investigate whether attachment anxiety increases children's and early adolescents' vulnerability for body image dissatisfaction in stressful circumstances. Moreover, the present study uses a controlled laboratory setting to investigate whether changes in state negative and/or positive affect moderate the association between attachment anxiety and body satisfaction in children and early adolescents. The changes in state affect are caused by the exposure to an interpersonal stressor using the Trier Social Stress Test for Children (TSST-C; Kirschbaum, Pirke, & Hellhammer, 1993). Since previous studies that examine emotion regulation in disordered eating usually focus on how changes in negative affect are associated with eating pathology (including body dissatisfaction), more research is needed to evaluate whether eating pathology may also be explained by changes in positive affect (Haedt-Matt & Keel, 2011). **Therefore in the present study it is hypothesized that in children and early adolescents with higher levels of attachment anxiety, increases in negative affect and/or decreases in positive affect after exposure to stress will cause decreases in their body satisfaction.**

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Figures

Figure 1. *The transdiagnostic theory of the maintenance of eating disorders (Fairburn et al., 2003)*
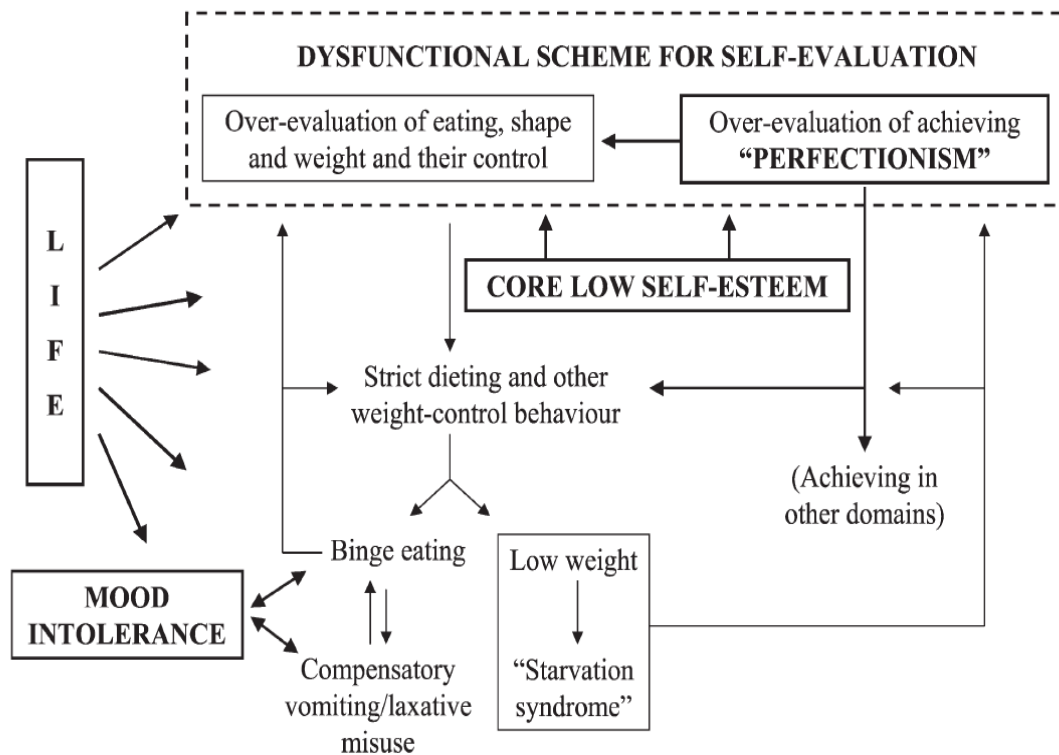
Figure 2. *The multi-causal model of eating disorders (e.g. Jansen, 2001)*
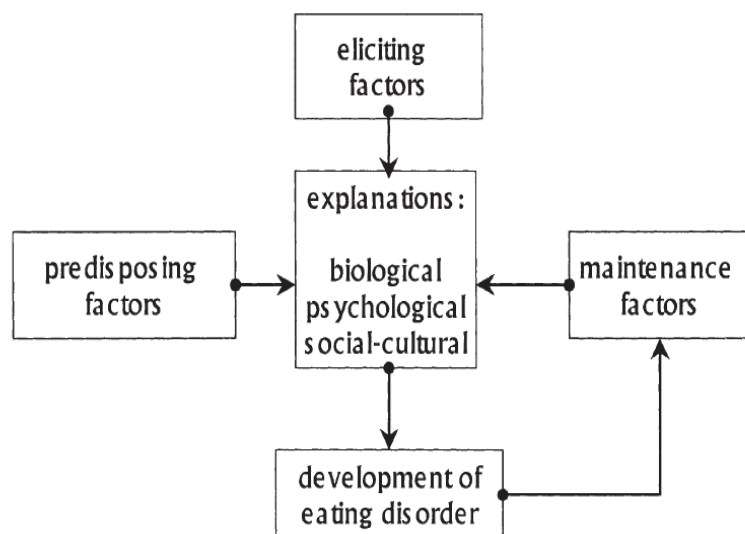
Figure 3. *The Emotion Regulation Model of Attachment (Shaver &*
Mikulincer, 2002)
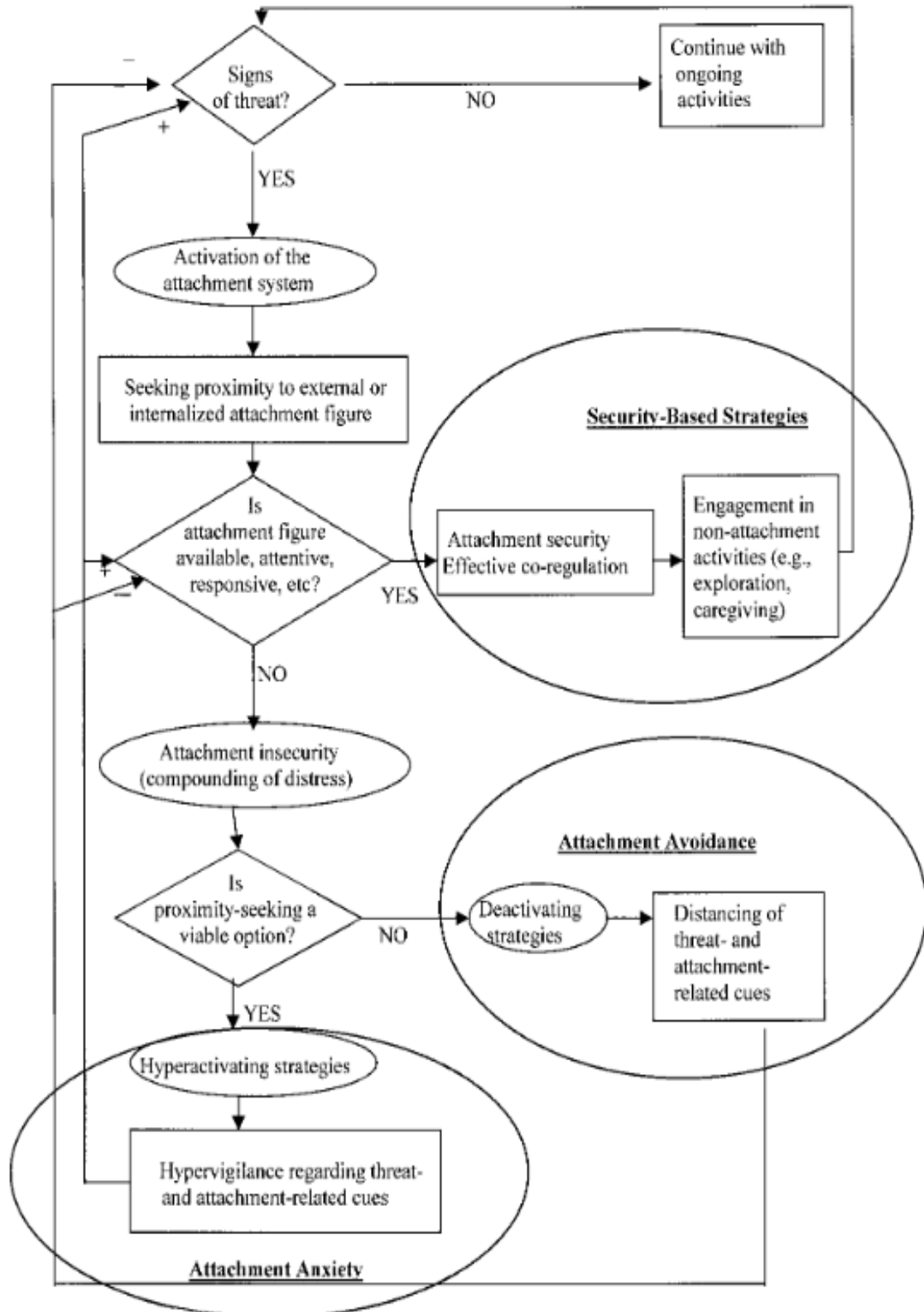
Tables

Table 1. *Overview of the samples used in the different empirical chapters*

	Sample	Recruitment	Age range	Number of participants
Chapter 2 (N = 952)	Community sample Cross-sectional	Primary school (6th) Secondary school (2nd)	10-15 $M = 12.19$	$n = 952$
Chapter 3 (N = 397)	Community sample Longitudinal	Secondary school (3th)	14-15 $M = 14.02$	$n = 397$
Chapter 4 (N = 68)	Elite aesthetic athletes Cross-sectional	Dance school Figure skating clubs	12-18 $M = 14.6$	$n = 68$
Chapter 5 (N = 78)	Female ballet dancers Longitudinal	Elite dance schools	11-18 $M = 14.29$	$n = 78$
Chapter 6 (N = 52)	Adolescents with AN-R Cross-sectional	Eating disorder clinics	11-18 $M = 14.38$	$n = 52$
Chapter 7 (N = 81)	Community sample Lab-study	Primary school Secondary school	9-14 $M = 11.74$	$n = 81$

Chapter 2

Insecure attachment and eating Pathology in early adolescence: Role of emotion regulation[1]

Abstract

Objective: The present study investigated whether associations exist between attachment dimensions toward mother and different forms of eating pathology (EP) in a group of early adolescent boys and girls, and whether these associations were mediated by maladaptive emotion regulation (ER) strategies. Method: Developmentally appropriate self-report questionnaires were administered to a community sample of 952 early adolescents (Mage = 12.19, 54.6% female). Results: The results demonstrated associations between the insecure attachment dimensions and the different forms of EP. Moreover, the relationships between both attachment anxiety and attachment avoidance toward mother on the one hand and restraint and EP concerns on the other hand, were partially mediated by maladaptive ER. Conclusion: These results assign an important role to maladaptive ER, in explaining the relationship between insecure attachment and EP. Future longitudinal research should replicate and elaborate on these findings.

Introduction

Disturbed eating behavior and attitudes can be defined as "behaviour and attitudes toward body perception, eating habits, weight regulation and self-evaluation that increase the risk of developing clinical eating disorders as well as the risk of developing physical health problems" (Waaddegaard, Thoning, & Petersson, 2003, p. 434). In this manuscript, these problems will further be referred to as eating pathology (EP). Based on this definition, EP includes attitudes such as concerns about weight, shape, and eating; as well as behaviors such as dieting, binge eating, and compensatory behavior. EP is already observable from the age of 10 (Kaneko, Kiriike, Ikenaga, Miyawaki, & Yamagami, 1999) and gradually expands throughout adolescence. In a community study of Carter, Stewart, and Fairburn (2001), 13% of the girls (aged 12-14) had weight concerns, 20% had shape concerns, and 24% of the girls restrained their eating to influence weight or body shape on at least half of the days during the past month. Furthermore, objective binge eating (eating an objectively large amount of food in a limited amount of time accompanied with experiencing loss of control) was reported by 21% of the girls, self-induced vomiting by 4%, and use of laxatives and/or diuretics by 1.4% at least once during the past month. Research suggests higher levels of EP in adolescent girls compared with boys (Klein & Walsh, 2003). However, gender differences in younger adolescents (11.6 years) are somewhat less profound compared with the gender differences in older adolescents (15.6 years). Moreover, in a group of young adolescents with EP, about 16.5% was male while in an older adolescent group only 7.8% was male (Peebles, Wilson, & Lock, 2006). In our study, both boys and girls have been included.

Within the transdiagnostic theory of EP (Fairburn, Cooper, & Shafran, 2003), an insight is given on different EP features and how they

evolve over time. In this model, EP concerns, that is, concerns about weight, shape, and eating and their control (cf. the abovementioned attitudes), are considered to be the core pathology of EP which contribute to the development of a dysfunctional system of self-evaluations, which in turn leads to the development of more extreme eating disorder symptoms and weight control methods (cf. behaviors). More specifically, EP concerns may trigger the start of restrained eating/dieting which in turn may cause more extreme EP features to develop, such as objective binge eating and compensatory behavior. Longitudinal studies have found EP in children and adolescents to be stable for a 6-month time period (Matton, Goossens, Braet, & Van Durme, 2013) as well as predictive for the development of full-blown eating disorders (Neumark-Sztainer et al., 2006) and obesity later in life (Kotler, Cohen, Davies, Pine, & Walsh, 2001). These results emphasize the importance of understanding the development and maintenance of EP in youngsters in order to construct adequate prevention and treatment programs.

EP is generally considered to be the result of an interaction between several biological, cultural, personality, and family factors (Klein & Walsh, 2003). Although family factors have received a lot of attention in EP research and evidence for a link between insecure attachment and EP has been established since 1989 by research of Armstrong and Roth, recent research is still trying to entangle the role of attachment in the development and maintenance of EP (Zachrisson & Skarderud, 2010). The attachment theory (Bowlby, 1973, 1969/1982) views attachment as an innate behavioral system that stimulates both safety and exploratory behavior. The goal of the system is to feel secure by pursuing proximity toward attachment figures in times of actual or symbolic threat. The attachment process starts with the mother–child relationship where hunger is the "threat" that makes the baby cry (innate attachment behavior) to get

proximity (breast) of the mother. The child's early experiences with primary caregivers gradually lead to the development of a cognitive schema, the internal working model, which consists of two cognitive representations. First, it contains expectations about the caregiver's availability in times of need/stress (safe haven). Second, it entails a representation of the self as being (or not being) worthy of taking care for. This internal working model determines whether secure attachment patterns will emerge. Secure attachment can only be obtained when attachment figures are/were available and responsive to the child in times of need. When attachment figures are not available and responsive, no sense of security can be obtained and insecure attachment patterns will emerge. The attachment system remains important during life because secure attachment enhances mental health and social adjustment later in life, whereas insecure attachment has frequently been related to various forms of psychopathology in general (Bowlby, 1988; Mikulincer & Shaver, 2007b), and EP in specific (Wilfley, Pike, & Striegel-Moore, 1997).

Several studies found a higher prevalence of insecure attachment in an adult eating-disordered population compared with adult non-clinical samples (Okearney, 1996; Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000; Zachrisson & Skarderud, 2010), as well as associations between insecure attachment and EP symptoms in both adult clinical (Broberg, Hjalmers, & Nevonen, 2001; Troisi et al., 2006) and nonclinical samples (Kiang & Harter, 2006). Although some research is also performed in late adolescence (e.g., Pace, Cacioppo, & Schimmenti, 2012; Salzman, 1997), research on parental attachment and EP in early adolescence and childhood is scarce. The few available studies found associations between insecure attachment and the presence of weight and shape concerns in preadolescent girls, aged 9 to 12

(Sharpe et al., 1998), and overweight boys and girls aged 10 to 17 (Bosmans, Goossens, & Braet, 2009). A recent, and to our knowledge first, longitudinal study of Goossens, Braet, Van Durme, Decaluwé, and Bosmans (2012) provides preliminary evidence for a prospective association between insecure attachment toward mother and dietary restraint, eating concerns, weight concerns, shape concerns, and adjusted Body Mass Index (BMI) in children (8-11 years).

Although associations have been found between insecure attachment and EP, conclusions are limited due to several reasons. First, to date, no studies have been performed on early adolescents, a group which is particularly at risk for EP due to puberty onset (Klein & Walsh, 2003) and in which parental factors are still important determinants for personal development (e.g., Soenens et al., 2008).

Second, research results are difficult to compare due to different conceptualizations and operationalizations of attachment and EP. As concerns attachment, categorical measures are most often used. Although some studies found similar attachment disturbances underlying different EP features (e.g., Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull et al., 2000), others did found specific associations. Some found anxious attachment style (e.g., Eggert, Levendosky, & Klump, 2007), others found avoidant attachment style to be more related to EP (e.g., ColeDetke & Kobak, 1996). Still others found dismissive attachment styles to be associated with symptoms of anorexia nervosa of the restricting type and preoccupied attachment styles with symptoms of anorexia nervosa of the purging type and bulimia (Candelori & Ciocca, 1998). Due to these inconsistencies, no decisive conclusions can be drawn about possible specific effects of different attachment styles.

Even though a dimensional view on parental attachment is widely accepted and used within the general attachment domain (Mikulincer &

Shaver, 2007b), this view has rarely been adopted within EP research. According to the dimensional view on attachment, two dimensions can be distinguished, that is, attachment-related anxiety and attachment-related avoidance (Brennan, Clark, & Shaver, 1998). Attachment anxiety refers to a strong need for closeness, worries about the unavailability of others, and fear of being rejected, while attachment avoidance refers to distrusting others, striving to independence and emotional distancing from others (Brennan et al., 1998; Mikulincer & Shaver, 2007a). One recent study of Shanmugam, Jowett, and Meyer (2012) in adult athletes used the dimensional view and found both attachment anxiety and attachment avoidance to be related to elevated levels of EP.

Third, and most importantly, the existence of an association between attachment and EP does not tell how attachment is theoretically and empirically linked to EP. In their review, Zachrisson and Skarderud (2010) posit theoretical hypotheses to explain the relationship between insecure attachment and EP, of which the existence of an indirect effect is considered most plausible. This view acknowledges that attachment might be of importance but perhaps acts as a more distal factor and affects EP through possible mediating factors.

Based on The Interpersonal Vulnerability Model (Wilfley et al., 1997), emotion regulation (ER) might be expected to be an important mediating factor. ER can be defined as "all the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goal" (Thompson, 1994, p. 27). Maladaptive ER might then be understood as deficits in the ability to adequately cope with challenging emotions, a factor that has repeatedly been linked to different psychological problems (Berking & Wupperman, 2012).

According to the interpersonal vulnerability model (Wilfley et al., 1997), disturbances in the early parent–child relationship lead to insecure attachment, which through disturbances in the self (self-esteem and social self) may lead to increased negative affect combined with lack in functional ER to regulate this negative affect (affective dysregulation) which may ultimately result in binge eating (or other EP). The interpersonal vulnerability model clearly assigns a mediating role to maladaptive ER in the relationship between insecure attachment and EP as it presumes links between (a) insecure attachment and maladaptive ER, which is conform with the attachment theory (Bowlby, 1982) and (b) maladaptive ER and EP, which is conform with ER theories (Stice, 2001). The latter states that failure to adequately deal with emotions leads to the development of maladaptive mechanisms to temporarily reduce, compensate, or neutralize the experienced emotions such as EP.

The ER model of attachment (Shaver & Mikulincer, 2002) explains more clearly how insecure attachment might be related to maladaptive ER (and how maladaptive ER might in turn lead to psychopathology). Dependent on the quality of attachment, people adopt different strategies to regulate emotional distress. Securely attached individuals apply the primary attachment related affect regulation strategy of proximity seeking due to its effectiveness in the past. However, insecurely attached individuals, not acquainted with responsiveness of attachment figures, develop secondary affect regulation strategies (strategies other than proximity seeking) to relieve distress. Those secondary affect regulation strategies (like clinging responses, suppression, etc.) may be adaptive for a short time period by reducing negative feelings toward primary caregivers who have been unavailable, unresponsive, or unpredictable. However, continued use of these strategies throughout life, appears to be associated

with psychological problems such as EP (Mikulincer, Shaver, & Pereg, 2003).

Maladaptive ER has also been empirically linked to EP in both adults and adolescents (Aldao & Nolen-Hoeksema, 2010; Ball & Lee, 2000; Sim & Zeman, 2005). More specifically, maladaptive ER has been linked to EP rather than the non-use of adaptive ER (e.g., Aldao & Nolen-Hoeksema, 2010; Czaja, Rief, & Hilbert, 2009). Although both attachment and maladaptive ER have been associated with EP, only few studies have been empirically investigating the possibility of the assumed mediation effect. Tasca et al. (2009) found that attachment anxiety indirectly contributed to eating disorder symptoms through maladaptive ER, while attachment avoidance was only directly linked to symptoms in adult female eating-disordered patients. Another recent study of Burns, Fischer, Jackson, and Harding (2012) found the association between emotional abuse and emotional dysregulation (ED) symptoms, to be partially mediated by ED, which is interesting because emotional abuse might be linked to the development of insecure attachment in children and adolescents (Limke, Showers, & Zeigler-Hill, 2010).

Current Study

Based on the shortcomings in previous research, the present study adds to the current literature by (a) investigating the association between insecure attachment and EP in early adolescents, (b) using a dimensional view on attachment, and (c) investigating whether maladaptive ER functions as a mediator based on both theoretical (Shaver & Mikulincer, 2002; Wilfley et al., 1997) and empirical motions (Tasca et al., 2009). In sum, the current study aims to investigate whether associations exist between the attachment dimensions (attachment anxiety and attachment avoidance) and EP in early adolescents and more specifically whether these associations

are mediated by maladaptive ER strategies. Four types of EP will be measured conform with the transdiagnostic theory of EP (Fairburn et al., 2003), namely, EP concerns, restraint, objective binge eating, and purging as these features may refer to different stadia in the development of EP.

Method

Participants and Procedure

Early adolescents were recruited from the sixth grade of primary schools and the second grade of secondary schools (Dutch school system). Information letters and passive informed consents were distributed to the parents of the youngsters. Of the 1,071 contacted parents, 952 allowed their child to participate in the study, which is consistent with a response rate of 88.1%.

All of the early adolescents received an active informed assent at the beginning of the study and agreed to participate. As such, the total sample consisted of 952 10- to 15-year-olds ($X = 12.19$, $SD = 1.06$), with the largest groups consisting of 11- (37.9%) and 13-year-olds (47.1%). As concerns gender, 45.4% (n = 432) was male and 54.6% (n = 520) was female. Of the participants, 75% came from intact, two-parent families, 23% had divorced parents, 2% came from a family in which one of the parents had died (none of which was the mother). Youngsters filled in a battery of questionnaires during a regular class period (50 minutes) under the supervision of the researcher. This study was approved by the university's research ethics committee.

Instruments

Adjusted BMI. Adolescents from secondary schools self-reported their height and weight, while youngsters from primary schools were objectively and privately measured and weighed by the researcher as research showed the ability of adolescents to reliably report their own

height and weight, in contrast to younger children where such evidence is absent (Field et al., 1999). These anthropometric data allowed us to calculate the adjusted BMI by dividing the general BMI (kilograms/meter2) by the 50th percentile of BMI for age and gender, and then multiplying this number by 100. The 50th percentile is based on Dutch norms from Fredriks, van Buuren, Wit, and Verloove-Vanhorick (2000). An adjusted BMI between 85 and 120 indicates a normal weight (Van Mil & Van Winckel, 2001).

Attachment. The Experiences of Close Relationships–Revised–Child Version (ECR-R-C; Brenning, Soenens, Braet, & Bosmans, 2011a) questionnaire is an adaptation of the ECR (Brennan et al., 1998). The ECR was originally developed to measure adult romantic attachment toward the partner, while the ECR-R-C is a 36-item self-report questionnaire developed to assess a child's and early adolescent's attachment toward their primary caregiver. Moreover, the questionnaire in this study assesses individual differences with respect to attachment anxiety and attachment avoidance toward the mother. Anxiety reflects the extent to which youngsters are (in)secure about their mother's availability and responsiveness, and the presence or absence of fear of rejection and abandonment; while avoidance reflects the extent to which youngsters are (un)comfortable being close toward the mother. The ECR-RC was proven to be a reliable and valid instrument because the internal structure, construct validity, and predictive validity (for depressive symptoms and ER) were adequate (Brenning et al., 2011a). In the present study, Cronbach's alphas for attachment anxiety and attachment avoidance were .87 and .91, respectively.

EP. The Children's Eating Disorder Examination–Questionnaire (ChEDE-Q; BryantWaugh, Cooper, Taylor, & Lask, 1996) is a self-report questionnaire to assess specific eating-disordered attitudes and behaviors

in children and adolescents and is derived from the Eating Disorder Examination interview (chEDE; BryantWaugh et al., 1996), which is the golden standard for diagnosing eating disorders. In this study, the Dutch version of the ChEDE-Q was used (Decaluwé & Braet, 1999). The ChEDE-Q has a 28-day time frame for each of the 30 items. The questionnaire is divided into four subscales (23 items), that is, Restrained Eating (restraint), Weight Concern, Shape Concern, and Eating Concern, with higher scores reflecting more EP. As the different concerns were highly correlated in our sample (range r = .69-.93), we decided to combine them into one measure of EP concerns. Therefore, the focus of this study will be on restraint and EP concerns. Besides these subscales, additional diagnostic items were used to measure the occurrence of episodes of objective binge eating and purging (self-induced vomiting, use of laxatives, and/or use of diuretics). These four EP types were included with the intent to cover the different EP features from the transdiagnostic model (Fairburn et al., 2003). The ChEDE-Q is often used due to its good psychometric qualities and relevance for the clinical practice. Adequate to good internal consistency and stability were found for the ChEDE-Q total score as well as fot the ChEDE-Q subscale scores (Goossens & Braet, 2010). Within this study Cronbach's alpha for restraint was .82 and for EP concerns .94.

ER. The Questionnaire to Assess Children's and Adolescents' ER strategies (FEEL-KJ; Grob & Smolenski, 2005; Theuwis & Braet, 2010) is a 90-item self-report questionnaire measuring 15 ER strategies in response to three "negative" emotions, that is, anger, anxiety, and sadness in children and adolescents between the age of 10 and 20. In this study, only ER strategies in response to anxiety and sadness were included (60 items) in order to limit the length of the total assessment measures. The FEEL-KJ encompasses 15 primary ER strategies and two secondary ER scales as

determined by factor analysis, that is, an adaptive ER scale and a maladaptive ER scale. Internal consistency of the ER strategies lies between .69 and .91, with a mean of .77, which indicates good reliability of the FEEL-KJ (Grob & Smolenski, 2005). In this study, the focus will be on the total maladaptive ER scale because previous research showed maladaptive ER to be related to EP, in contrast to the non-use of adaptive ER (e.g., Aldao & Nolen-Hoeksema, 2010; Czaja et al., 2009). We chose to work with the composite score of total maladapive ER scale based on previous research recommending the use of secondary order scales as they were more comprehensive and more stable with higher internal consistency and acceptable test–retest stability (Braet, Cracco, & Van Durme, forthcoming). Questions are formulated as follows: "When I am scared/sad, I redraw myself from the situation," "When I am scared/sad, I keep my feelings hidden inside," "When I am scared/sad, I blame myself for feeling this way." In the present study, Cronbach's alpha for total Maladaptive ER scale was .81.

Pubertal status. The Pubertal Development Scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988) is a five-item self-report questionnaire to ascertain pubertal status in adolescents. The five items refer to indices of pubertal growth associated with the different Tanner stages of puberty (Marshall & Tanner, 1969, 1970). Three items are similar for both boys and girls. These items assess the extent to which growth spurt, growth of body hair (hair under their arms and pubic hair), and skin changes (pimples) have occurred. The two remaining items are gender-specific. Males are additionally asked about voice changes and growth of facial hair, while females are asked about breast development and presence (and onset) of menstruation. Based on these items, a mean continuous pubertal score (puberty) can be computed for each gender. In addition to this mean pubertal score, scores on the body hair item and gender-specific items can

also be used to compute the pubertal stage of the adolescent following the Tanner stages for each gender, that is, pre-, early-, mid-, late-, and post-adolescence (Marshall & Tanner, 1969, 1970). Cronbach's alpha for both boys and girls is .78.

Data Analysis

Missing values. Of all participants, 806 youngsters (84.6%) provided complete data on all the variables of interest, resulting in 1.32 % missing data points. Comparison of means and covariances of all questionnaire variables using Little's (1988) Missing Completely At Random (MCAR) test revealed a normed chi-square ($\chi2$= 2568.46/df = 1533) of 1.62, p = .20, indicating that the data were likely missing at random (Bollen, 1989). As a consequence, missing values could be estimated and it was decided to estimate them following the expectation maximization (EM) algorithm available in SPSS (Schafer, 1997).

Data-analytic plan. Adjusted BMI, attachment anxiety, attachment avoidance, restraint, EP concerns, maladaptive ER, and puberty were considered as continuous variables. Before the mediation effects were examined, the prevalence of the different types of EP was examined and some preliminary analyses were performed in order to detect possible associations between sample characteristics and the study variables. Considering analyses revealed that the score distribution of attachment anxiety, attachment avoidance, restraint, and EP concerns were not normal, Spearman's correlation coefficient was used. These preliminary analyses were performed in order to detect possible control variables for further mediation analyses.

For mediation to occur, significant associations should be found between the independent variables (attachment anxiety and attachment avoidance) and the dependent variable (restraint or EP concerns). Second,

the independent variables should significantly relate to the supposed mediator (maladaptive ER) and the mediator should significantly correlate with the dependent variable. Finally, the indirect path between the independent variable and the dependent variable through the mediator should be significant. When adding this indirect effect to the model, the direct effect of the independent variable on the dependent variable, should no longer be significant (complete mediation) or should be lower compared with the total direct effect (partial mediation).

Following the recommendations by MacKinnon, Lockwood, and Williams (2004), bootstrapping, a nonparametric resampling procedure, was used to test the different mediation models in which maladaptive ER is hypothesized to mediate the relationship between insecure attachment and EP. This bootstrapping procedure was performed using the SPSS macro "mediate" developed by Hayes and Preacher (2013), enabling us to enter different independent variables in one model (attachment anxiety and attachment avoidance). Bootstrapping is superior to previous approaches, such as the procedure of Baron and Kenny (1986), as it additionally tests the significance of the indirect effects and is non-sensitive to the violations of normality in our data (Preacher & Hayes, 2008). The bootstrapping procedure can also take into account the effect of control variables thereby reporting "pure" mediation effects independent of the influence of other control variables. In the current study, 5,000 bootstrap resamples, replacing the original sample ($n = 952$), were used to derive the 95% confidence intervals (CIs) for the indirect effects.

Results

Characteristics of the Sample

Table 1 presents the distribution of weight status and pubertal status across the study sample. The majority of both boys and girls had a normal

weight. However, there were significant gender differences in terms of weight status with $\chi 2(2, N = 952) = 13.110$, $p = .001$: More girls compared with boys were underweight; and more boys compared with girls were overweight. As concerns pubertal status, most boys were situated in early puberty and midpuberty, while most girls were situated in mid-puberty and late puberty. The gender differences in terms of pubertal status were significant with $\chi 2(4, N = 952) = 204.645$, $p < .001$, showing girls to be further evolved in puberty. For both boys and girls a minority of youngsters was already situated in post puberty.

Within this community sample, 25% of the youngsters self-reported features of restrained eating for at least 1 to 5 days during the past month. A clinical score on restraint was obtained by 1.8% of the group, which means these adolescents reported restrained eating for more than half of the days during the past month. When looking at the prevalence of EP concerns, 43.6% showed EP concerns for at least 1 to 5 days. A clinical score on EP concerns was obtained by 2.4% of the youngsters. Regarding more pathological EP features, 14% of the youngsters reported objective binge eating at least once during the past month, while 4.9% of adolescents obtained a clinical score, which means they self-reported objective binges at least once a week during the past month. As concerns purging, 4.9% of the youngsters reported purging behavior at least once during the past month, while 1.6% of them obtained a clinical score. Table 2 presents an overview of the prevalence of the different EP features. As prevalence is rather low for both objective binge eating and purging, we decided not to use these variables as dichotomous dependent variables in the mediation analyses as the restricted range would make it difficult to detect effects. In what follows, we will mainly focus on restraint and EP concerns.

Preliminary Analyses.

 Bivariate analyses between study variables. Table 3 presents correlations between the independent, mediator, and dependent variables of the current study. As expected, significant correlations were found between (a) insecure attachment dimensions and EP variables, (b) insecure attachment dimension and maladaptive ER, and (c) maladaptive ER and EP variables.

 Associations between sample characteristics and EP. Table 3 also presents correlations between the sample characteristics and the different study variables. Gender was significantly associated with restraint and EP concerns: Girls scored higher on both restraint and EP concerns compared with boys. Furthermore, age, adjusted BMI, and puberty were all positively associated with both restraint and EP concerns.

 Associations between sample characteristics and other study variables. Next to the associations between the sample characteristics and EP, some other correlations were also of significance. Gender was significantly related to maladaptive ER with girls scoring higher than boys. Furthermore, age was positively correlated with attachment avoidance and puberty was positively associated with attachment anxiety, attachment avoidance, and maladaptive ER. The correlations between the different sample characteristics were congruent with the abovementioned section on sample characteristics. To conclude, gender, age, adjusted BMI, and puberty were to some extent associated with the different EP features and study variables. Therefore, these, sample characteristics were included as control variables in further mediation analyses.

Mediation Analyses

 Restraint. The left column of table 4 presents the results of the mediation analysis for restraint as dependent variable. First, the direct

effect from the attachment dimensions on restraint was tested. Both attachment anxiety, $\beta = .17$, partial $\eta^2 = .03$, and attachment avoidance, $\beta = .15$, partial $\eta^2 = .02$, had a significant effect on restraint next to some of the control variables. Secondly, both attachment anxiety, $\beta = .29$, partial $\eta^2 = .07$, and attachment avoidance, $\beta = .07$, partial $\eta^2 = .01$, were significantly related to maladaptive ER; and maladaptive ER was significantly associated with restraint, $\beta = .22$, partial $\eta^2 = .05$. Finally, when controlling for the indirect effect of maladaptive ER, the direct effects of attachment anxiety, $\beta = .15$, partial $\eta^2 = .02$, and attachment avoidance, $\beta = .13$, partial $\eta^2 = .01$, on restraint diminished but were still of significance. To examine whether the indirect effect of maladaptive ER was significantly different from 0, an accelerated-bias-corrected bootstrapping (Hayes and Preacher, 2013) was used. Results indicated that the indirect effect of maladaptive ER was of significance for both attachment anxiety, 95% CI[.02, .08], S.E. = .01, p < .05, and attachment avoidance , 95% CI[.01, .03], S.E. =.00, p < .05, on restraint. These results showed partial mediation of the relationship between the insecure attachment dimensions and restraint by maladaptive ER.

EP concerns. The right column of table 4 presents the results of the mediation analysis for EP concerns as dependent variable. First, the direct effect from the attachment dimensions on EP concerns was tested. Both attachment anxiety, $\beta = .26$, partial $\eta^2 = .08$, and attachment avoidance, $\beta = .13$, partial $\eta^2 = .02$, had a significant effect on EP concerns next to some of the control variables. As mentioned above, both attachment anxiety and attachment avoidance were significantly related to maladaptive ER; and maladaptive ER was significantly associated with EP concerns, $\beta = .30$, partial $\eta^2 = .11$. Finally, when controlling for the indirect effect of maladaptive ER, the direct effects of attachment anxiety, $\beta = .20$, partial $\eta^2 = .05$, and attachment avoidance, $\beta = .11$, partial $\eta^2 = .01$, on EP concerns

diminished but were still of significance. To examine whether the indirect effect of maladaptive ER was significantly different from 0, an accelerated-bias-corrected bootstrapping (Hayes and Preacher, 2013) was used. Results indicated that the indirect effect of maladaptive ER was of significance for both attachment anxiety, 95% CI[.04, .08], S.E. = .01, p < .05, and attachment avoidance , 95% CI[.01, .03], S.E. =.01, p < .05, on EP concerns. These results showed partial mediation of the relationship between insecure attachment dimensions and EP concerns by maladaptive ER.

Discussion

EP in children and adolescents is a major topic of concern due to the detrimental physical and mental health consequences (Klein & Walsh, 2003). Throughout the years, several risk factors have already been identified. Although empirical evidence has highlighted the role of insecure attachment (Zachrisson & Skarderud, 2010) and maladaptive ER (Czaja et al., 2009) in the development and maintenance of EP, little is known about underlying mechanisms explaining how these three concepts might be related to each other. Based on the theoretical assumptions of the interpersonal vulnerability model (Wilfley et al., 1997) and the ER model of attachment (Shaver & Mikulincer, 2002), the present study aimed to investigate whether associations exist between attachment representations and EP in early adolescents and more specifically whether these associations might be mediated by maladaptive ER.

Initially, the goal was to perform mediation analyses for all four EP features derived from the transdiagnostic theory (Fairburn et al., 2003), that is, restraint, EP concerns, objective binge eating, and purging. However, prevalence for both objective binge eating and purging was rather low, making us decide not to use these variables as dependent

variables in the mediation analyses as the restricted range would make it difficult to detect effects. As a consequence, the main focus of this study was on restraint and EP concerns.

Results showed direct effects of insecure attachment toward mother on both EP features after controlling for gender, age, adjusted BMI, and puberty. More specifically, higher presence of insecure attachment, defined here as attachment anxiety or attachment avoidance was related to higher scores on the EP measures, namely, restraint and EP concerns, which is in line with previous research showing clear associations between insecure attachment and EP in clinical adults, non-clinical adults, and clinical youngsters (e.g., Bosmans et al., 2009; Goossens et al., 2012; Zachrisson & Skarderud, 2010). Our findings add to the literature by using a dimensional view on parental attachment differentiating between two dimensions, attachment anxiety, and attachment avoidance. Remarkably, both insecure attachment dimensions seem to be related to EP in an early adolescent group, which seems to be consistent with studies suggesting that similar attachment disturbances underlie different EP symptoms (Okearney, 1996; Ward, Ramsay, Turnbull, et al., 2000). However, the fact that we did not find a difference in effect for the two attachment dimensions, does not rule out the possibility that different underlying mechanisms might account for the contribution of these attachment dimensions to EP.

Furthermore, significant indirect effects were found, suggesting an important role of maladaptive ER as mediator in the relationship between insecure attachment and EP. Moreover, the relationship between insecure attachment, that is, attachment anxiety and attachment avoidance, and both EP variables (restraint and EP concerns) was partially mediated by maladaptive ER. These results are to some extent in line with the study of Tasca et al. (2009) in which maladaptive ER also partially mediated the

relationship between attachment anxiety and EP. However, the study of Tasca et al. only found a direct effect of attachment avoidance on EP and no indirect effect, where our study also found an indirect effect through ER. This discrepancy might be linked with our observation that the effects of attachment anxiety on EP tended to be stronger than the effects of attachment avoidance, which might be rooted in the characteristics of both insecure attachment patterns. High scores on attachment anxiety might be related to a need for approval as a consequence of their fear of being rejected, making them vulnerable for influences from media and peers concerning appearance (a known risk factor for EP). This in contrast to those scoring high on attachment avoidance who might be less vulnerable for external influences as they try to distance themselves from others (Collins & Read, 1990).

Overall, the results of the mediation analyses are conform with the theoretical hypothesis of Zachrisson and Skarderud (2010) acknowledging that insecure attachment might be of importance for explaining EP, but perhaps acts as a more distal factor and affects EP through possible mediating factors. In addition, this study provides evidence for the interpersonal vulnerability model (Wilfley et al., 1997) and the ER model of attachment (Shaver & Mikulincer, 2002) as theoretical frameworks in which maladaptive ER is conceptualized as an important mediator in the relationship between insecure attachment and psychopathology in general and EP more specifically.

Strengths and Limitations

This study has several strengths. First, research in young age groups on the role of attachment in the development and maintenance of EP is scarce. The current study fills this gap by focusing on early adolescent boys and girls, from the general population. This is important because

early adolescents are particularly at risk for EP due to puberty onset (Klein & Walsh, 2003) and because parental factors are still important determinants for personal development (Fiese, 1997).

The second strength entails the use of a dimensional view on parental attachment. This dimensional view is widely accepted within the attachment domain (Mikulincer & Shaver, 2007b) but rarely adopted within the EP domain due to the absence of adequate dimensional measurement of parental attachment in middle childhood and early adolescence. Therefore, the use of the recently developed age-appropriate ECR-R-C (Brenning et al., 2011a) is beyond a doubt a great advantage of this study.

Third, and most importantly, this is one of the few studies investigating possible underlying mechanisms of the relationship between insecure attachment and EP. Although a few studies have already been investigating the role of underlying mechanisms, such as neuroticism, depression, and self-esteem (e.g., Eggert et al., 2007; Shanmugam et al., 2012), little research has been performed on the role of maladaptive ER. To our knowledge, only one study (Tasca et al., 2009) has investigated the links between insecure attachment, maladaptive ER, and EP in adult patients. The present study is the first to cover all three concepts in a sample of early adolescents from the general population.

Next to the abovementioned strengths, some limitations can be distinguished. First, cross-sectional data were used to investigate mediation, which means no temporal conclusions can be drawn. Furthermore, the effect sizes for the different direct and indirect effects were rather small in the current study. In the future, longitudinal designs are necessary to replicate our findings and to investigate whether insecure attachment prospectively leads to EP through the development of maladaptive ER strategies.

Second, given the exploratory nature of this study, only a general measure of maladaptive ER was used, which might explain the homogeneity of our findings. However, it is still possible that the attachment dimensions may lead to different maladaptive ER strategies and that those strategies in turn may lead to different forms of EP. This line of thinking is consistent with the ER model of attachment (Shaver & Mikulincer, 2002) wherein attachment anxiety seems to be more related to rumination, while attachment avoidance seems to be more related to suppression and withdrawal (e.g., Brenning, Soenens, Braet, & Bosmans, 2011b). In turn, rumination might be more related to symptoms of anorexia nervosa of the purging type and bulimia as a way to escape from overwhelming negative self-evaluations and emotions, while suppression and withdrawal might be more related with symptoms of anorexia nervosa of the restricting type to escape feelings all together by reaching an extremely low weight (Candelori & Ciocca, 1998). It would be interesting to test the proposed mediation effects more thoroughly in a clinical sample of young eating-disordered patients or in a group with clinical significant scores on pathological eating features like objective binge eating and purging.

Third, only attachment toward mother was investigated, because the mother is considered to be the primary caregiver with most responsibility and influence on the eating behavior of the early adolescent, which is consistent with a developmental psychology view where the feeding task is mainly assigned to the mother (Winnicott, 1957). Research confirms this by demonstrating that attachment toward mother is most strongly associated with children's EP and weight status (Goossens et al., 2012). However, the father–child relationship might have a differential impact on EP, emphasizing the necessity for future research to investigate whether

the same mediation effects can be found when attachment toward father is taken into account.

Finally, this study was mainly conducted on White participants with a high socio-economic status, which might limit the generalizability of the results. Further research should investigate youngsters with diverse socio-economical and ethnic backgrounds to figure out whether the same relationships also hold for those samples.

Clinical Implications

Although the current findings need to be replicated and further specified in longitudinal studies, our results appear to stress the importance of insecure attachment and dysfunctional ER in EP, warranting some preliminary clinical implications. Both prevention and intervention/treatment programs may need to address these issues adequately. Prevention programs of EP may need to target the adolescent (ER), as well as the family as supporting and contributing context to the EP of the youngster (attachment). Based on the results of this study, prevention programs may include a program to improve the emotion coping skills of the adolescents in order for them to learn to adequately deal with emotional distress. This might make them less vulnerable to develop EP. In addition, parents could be included in education programs on the importance of the quality of the parent–child relationship for mental health and could be educated to adequately help their children deal with problems (responsiveness) to further enhance adaptive ER skills in their child.

As concerns the treatment of EP, several additional techniques might be suggested based on the results of this study. Cognitive Behavioral Therapy for eating disorders, the most effective treatment for Bulimia Nervosa and Binge Eating Disorder (CBT-E; Fairburn, 2008), can

be supplemented by taking account of the attachment configuration and related ER problems of the patient. In individuals high on attachment anxiety focus might be on ER, whereas in those high on attachment avoidance focus might be on exposure to emotions and interpersonal closeness (Tasca et al., 2009). If the attachment problems need further attention, Family-Based Therapy (Lock & le Grange, 2005) and Attachment-Based Family Therapy (ABFT; Diamond & Siqueland, 1995) might be applied in order to provide corrective attachment experiences with the caregiver which may improve the attachment bond as well as the ER skills of the adolescent.

To conclude, results of the present study demonstrate that the relationships between insecure attachment patterns toward mother and EP are partially mediated by maladaptive ER. Future longitudinal research should replicate and elaborate on these findings by including additional measures of different maladaptive ER strategies as well as attachment toward father.

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Tables

Table 1

Weight Status and Pubertal Status of the Study Sample

Variable		Total (%)	Boys (%)	Girls (%)
Weight status				
	Underweight	7.6	4.4	10.2
	Normal weight	78.8	79.9	77.9
	Overweight	13.7	15.7	11.9
Pubertal status				
	Pre-puberty	10.2	16.3	5.3
	Early-puberty	20.4	35.7	8.0
	Mid-puberty	38.7	38.2	39.0
	Late puberty	29.4	9.6	45.6
	Post-puberty	1.3	.3	2.1

Table 2

Frequency of Eating Pathology in the Study Sample

Variable		Total (%)
Restraint[a]		
	< 1-5 days	75.0
	≥ 1-5 days	14.1
	≥ 6-12 days	6.2
	≥ 13-15 days	2.9
	≥ 16-22 days[b]	1.8
EP concerns[a]		
	< 1-5 days	56.4
	≥ 1-5 days	23.0
	≥ 6-12 days	12.8
	≥ 13-15 days	5.3
	≥ 16-22 days[b]	2.4
Objective binges[c]		
	≥ 1 time	14.0
	≥ 4 times[b]	4.9
Purging[c]		
	≥ 1 time	4.9
	≥ 4 times[b]	1.6

Note: [a]days on which the behaviour was exhibited during the past month; [b]equivalent to a clinical score (score of at least 4); [c]number of times the behaviour was exhibited during the past month.

Table 3.

Correlations between the different Independent, Mediator, Dependent Variables and Sample Characteristics.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Anxiety	1								
2. Avoidance	.49**	1							
3. Mal ER	.34**	.21**	1						
4. EPconcerns	.37**	.26**	.35**	1					
5. Restraint	.29**	.24**	.26**	.75**	1				
6. Gender	.05	-.02	.26**	.29**	.16**	1			
7. Age	.04	.27**	.06	.09**	.08*	.11**	1		
8. AdjBMI	.06	.03	-.03	.36**	.36**	-.17**	-.13**	1	
9. Puberty	.12**	.22**	.20**	.30**	.22**	.35**	.53**	.10**	1

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Mal ER= Maladaptive Emotion Regulation; EP concerns=Eating Pathology concerns; AdjBMI=Adjusted BMI.

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

Table 4.

Summary of the Bootstrapping Procedure testing the Indirect Effect of the Attachment

Dimensions on Restraint and EP concerns

	Restraint					EP concerns			
Variables	*B*	*SE*	*β*	*t*	Variables	*B*	*SE*	*β*	*t*
Direct effects on dependent variable[a]									
Gender	.25	.06	.25	3.96***	Gender	.59	.06	-.55	9.74***
Age	-.01	.03	-.01	-.21	Age	.03	.03	.03	.95
AdjBMI	.02	.00	.34	11.21***	AdjBMI	.03	.00	.41	15.34***
Puberty	.10	.05	.07	1.84	Puberty	.13	.05	.09	2.60**
Anxiety	.18	.04	.17	5.16***	Anxiety	.31	.03	.26	9.05***
Avoidance	.15	.03	.15	4.34***	Avoidance	.14	.03	.13	4.35***
Effects of independent variables on Mal ER[b]									
Gender	4.43	.77	-.37	5.76***	Gender	4.43	.77	-.37	5.76***
Age	-.55	.41	-.05	-1.34	Age	-.55	.41	-.05	-1.34
AdjBMI	-.02	.02	-.02	-.75	AdjBMI	-.02	.02	-.02	-.75
Puberty	2.03	.63	.12	3.17**	Puberty	2.03	.63	.12	3.17**
Anxiety	3.74	.43	.29	8.69***	Anxiety	3.74	.43	.29	8.69***
Avoidance	.87	.41	.07	2.12*	Avoidance	.87	.41	.07	2.12*
Effects on dependent when controlling for indirect effect[c]									
Gender	.19	.06	-.20	3.07**	Gender	.51	.06	-.47	8.48***
Age	-.00	.03	-.00	-.01	Age	.04	.03	.04	1.30
AdjBMI	.02	.00	.34	11.45***	AdjBMI	.03	.00	.41	15.95***
Puberty	.07	.05	.05	1.37	Puberty	.09	.05	.06	1.89
Anxiety	.14	.04	.15	3.74***	Anxiety	.24	.03	.20	6.94***
Avoidance	.13	.03	.13	4.05***	Avoidance	.13	.03	.12	3.95***
Mal ER	.01	.00	.15	4.71***	Mal ER	.02	.00	.20	7.41***

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Mal ER=

Maladaptive Emotion Regulation; AdjBMI=Adjusted BMI. [a] restraint: η^2 = .22; EP concerns η^2=

.39,   [b] η^2 = .18 , [c] restraint: η^2 = .24 ; EP concerns η^2= .43.

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

Chapter 3

The role of attachment and maladaptive emotion regulation strategies in the development of bulimic symptoms in adolescents[1]

Abstract

Objective: Following the theoretical propositions of the Emotion Regulation model of attachment, the current study investigated whether attachment anxiety and attachment avoidance, might play a differential contributing role in the development of bulimic symptoms through assumed differences in adopting specific maladaptive emotion regulation strategies in a sample of adolescents. Method: Developmentally appropriate self-report questionnaires were administered to a community sample of 397 adolescents (Mean age: 14.02) and this at two time points with a one year time lag. Results: Results provided longitudinal evidence for the Emotion Regulation model of attachment in confirming the differential contributing role of the attachment dimensions on the development of bulimic symptoms in a sample of adolescents. More specifically, attachment anxiety seemed to be related to bulimic symptoms through rumination, while attachment avoidance through emotional control. Conclusion: These results may have clinical implications for the treatment of bulimic symptoms in adolescents.

Introduction

Bulimic symptoms refer to episodes of binge eating and compensatory behaviour to prevent weight gain or to control one's body weight, without necessarily fulfilling all criteria for Bulimia Nervosa (American Psychiatric Association, 2013; Goldschmidt, Aspen, Sinton, Tanofsky-Kraff, & Wilfley, 2008). Bulimic symptoms are prevalent in adolescence and are much more prevalent compared to full-blown clinical Bulimia Nervosa (e.g. Goldschmidt et al., 2008; Kjelsås, Bjørnstrøm, & Götestam, 2004; Peebles, Wilson, & Lock, 2006). The study of Goossens, Soenens, and Braet (2009) found a prevalence of 4.8% for objective binge eating and 9.3% for subjective binge eating in adolescents with a mean age of 14. As concerns compensatory behaviour, the study of Field et al. (1999) found a prevalence of 1.35-1.75% in adolescents. Bulimic symptoms increase from early-mid adolescence to late adolescence (Field et al., 2003; Slane, Klump, McGue, & Iacono, 2014) and are more prevalent in adolescent girls compared to boys (Klein & Walsh, 2003). They also confer a great risk for full-blown Bulimia Nervosa, Binge Eating Disorder, and weight gain/obesity in young adulthood (Kotler, Cohen, Davies, Pine, & Walsh., 2001; Neumark-Sztainer et al., 2006) and affect individuals' physical and psychosocial functioning (Goldschmidt et al., 2008; Waaddegaard, Thoning, & Petersson, 2003). These findings emphasize the importance of investigating which variables contribute to the development of bulimic symptoms throughout adolescence, in order to enhance early detection and treatment options.

Disordered eating attitudes and behaviours, such as bulimic symptoms, are multi-causally determined and are seen as the result of an interaction between several biological, personality, sociocultural and family factors (Klein & Walsh, 2003; Polivy & Herman, 2002). As concerns family factors, attachment processes might play a contributing

role in the development of disordered eating attitudes and behaviour in general and bulimic symptoms in specific (eg. Zachrisson & Skarderud, 2010). According to Bowlby (Bowlby, 1973, 1982, 1988), no sense of security can be obtained when attachment figures are insensitive, inconsequent or unresponsive in times of need. Hence, individual differences in attachment patterns develop early on based on the availability and responsiveness of attachment figures (eg. Ainsworth & Bell, 1970).

According to the dimensional view on attachment (Brennan, Clark, & Shaver, 1998; Mikulincer & Shaver, 2007a, 2007b), two attachment dimensions can be distinguished, i.e. attachment anxiety and attachment avoidance. Attachment anxiety refers to fear of rejection and abandonment while attachment avoidance refers to fear of intimacy and discomfort with closeness and dependence (Brennan et al., 1998). An individual's position on the attachment dimensions affects emotion regulation (further referred to as ER) strategies and social interactions throughout life (Bowlby, 1988; Brumariu, 2015; Mikulincer & Shaver, 2007b) in such a way that secure attachment (low scores on both dimensions) enhances mental health and social adjustment, whereas insecure attachment (high score on one or both dimensions) has been related to various forms of psychopathology (Bowlby, 1988; Cooper, Shaver, & Collins, 1998; Mikulincer & Shaver, 2007b).

Insecure attachment has more specifically been related to both clinical and subclinical disordered eating attitudes and behaviours in clinical and non-clinical adults (e.g.Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000; Zachrisson & Skarderud, 2010). The available studies in children and adolescents on attachment towards mother and/or father, found cross-sectional and longitudinal relationships between insecure attachment and the presence

of weight, shape and eating concerns; as well as dietary restraint and bulimic symptoms (Bosmans, Goossens, & Braet, 2009; Goossens, Braet, Van Durme, Decaluwé, & Bosmans, 2012; Pace, Cacioppo, & Schimmenti, 2012; Sharpe et al., 1998). However, these studies in children and adolescents used a unitary measure of insecure attachment or a categorical view on attachment. This indicates that research on the differential and specific effects of parental attachment dimensions is scarce (Shanmugam, Jowett, & Meyer, 2012; Van Durme, Braet, & Goossens, 2015).   Additionally, research on possible underlying mechanisms explaining the link between insecure attachment and disordered eating attitudes and behaviour is also scarce (Zachrisson & Skarderud, 2010). However, finding a differential relationship between the attachment dimensions and bulimic symptoms as well as gaining insight in the possible underlying mechanisms of this relationship may have clinical implications for the treatment of people with bulimic symptoms, i.e. differential techniques may have to be applied depending on the individual's score on the attachment dimension and/or the underlying variables.

According to the Interpersonal Vulnerability Model (IPV-model; Rieger et al., 2010; Wilfley, Pike, & Striegel-Moore, 1997), insecure attachment may lead to the development of maladaptive ER strategies, which in turn may lead to the development of bulimic symptoms. Although the IPV-model (Rieger et al., 2010; Wilfley et al., 1997) points to maladaptive ER as a mediating factor, this model makes no distinction between different insecure attachment dimensions or emotion regulation strategies. Hence, no assumption on differential relationships can be distinguished. This in contrast to the ER model of attachment (Mikulincer, Shaver, & Pereg, 2003; Shaver & Mikulincer, 2002). According to this the model, people adopt different strategies to regulate emotional distress

based on their quality of attachment (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). Securely attached individuals more likely use proximity and support seeking as ER strategy due to its effectiveness in the past (Dujardin et al., 2016). However, insecurely attached individuals will less likely seek proximity and support to relieve distress (Dujardin et al., 2016), but instead will develop alternative ER strategies (Brumariu, 2015). These alternative ER strategies refer to deficits in the ability to adequately cope with challenging emotions and are therefore defined as maladaptive (Berking & Wupperman, 2012). According to the ER model of attachment, individuals high on attachment anxiety are characterized by their frequent use of hyperactivating strategies whereas those high on attachment avoidance frequently use deactivating strategies. Hyperactivation refers to recurrent attempts to minimize distance from attachment figures and entails: eliciting attention through clingy and controlling responses, an enhanced focus on attachment figures and relationships, enhanced activation of negative emotions and thoughts and failure to detach from psychological pain, all leading to a heightened mental rumination on threat-related concerns (Cassidy, 1994). Deactivation on the other hand refers to recurrent attempts to maximize distance from attachment figures and entails: avoidance of interdependence, strive for self-reliance and control leading to suppression of distressing thoughts and suppression of painful memories (Mikulincer et al., 2003; Shaver & Mikulincer, 2002).

Continued use of these hyperactivating or deactivating ER strategies throughout life appears to be maladaptive and is associated with psychological problems (Mikulincer, Shaver, & Pereg, 2003). Hence, this ER-model of attachment assigns a mediation role to hyperactivating or deactivating ER strategies in the relationship between the insecure attachment dimensions and psychopathology. Although this ER model of

attachment has already been empirically confirmed for negative mood, interpersonal problems and depression (e.g. Brenning, Soenens, Braet, & Bosmans, 2011; Wei, Vogel, Ku, & Zakalik, 2005), only few studies have empirically investigated the possibility of the assumed mediation effect in the eating disorder domain. For example, Tasca et al. (2009) performed a cross-sectional study in adult female eating disordered patients and found attachment anxiety to be indirectly contributing to eating disorder symptoms through hyperactivating ER strategies, while attachment avoidance was only directly linked to symptoms (and not through deactivating ER strategies).

As concerns studies in children and adolescents, the ER model of attachment has not yet been rigorously tested in the eating disorder domain. A study of Van Durme et al. (2015), investigated the cross-sectional relationships between the insecure attachment dimensions, maladaptive ER and both eating-related concerns and restraint in a sample of 952 early adolescents. Results showed that the relationships between both attachment anxiety and attachment avoidance towards mother on the one hand and restraint and eating-related concerns on the other hand were partially mediated by maladaptive ER. In fact, part of the sample of this cross-sectional study was followed up over a one-year period and it is the aim of the present study to extend these cross-sectional findings in several ways. First of all the cross-sectional study did not investigate whether the attachment dimensions were differentially related to specific maladaptive ER strategies (hyperactivating or deactivating ER strategies) as hypothesised by the ER-model of attachment (Shaver & Mikulincer, 2002). Additionally, in the cross-sectional study bulimic symptoms were not included as outcome measure due to their low prevalence caused by the inclusion of a young age cohort of 11 year olds. Therefore, the current study aimed to conduct a more rigorous and longitudinal test of the ER-

model of attachment for bulimic symptoms in a group particularly at risk, i.e. the age cohort of the 13 year olds. This is important as finding a differential relationship between the attachment dimensions and specific maladaptive ER strategies may have clinical implications for the treatment of people showing bulimic symptoms.

In sum, following the theoretical propositions of the ER model of attachment (Mikulincer et al., 2003; Shaver & Mikulincer, 2002), together with the lack of empirical prospective research on this model for bulimic symptoms, the current study wants to investigate whether the two attachment dimensions have a differential longitudinal relationship with bulimic symptoms through specific maladaptive ER strategies, and this in a community sample of adolescents. The first goal was to investigate whether attachment anxiety is related to bulimic symptoms one year later through hyperactivating ER strategies while controlling for attachment avoidance. The second goal was to investigate whether attachment avoidance is related to bulimic symptoms one year later through deactivating strategies while controlling for attachment anxiety. Additionally, it will also be investigated whether gender, adjusted BMI and bulimic symptoms at time 1 are related to bulimic symptoms at time 2 and thus have to be taken into account as control variables. Based on the findings of previous research, we expect girls to score higher on bulimic symptoms compared to boys (e.g. Klein & Walsh, 2003). Furthermore, we expect higher adjusted body mass index to be related to more bulimic symptoms (e.g. Tanofsky-Kraff et al., 2004) and bulimic symptoms to be highly stable over time (e.g. Matton, Goossens, Braet, & Van Durme, 2013).

Method

Participants and Procedure

During 2011, adolescents were recruited from the second year of secondary schools in Belgium. The total sample of this first data wave (time 1; T1) consisted of 508 adolescents with a mean age of 13.10 (*SD*=.36). During 2012, the second data wave (time 2; T2) was conducted with a one-year time lag between time 1 and time 2. The total sample at time 2 consisted of 397 adolescents with a mean age of 14.02 (*SD*=.99), all performing their third year of secondary school. As mentioned in the introduction, the T1 sample of the current study was part of a previously used sample in a cross-sectional study in 952 early adolescents with two age cohorts, i.e. a group of 11- year olds and a group of 13-year olds (Van Durme et al.; 2015). However, the current study is solely based on follow-up data of the 13-year olds (n=397), as these seem to confer a great risk for eating pathology with a higher prevalence of eating pathology compared the 11-year olds, especially for bulimic symptoms.

As concerns gender, 37.3% (*n*=148) was male and 62.7% (*n*=249) was female. Of the participants, 79.3% came from intact two parent families, 17.7% had divorced parents, 3% came from a family in which one of the parents had died. At both time points, participants were almost exclusively situated in the upper-middle, middle or lower middle socio-economical class. Less than one percent was situated in the upmost high or low socio-economical class, based on the occupation and education of the parents (Hollingshead, 1975). The percentage of parents who did not complete secondary school (8.7%) was quite similar to the normative data of adults in Belgium in 2014 (9.8%) (Federal government, 2014b). However, the number of parents completing higher education (bachelor diploma or higher) was higher (64%) compared to the normative data

(43.8%) (Federal government, 2014a). Our sample may therefore have a somewhat higher socio-economic status compared to the norm.

The youngsters were recruited through secondary schools. We contacted schools in order to get their approval to participate in the study with an active informed consent. Next, the parents of the youngsters received a passive informed consent, which they had to return to the school when their child was not allowed to participate. At the time of the administrations (both time-points), these youngsters were excluded from the study. The other youngsters filled in an active informed consent at the start of the administration of the questionnaires during a regular class period (50 minutes), and this at both time points. The battery of questionnaires was administered under the supervision of the researcher. This study was approved by the university's research ethics committee.

The drop-out rate was 21.8%, which might mainly be due to the fact that in Belgium the third year of secondary school is an important transition moment for adolescents. This may have led to a great number of adolescents changing school at the beginning of third year, making them unavailable for the administration of the follow-up questionnaires at their previous schools.

Instruments

Adjusted Body Mass Index (Adjusted BMI). The self-reported height and weight of the adolescents allowed to calculate the adjusted BMI by dividing the general BMI (kg/m²) by the 50th percentile of BMI for age and gender, and then multiplying this number by 100. The 50th percentile is based upon Dutch norms from Fredriks, van Buuren, Wit, and Verloove-Vanhorick (2000). Based on the adjusted BMI score, weight status can be determined. An adjusted BMI between 85 and 120 indicates

a normal weight, whereas a score below 85 indicates underweight and above 120 overweight (Van Mil & Van Winckel, 2001).

Attachment. The Experiences of Close Relationships-Revised-Child Version (ECR-R-C; (Brenning, Soenens, Braet, & Bosmans, 2011) questionnaire is an adaptation of the ECR (Brennan et al., 1998). The ECR-R-C is a 36-item self-report questionnaire intended to assess a youngster's attachment towards their primary caregiver. In the current study, individual differences with respect to attachment anxiety and attachment avoidance were measured towards the mother. Attachment anxiety reflects the extent to which adolescents are (in)secure about their mother's availability and responsiveness, and the presence or absence of fear of rejection and abandonment (for example: 'I do not often worry about being abandoned by my mother'); while attachment avoidance reflects the extent to which youngsters are (un)comfortable being close towards the mother (for example: 'I feel comfortable sharing my private thoughts and feelings with my mother'). The following instructions were given to the participants: "Below are a number of statements about your mother. Please indicate to which degree you agree with these statements, thereby picturing your mother as vividly as possible". All items were rated on a 7-point scale ranging from 1 (= "strongly disagree") to 7 (= "strongly agree"). The ECR-R-C was proven to be a reliable and valid instrument (Brenning et al., 2011; Dujardin et al., 2016). In the present study, cronbach's alphas for attachment anxiety and attachment avoidance at time 1 were .88 and .91 respectively.

Bulimic Symptoms. The Eating Disorder Inventory II (EDI-II; Garner, 1991; Dutch translation: Van Strien, 2002), an adaptation of the original Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) was used to measure bulimic symptoms. The EDI-II is a self-report questionnaire measuring psychological and behavioral characteristics

related to eating disorders such as Anorexia Nervosa and Bulimia Nervosa. In the current study, only the Bulimia (B) subscale was used. This subscale consists of 7 items measuring bulimic symptoms, for example 'I sometimes have binges where I lose control over my eating'. All items were rated on a 6-point scale ranging from 1 (= "never") to 6 (= "always"). The EDI and EDI-II were found to be reliable and valid instruments (Garner et al., 1983). In the present study, cronbach's alpha for Bulimia was .76 at time 1 and .78 at time 2.

Emotion regulation. The Questionnaire to Assess Children's and Adolescents' Emotion Regulation strategies (FEEL-KJ; Cracco, Van Durme, & Braet, 2015; Grob & Smolenski, 2005) is a 90-item self-report questionnaire measuring 15 emotion regulation strategies in response to three 'negative' emotions, i.e. anger, anxiety and sadness in children and adolescents between the age of 10 and 20. The FEEL-KJ encompasses 15 lower-order emotion regulation scales and two higher order emotion regulation scales conformed through factor analyses, i.e. an Adaptive emotion regulation scale and a Maladaptive emotion regulation scale (Cracco et al., 2015). The current study includes two specific emotion regulation strategies (lower order scales) to measure hyperactivating versus deactivating ER strategies conform with the theoretical assumptions of the ER-model of attachment, namely rumination (6items; for example: 'when I am angry, I can't stop thinking about it/can't get it out if my head') and emotional control (6 items; for example: 'when I am angry, I do not show to others that I am angry (suppression) (Shaver & Mikulincer, 2002). All items were rated on a 5-point scale ranging from 1 (= "never") to 5 (= "almost always"). The FEEL-KJ has proven to be a reliable (internal consistency and test-retest reliability) and valid measure (construct, convergent and divergent valid) for emotion regulation in Belgium. For example, the FEEL-KJ subscales with similar content to the

Cognitive Emotion Regulation Questionnaire for Children (CERQ; Garnefski, Rieffe, Jellesma, Terwogt, &,Kraaij, 2007) subscales are strongly correlated (Cracco et al., 2015). In previous research in older adolescents, the internal consistency of the lower order emotion regulation scales lies between .69 and .91, with a mean of .77 which indicates good reliability of the FEEL-KJ (Grob & Smolenski, 2005). Specifically for both rumination and emotional control, the cronbach's alpha was about .70 in Belgium (Cracco et al., 2015). In the present study, cronbach's alpha was for .62 rumination and .72 for emotional control at time 1.

Data-analysis

To start, missing data analyses were performed (Schafer, 1997) as well as drop-out analyses in order to detect whether the follow-up participants differed from the participants who dropped out on the variables of interest. Since Shapiro-Wilk normality tests showed non-normality of several of our variables of interest, we used non-parametric tests throughout the analyses.

Following Holmbeck (1997) two types of intervening variables can be distinguished, i.e. mediation and indirect effects. In both cases, the indirect effect of the intervening variable is significant in explaining the relationship between the independent variable and the dependent variable. However, mediation also entails an initial significant relationship between the independent variable and the dependent variable, whereas an indirect effect does not entail such initial relationship (Zhao, Lynch, & Chen, 2010).

Following the recommendations by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), bootstrapping, a non-parametric resampling procedure, was used to test the different intervening models. This bootstrapping procedure was performed using the SPSS macro

'mediate' developed by Hayes and Preacher(2011). Bootstrapping is superior to previous approaches, such as the procedure of Baron and Kenny (1986), as it additionally tests the significance of the indirect effects and is non-sensitive to violations of normality in the data (Preacher & Hayes, 2008). In the current study, 5000 bootstrap resamples, replacing the original sample (n=397), were used to derive the 95% confidence intervals (CI) for the indirect effects.

Results

Missing Values.

Of all participants at time 2, 379 youngsters (95.5%) provided complete data on all the variables of interest, resulting in 1.06% missing data points. Comparison of means and covariances of all questionnaire variables using Missing Completely At Random (MCAR) test (Little, 1988) revealed a normed χ^2 (χ^2=1063.97/df=943) of 1.13, indicating that the data were likely missing at random (Bollen, 1989). As a consequence missing values could be estimated and it was decided to estimate them following the expectation maximization (EM) algorithm available in SPSS (Schafer, 1997).

Characteristics of the Sample

When looking at the weight status of the participants at both time points, about 9.5% was considered underweight, 79.7% had a normal weight and 10.8% was considered overweight. The percentage of overweight youngsters was somewhat lower than in the Health Survey conducted in Belgium in 2013 (16%) (Drieskens, 2014). This may be due to the rather high socio-economic status of our sample. Youngsters from families with low socio-economic status have a higher risk to become overweight compared to youngsters from families with high socio-economic status (Drieskens, 2014).

Since girls consistently score higher on bulimic symptoms compared to boys, we looked at the gender-specific prevalence of subclinical bulimic symptoms, based on normative data of the EDI-II manual (Van Strien, 2002). For the current study, norm groups of female adolescents ($N = 735$, $M = 11.4$, $SD = 4.6$) and male adolescents ($N = 220$, $M = 10.8$, $SD = 3.5$) from the general population were applied from the manual. Of the girls, 21.7% reported binge eating and/or compensatory behaviour (without necessarily fulfilling al criteria for BN) compared to 13.7% of the boys.

Effect of Drop-Out

When comparing the follow-up participants to the drop-outs, there were no significant differences in terms of adjusted BMI, $F(1,506) = 2.97$, $p = .09$, attachment anxiety, $F(1,506) = 2.05$, $p = .15$; attachment avoidance, $F(1,506) = 3.14$, $p = .08$; rumination, $F(1,506) = .18$, $p = .68$; emotional control, $F(1,506) = .80$, $p = .37$; and bulimic symptoms, $F(1,506) = 1.02$, $p = .31$; all at time 1. However, there was a significant difference in terms of gender, $\chi^2 (1) = 5.24$, $p = .02$. The percentage of girls of time 1 participating at the follow-up study (81.4%) was higher than the percentage of boys (72.8%).

Control Variables

When looking at the outcome measure, i.e. bulimic symptoms at time 2, there was a significant difference between boys and girls, $F(1,395) = 13.92$, $p < .001$, with girls scoring higher ($M = 12.38$, $SD = 5.12$) than boys ($M = 10.57$, $SD = 3.84$). When further looking at the associations between the sample characteristics and bulimic symptoms (see table 2), adjusted BMI at time 1 was significantly associated with bulimic symptoms both at time 1, $r(397) = .12$, $p = .02$, and time 2, $r(397) = .14$, $p = .004$, with those having a higher Adjusted BMI at time 1 showing higher scores on bulimic symptoms at both time points. Furthermore, bulimic

symptoms at time 1 were strongly related to bulimic symptoms at time 2, $r(397) = .58$, $p < .001$, showing high stability of eating pathology over a one-year time period. These results call for the inclusion of gender, adjusted BMI and bulimic symptoms at time 1 as control variables in further intervening analyses.

Associations between the Study Variables.

Table 1 shows the descriptive information on the variables of interest (*M* and *SD*), whereas table 2 further presents the spearman correlations between the independent, mediator, and dependent variables of the current study. All necessary conditions to enable the investigation of the proposed intervening analyses were fulfilled. Firstly, both insecure attachment dimensions at time 1 were significantly related to bulimic symptoms at time 2. Secondly, attachment anxiety was associated with rumination and emotional control, while attachment avoidance was only correlated with emotional control. Thirdly, rumination and emotional control were significantly related to bulimic symptoms at time 2.

Intervening Analyses

Rumination as intervening variable (see table 3) First, the direct effect of attachment anxiety (T1) on bulimic symptoms (T2) was not significant, $\beta = .03$, partial $\eta^2 = .00$. Secondly, attachment anxiety was significantly related to rumination (both at T1) $\beta = .17$, partial $\eta^2 = .02$; and rumination at T1 significantly predicted bulimic symptoms at T2, $\beta = .11$, partial $\eta^2 = .02$. Although the relationship between attachment anxiety and bulimic symptoms one year later (direct effect) was non-significant, there was a significant indirect effect of rumination, 95% CI[.01, .05], S.E. = .01, $p < .01$. As concerns attachment avoidance, no indirect effect of rumination could be found since the accelerated-bias-corrected bootstrap interval contained 0; 95% CI[-.01, .02], S.E. = .01, even though the direct

effect of attachment avoidance at T1 on bulimic symptoms at T2 remained.

Emotional control as intervening variable (see table 4). First, the direct effect of attachment avoidance (T1) on bulimic symptoms (T2) was significant, β = .13, partial η^2 = .02. Secondly, attachment avoidance was significantly related to emotional control (both at time 1), β = .34, partial η^2 = .02; and emotional control at T1 significantly predicted bulimic symptoms at T2, β = .13, partial η^2 = .03. Finally, when controlling for the indirect effect of emotional control, the direct effect of attachment avoidance at T1on bulimic symptoms at T2 diminished but was still of significance, β = .10, partial η² = .01; and the indirect effect was significant with the accelerated-bias-corrected bootstrap interval being 95% CI[.01, .06], S.E. = .01, p < .05. These results indicate a partial mediation. As concerns attachment anxiety, no direct effect on bulimic symptoms at T2 nor indirect effect of emotional control could be found, 95% CI[-.02, .01], S.E. = .01.

Discussion

The goal of the current study was to prospectively investigate whether insecure attachment dimensions might play a differential contributing role in the development of bulimic symptoms through their effect on specific maladaptive emotion regulation (ER) strategies and this in a sample of adolescents from the general population, conform to the ER-model of attachment. Results showed that rumination (an hyperactivating ER strategy) served as a intervening variable in the relation between attachment anxiety and bulimic symptoms one year later (indirect effect) while emotional control (deactivating ER) served as a intervening variable in the relation between attachment avoidance and bulimic symptoms one year later (partial mediation).

The results provide empirical evidence for the IPV-model (Wilfley et al., 1997) since maladaptive ER seems to be an underlying mechanism of the relationship between insecure attachment and bulimic symptoms. The results further provide evidence for the ER-model of attachment (Shaver & Mikulincer, 2002) which distinguishes differential relationships between insecure attachment dimension and maladaptive ER strategies. The results are conform with this model: people adopt different strategies to regulate emotional distress based on their quality of attachment in such way that individuals high on attachment anxiety use hyperactivating strategies (rumination) whereas those high on attachment avoidance rather use deactivating strategies (emotional control). The use of those maladaptive ER strategies can give short term relief, but continued use is associated with psychological problems such bulimic symptoms (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). It is assumed that individuals with insecure early child-caregiver interactions are not able to adequately regulate emotional arousal, which may lead to the development of bulimic symptoms.

The results of the current study further elaborate on previous cross-sectional and longitudinal empirical research on the ER model of attachment for negative mood, interpersonal problems and depression in different age groups (e.g. Wei et al., 2005), as well as on research on the ER-model of attachment for disordered eating attitudes and behaviour in adult female patients (Tasca et al., 2009). In sum, the findings of the current study extends contemporary research by providing longitudinal evidence for the ER-model in explaining bulimic symptoms in a sample of non-clinical adolescents.

The results also extend the findings of the cross-sectional study of Van Durme et al. (2005) in several ways. As the younger age cohort was

excluded from the current longitudinal study, it was now possible to focus on change in disordered eating behaviour such as bulimic symptoms instead of disordered eating attitudes such as eating related concerns. Secondly, the results of the current study provide longitudinal insights in the development of bulimic symptoms; in such a way that insecure attachment may lead to the development of bulimic symptoms through specific ER strategies. Thirdly, the attachment dimensions were differentially related to specific maladaptive emotion regulation strategies (hyperactivating or deactivating ER strategies) as hypothesised by the ER-model of attachment (Shaver & Mikulincer, 2002), this in contrast to the cross-sectional study where only the second order maladaptive ER scale was included. Finding differential relationships may have clinical implications for the treatment of bulimic symptoms, i.e. differential ER techniques may have to be applied depending on the individual's score on the attachment dimensions (see clinical implications).

The current study has several strengths. First of all, it is the first longitudinal empirical study on the IPV-model (Wilfley et at., 1997) and the ER model of attachment (Shaver & Mikulincer, 2002) for bulimic symptoms in a group of adolescents. Only few research has been performed on the link between attachment, emotion regulation and disordered eating attitudes and behaviour, and this mainly in cross-sectional studies (Tasca et al., 2009; Van Durme et al., 2015) and/or in adult populations (Tasca et al., 2009). This current study focused on adolescents as they are particularly at risk for disordered eating attitudes and behaviour (Klein & Walsh, 2003).

Furthermore, the concepts related to the ER-model of attachment were thoroughly operationalised. As concerns attachment, a dimensional view on parental attachment was adopted and the measurement of all concepts, i.e. attachment dimensions (Brenning et al., 2011), maladaptive

emotion regulation strategies (Cracco et al., 2015) and bulimic symptoms (Van Strien, 2002) was conducted through age-appropriate, valid and reliable measures.

Next to abovementioned strengths, the current study also entails some shortcomings. To start, the current longitudinal study only consisted of two time points. Future research should ideally contain three time points to fully investigate the longitudinal relationships between the three concepts. Additionally, the current study only considered bulimic symptoms as an outcome measure. Future studies should investigate whether the differential emotion regulation strategies may be more strongly related to certain forms of disordered eating attitudes and behaviour compared to others. Previous research suggests that rumination might be more strongly related to symptoms of anorexia nervosa of the purging type and bulimia, while suppression and withdrawal might be more related with symptoms of anorexia nervosa of the restricting type (Candelori & Ciocca, 1998).

Another limitation is that only attachment toward mother was included in the current study, because the mother is considered to be the primary caregiver with most responsibility and influence on the eating behaviour of the adolescent (Goossens et al., 2012). However, the father–child relationship might have a differential impact, emphasizing the necessity for future research to investigate whether the same mediation effects can be found when attachment toward father is taken into account.

Finally, the generalizability of the results may be compromised due to several reasons. First of all, the sample of this study was rather homogeneous as participants were mainly white with middle to high socio-economic status making it difficult to deduct about other ethnic backgrounds and individuals with lower socio-economic status. Drop-out analyses further showed that more boys compared to girls were lost at

follow-up assessment. Furthermore, research was conducted on self-reported bulimic symptoms in adolescents for the general population. The use of self-report data may pose concerns about biased reporting (i.e. social desirability), shared method variance and limited control on the comprehension of the items, even though the researcher was present during the administration in order to enhance reliable reporting. The cronbach's alphas for the ER strategies were also rather low, as well as the effect sizes in the intervening effects. Although it is acknowledged that adolescents are the best informant on their inner thoughts and feelings, future research should include multiple methods next to self-report, such as the use of clinical interviews and/or multiple informants in order to replicate the findings of the current study.

The provided empirical evidence for the IPV-model and the ER-model of attachment has clinical implications. As concerns treatment for individuals with bulimic symptoms, the individual's attachment configuration and related emotion regulation strategies should be thoroughly assessed in order to provide an individually tailored treatment in combination with the current evidence based treatment for Bulimia Nervosa, i.e. Cognitive Behavioral Therapy (CBT-E; Fairburn, 2008). Moreover, when insecure attachment dimensions are present in adolescence, principles of Family-Based Therapy (FBT; Lock & le Grange, 2005) or Attachment-Based Family Therapy (ABFT; Diamond, Diamond, & Levy, 2014) can be used to improve the mother-child relationship and hence the attachment experiences and relationship. Next to ABFT and FBT, Interpersonal Psychotherapy for adolescents (IPT; Tanofsky-Kraff et al., 2007) could also be used. Since people adopt different emotion regulation strategies based on their attachment configuration, this difference should be reflected in a different approach when working on emotion regulation. In individuals high on attachment

anxiety, therapists may focus on teaching them other and more appropriate ways (than hyperactivating) to deal with their overwhelming emotions, whereas in individuals high on avoidance focus may first be on exposure to emotion and interpersonal closeness in order to learn to tolerate and recognize emotions rather than on teaching them emotion regulation strategies immediately (Tasca et al., 2009).

To conclude, results show how insecure attachment processes might play a differential contributing role in the development of bulimic symptoms through their effect on specific maladaptive emotion regulation in a sample of adolescents. Attachment anxiety seems to be related to bulimic symptoms trough rumination, while attachment avoidance through emotional control.

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Tables

Table 1.

Descriptive Information Study Variables and Sample Characteristics.

Variables	*M*	*SD*
Anxiety (T1)	2.22	.84
Avoidance (T1)	3.27	.98
Rumination (T1)	11.51	3.36
Emo control (T1)	12.29	3.58
B (T1)	11.38	4.29
B (T2)	11.71	4.76
AdjBMI (T1)	100.60	15.06

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Emo
control=Emotional control; B=Bulimic Symptoms; AdjBMI=Adjusted BMI.

Table 2.

Spearman correlations between the different Study Variables and Sample Characteristics.

	1.	2.	4.	5.	6.	7.	8.
1. Anxiety (T1)	1						
2. Avoidance (T1)	.48***	1					
3. Rumination (T1)	.19***	.07	1				
4. Emo control (T1)	.15**	.32***	.17**	1			
5. B (T1)	.32***	.17**	.20***	.13**	1		
6. B (T2)	.28***	.21***	.23***	.18***	.58***	1	
7. AdjBMI (T1)	.11*	.08	-.03	.06	.12*	.14**	1

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Emo control=Emotional control; B=Bulimic Symptoms; AdjBMI=Adjusted BMI.

**p<.01; *p<.05.

Table 3.

Summary of the Bootstrapping Procedure testing the Intervening role of Rumination.

Variables	*B*	*SE (B)*	*β*	*t*
Direct effects on B (T2)[a]				
Gender	1.20	.41	.25	2.92**
AdjBMI (T1)	.03	.01	.10	2.46*
B (T1)	.57	.05	.51	11.88***
Anxiety (T1)	.18	.27	.03	.66
Avoidance (T1)	.63	.22	.13	2.88**
Effects of insecure attachment dimensions (T1) on Rumination (T1)[b]				
Gender	1.80	.34	.54	5.26***
AdjBMI (T1)	-.01	.01	-.04	-.88
B (T1)	.05	.04	.06	1.25
Anxiety (T1)	.69	.22	.17	3.10**
Avoidance (T1)	.09	.18	.03	.49
Effects on B (T2) when controlling for Rumination[c]				
Gender	.95	.42	.20	2.24*
AdjBMI (T1)	.03	.01	.11	2.58*
B (T1)	.56	.05	.51	11.77***
Anxiety (T1)	.08	.27	.01	.30
Avoidance (T1)	.62	.22	.13	2.83**
Rumination (T1)	.14	.06	.10	2.31*

Note: AdjBMI=Adjusted BMI; B=Bulimic symptoms; Anxiety=Attachment Anxiety;

Avoidance=Attachment Avoidance; [a] $\eta^2 = .38$; [b] $\eta^2 = .13$, [c] $\eta^2 = .39$

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

Table 4.

Summary of the Bootstrapping Procedure testing the Intervening role of Emotional Control

Variables	*B*	*SE (B)*	*β*	*t*
Direct effects on B (T2)[a]				
Gender	1.20	.41	.25	2.92**
AdjBMI (T1)	.03	.01	.10	2.46*
B (T1)	.57	.05	.51	11.88***
Anxiety (T1)	.18	.27	.03	.66
Avoidance (T1)	.63	.22	.13	2.88**
Effects of insecure attachment dimensions (T1) on Emotional control (T1)[b]				
Gender	-.37	.37	-.10	-1.00
AdjBMI (T1)	.00	.01	.06	.12
B (T1)	.04	.04	.05	.93
Anxiety (T1)	-.08	.24	-.02	-.32
Avoidance (T1)	1.25	.20	.34	6.26***
Effects on B (T2) when controlling for Emotional control[c]				
Gender	1.24	.41	.26	3.04**
AdjBMI (T1)	.03	.01	.10	2.46*
B (T1)	.56	.05	.51	11.87***
Anxiety (T1)	.19	.26	.03	.70
Avoidance (T1)	.48	.23	.10	2.11*
Emo control (T1)	.12	.06	.09	2.14*

Note: AdjBMI=Adjusted BMI; B=Bulimic symptoms;Anxiety=Attachment Anxiety;

Avoidance=Attachment Avoidance; Emo control=Emotional control; [a] $\eta^2 = .38$; [b] $\eta^2 = .12$,

[c] $\eta^2 = .39$.

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

Chapter 4

Adolescent aesthetic athletes: A group at risk for eating pathology?[1]

Abstract

Objective: Previous research shows that leanness- and weight-dependent sports increase the risk of developing disturbed eating behaviour. This study investigated whether adolescent aesthetic athletes (n=68, M=14.6 years), particularly ballet dancers and figure skaters, exhibit more eating pathology compared to the general population. Furthermore, it was investigated whether sport-related factors have explanatory value for the dieting behaviour of aesthetic athletes. Method: To asses eating pathology, reliable and valid self-report questionnaires were used including the Eating Disorder Inventory-II, the Children's Eating Disorder Examination-Questionnaire and the Dutch Eating Behaviour Questionnaire. Results: Results show that female aesthetic athletes show more drive for thinness, features of bulimia, dieting behaviour and concerns about weight and shape compared to female adolescents from the general population. Concerning the explanation of dieting behaviour in aesthetic athletes, both sport-related factors (competition state anxiety) and general risk factors (eating concern) seem to be relevant. Conclusion: These results suggest that female aesthetic athletes show more disturbed eating behaviour and

thoughts than female adolescents from the general population and therefore may have an enhanced risk of developing clinical eating disorders.

Introduction

Studies have shown that in certain sports, adolescent athletes have an increased risk of developing eating disorder (ED) pathology compared to adolescents from the general population. Moreover, ED pathology seems to be more prevalent in (a) athletes compared to non-athletes, particularly in high sport level athletes, (b) female compared to male athletes and (c) leanness- and weight-dependent sports compared to other sports (e.g. Filaire, Rouveix, & Bouget, 2008; Sundgot-Borgen, 1999, 2002, 2004).

The present study will particularly focus on one of those leanness and weight-dependent sport-groups, namely aesthetic sports and more specifically on individual figure skating and ballet. Previous studies conducted on eating pathology in those two specific sports are scarce and mainly focus on female adult athletes. For example, similar eating pathology profiles were found in female ice skaters (part of a figure skating pair) as in females with EDs (Taylor & Ste-Marie, 2001). Also, studies found a lower Body Mass Index (BMI), a higher prevalence of clinical EDs and more features of (subclinical) eating pathology in female adult ballet dancers compared to the general population (e.g. Abraham, 1996; Ravaldia et al., 2003; Ringham et al., 2006).

As concerns the aetiology, research emphasises the possibility of sport-related factors being of more influence on the development of eating pathology in athletes compared to the more general ED risk factors (e.g. Bonci et al., 2008).

The objective of this study is to investigate hypotheses on both the prevalence and aetiology of ED pathology in adolescent aesthetic athletes. Moreover, our first research question will overcome some of the shortcomings of previous research by examining whether eating pathology is prevalent in aesthetic adolescent athletes, i.e. in both male and female

individual figure skaters (not part of a figure skating pair) and ballet dancers. Secondly, our study wants to investigate whether sport-related factors like sport-level (hours of sport per week) and competition anxiety (both as trait and state) explain aesthetic athletes' dieting behaviour, as well as the additional explanatory value of more general risk factors. Since Martinsen, Bratland-Sanda, Erikson, and Sundgot-Borgen (2010) found enhancement of performance to be the primary reason to lose weight in elite athletes, a link might exist between anxiety related to performance on competitions, and the presence of ED pathology in athletes.

The general risk factors are depicted from the transdiagnostic model of Fairburn, Cooper, and Shafran (2003), a comprehensive model on the development and maintenance of eating disorders which has already proven its applicability in the general population (Stice, 2002). Both the assumed preceding (weight concern, shape concern and eating concern) and sustaining factors (perfectionism, low self-esteem, emotional intolerance and interpersonal difficulties) of eating pathology will be analysed.

Method

Participants

The aesthetic athlete sample consists of 68 athletes (aged 11–21), who practiced ballet or figure skating for at least 10h/week. The figure skaters constitute 35.3% (n=24) of the athlete group and were recruited through Belgian figure skating clubs; the ballet dancers 64.7% (n=44) of the group and were recruited through a prestigious ballet school in Belgium. The total group contained 76.5% (n=52) females and 23.5% (n=16) males. Of the aesthetic athletes, 25% (n=16) were underweight and 1.5% (n=1) overweight. Response rate in the total group was 89.5%.

Instruments

      Subject variables. Participants reported on age, sex, height and weight. This allows to calculate the BMI and adjusted BMI (BMI/ Percentile 50 of BMI for age and sex; normal range: 85–120) (Fredriks, van Buuren, Wit, & Verloove-Vanhorick, 2000). Furthermore, sport participation was assessed with sport level being determined by hours of sport per week.

      Sport Competition Anxiety Test (SCAT). Sport Competition Anxiety Test (SCAT) (Martens, 1977) is a self-report questionnaire measuring competition anxiety as personality trait (disposition). Competition anxiety disposition (CAD; Cronbach's alpha (α) .47) is defined as the tendency to experience situations as threatening and to react to them with feelings of anxiety or nervousness.

      Competitive State Anxiety Inventory-2 (CSAI-2). Competitive State Anxiety Inventory-2 (CSAI-2) (Martens, Burton, Rivkin, & Simon, 1980) is a self-report questionnaire to measure anxiety as an emotional state before a competition. Competition state anxiety (CSA) reflects feelings of anxiety, nervousness and uncertainty that one can experience at the start of a specific competition. The CSAI-2 provides scores for cognitive anxiety (negative expectations regarding the sport performance; α=.87), somatic anxiety (physiological and vegetative features; α=.80) and lack of self-confidence (α=.78).

      The Dutch Eating Behaviour Questionnaire (DEBQ). The Dutch Eating Behaviour Questionnaire (DEBQ) (Van Strien, Frijters, Bergers, & Defares, 1986) is a self-report questionnaire that normally detects three types of eating behaviour. Here, only external (eating in response to an external cue without being hungry; α=.70) and emotional eating (eating when one becomes overwhelmed by certain emotions; α=.92) are assessed.

Eating Disorder Inventory II (EDI-II). Eating Disorder Inventory II (EDI-II) (Garner, 1991) is a self-report questionnaire measuring psychological and behavioural characteristics related to EDs. The following eating pathology scales were assessed: drive for thinness (EDI-II-DT; α=.89), bulimia (EDI-II-B; α=.76) and body dissatisfaction (EDI-II-BD; α=.93). In addition, perfectionism (EDI-II-P; α=.68) and interpersonal distrust (EDI-IIID; α=.75) were included to measure related psychological characteristics.

Children's Eating Disorder Examination Questionnaire (ChEDE-Q). Children's Eating Disorder Examination Questionnaire (ChEDE-Q) (Decaluwé & Braet, 1999) is a self-report questionnaire assessing specific ED behaviours and is derived from the Eating Disorder Examination interview (EDE, Fairburn & Cooper, 1993). The questionnaire is divided into four subscales: dieting behaviour (α .84), weight concern (chEDEQ-WC; α=.83), shape concern (chEDEQ-SC; α=.92) and eating concern (chEDEQ-EC; α=.71).

Children's Depression Inventory (CDI). Children's Depression Inventory (CDI) (Kovacs & Beck, 1977) is a self-report screening questionnaire measuring affective, cognitive and behavioural symptoms of depression. Cronbach's alpha is .84.

The Self-Perception Profile for Adolescents (SPP-A). The Self-Perception Profile for Adolescents (SPP-A) (Harter, 1988) is a self-report questionnaire in which various aspects of the self-concept are examined in adolescents. Here, two of the seven subscales were administered, i.e. physical appearance (α=.84) and general self-esteem (α=.83).

Results

Descriptive Statistics

Comparing both sport groups, there are no differences in terms of age, $F(1,66)=1.08$, $p>.05$, and sex ratio, $\chi^2(1)=2.51$, p>.05. In both groups, the average age is about 14.5 years and there is a majority of girls present. However, they do differ on hours of sport practiced, $F(1,64)=48.02$, $p<.001$ and adjusted BMI, $F(1,66)=16.47$, $p<.001$. The ballet dancers train more hours per week and have a lower adjusted BMI compared to the figure skaters. No differences occurred on eating pathology (EDI-II, ChEDEQ and DEBQ) using three oneway MANOVA's.

Is Eating Pathology Prevalent Among Aesthetic Athletes?

Table 1 shows a comparison between the aesthetic athletes and the norm groups (Braet et al., 2008; Garner, 1991; Goossens & Braet, 2010) on the nine eating pathology subscales of the EDI-II, ChEDEQ and DEBQ. Significant differences were found on five subscales, i.e. the female athletes showed significantly higher drive for thinness, more features of bulimia, engage more in dieting behaviour and have more concerns about their weight and body shape compared to the female norm group. No significant differences were found on body dissatisfaction, eating concerns, emotional and external eating.

The table shows no significant differences between the male aesthetic athletes and the male adolescent norm group on the nine eating pathology subscales.

Explanatory Power of Sport-Related Ractors for Athletes' Dieting Behaviour

Results of the hierarchical multiple regression analysis demonstrated in Table 2, with dieting behaviour as the dependent variable, show that the model with the sport-related factors (model 2) outperforms the model that

only takes account for the control variables age and gender, *Fchange* (3,50)=3.10, *p*<.05. The model that takes account of the sport-related factors explains 24% of the variance of the dieting behaviour in aesthetic athletes, F(5,50)=3.16, *p*<.05. Within this model, two variables play a significant role, i.e. age (β=.28, *p*<.05) and competition state anxiety (β=.45, *p*<.01). Block 3, the addition of the preceding and maintaining factors of the transdiagnostic model, adds a great amount of variance to the second model, *Fchange* (7,43)=20.5, *p*<.001. This third model explains 83% of the variance of dieting behaviour in the aesthetic athletes with only eating concern as significant variable, (β=.55, *p*<. 001).

Discussion

Results of the present study indicate that female figure skaters and ballet dancers show more eating pathology compared to female adolescents from the general population: higher drive for thinness, more features of bulimia, more dieting behaviour and more concerns about their weight and body shape. In male aesthetic athletes, no differences were found with the male norm group. These findings are in line with previous research showing a higher prevalence of eating pathology in (a) aesthetic athletes compared to non-athletes and (b) female compared to male athletes (Sundgot-Borgen & Torstveit, 2004).

With regard to the aetiology of athletes' dieting behaviour, the model only taking account the sport-related factors, explains 24% of the variance of the dieting behaviour. Within this model, both age and competition state anxiety play a significant role. However, adding the preceding and maintaining factors from the transdiagnostic model of Fairburn et al. (2003), leads to a more significant model explaining a total of 83% of the variance with eating concern as significant variable.

These results emphasise the importance of cognitive concerns as core psychopathology for eating pathology. However, only eating concern was of significance. This might be due to our dependent variable, dieting behaviour, which is almost directly linked to eating concerns. Weight and shape concerns might therefore be more distant variables. Although the preceding factors of the transdiagnostic model seem to be of most importance, results show that sport related factors might also be of relevance in absence of negative self-evaluation, particularly competition state anxiety. Feeling anxious, nervous and uncertain at the start of competitions might put aesthetic athletes at risk for developing eating pathology which might possibly function as a way to control fear and enhance performance (Martinsen et al., 2010).

Strengths of this study entail the under-researched study sample of individual elite figure skaters and ballet dancers with the inclusion of male athletes as well as the focus on sport-related factors in explaining dieting behaviour, especially with the absence of prior research on competition anxiety.

This study also has some limitations. Firstly, it is a cross-sectional study so no conclusive decisions can be made about directions of effects. Secondly, the use of self-report questionnaires has disadvantages in athletes, i.e. a tendency of underreporting eating pathology and associated psychological features (Johnson, Powers, & Dick, 1999) which might lead to false negatives and underestimation of our findings. A third limitation is the use of self-reported length and weight to calculate adjusted BMI. Therefore, a possible bias cannot be excluded. Fourthly, although the impact of selection bias is estimated as minimal, only athletes with little to no eating pathology may have entered our study while athletes with more severe pathology may not have participated. This would lead to conclude that all significant findings of our study are indeed indicative of important

trends. Finally, participants were almost exclusively white with high socio-economic status which limits the generalisability of our findings.

To conclude, our study shows that eating pathology is prevalent in leanness- and weight-dependent sports, i.e. figure skating and ballet, especially in female athletes. Both dysfunctional cognitive concerns (eating concern) and sport-related factors (competition state anxiety) seem to have explanatory value for the dieting behaviour of aesthetic athletes. Clinically, the results emphasise the importance of developing adequate prevention and screening programmes for athletes in the future. Furthermore, specific etiological models of eating pathology should be developed for (aesthetic) athletes taking account of sport-related and more general risk factors.

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Tables

Table 1.

Aesthetic Athletes versus Norm Group on the Eating Pathology Subscales.

Variable	Athletes (F) (M/SD)	Norm (F) (M/SD)	Stat (t)	Athletes (M) (M/SD)	Norm (M) (M/SD)	Stat (t)
DT	20.8 (9.21)	16.8 (7.8)	3.07**	13.31 (6.22)	13.1 (3.6)	.14
B	13.46 (4.90)	11.4 (4.6)	3.04**	12.31 (4.90)	10.8 (3.5)	1.24
BD	29.54 (11.93)	31.4 (12.8)	-1.13	26.25 (12.54)	19.8 (8.7)	2.06
Restraint	1.00 (1.18)	.61 (.95)	2.31*	.55 (1.00)	.30 (.71)	1.00
WC	1.71 (1.49)	1.27 (1.26)	2.09*	.99 (1.20)	.32 (.64)	1.56
EC	.59 (.98)	.47 (.75)	.87	.44 (.61)	.52 (.79)	.76
SC	1.77 (1.44)	1.32 (1.29)	2.16*	1.20 (1.47)	.53 (.82)	1.81
Emo	2.28 (.75)	2.19 (.78)	.85	2.21 (.92)	1.97 (.73)	1.05
Extern	3.03 (.46)	2.97 (.63)	1.02	3.26 (.82)	3.04 (.71)	1.09

Note: F=Female; M=Male; Stat=Statistic; DT=Drive for Thinness; B=Bulimia; BD=Body

Dissatisfaction. WC=Weight Concern; EC=Eating Concern; SC=Shape Concern;

Emo=Emotional Eating; Extern=External Eating.

*p<.05; **p<.01.

Table 2.

Summary of Hierarchical Regression Analysis for Variables Predicting Dieting in Aesthetic Athletes.

Variable	Model 1			Model 2			Model 3		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	.14	.07	.25	.16	.08	.28*	.02	.05	.03
Gender	.60	.39	.20	.39	.38	.13	.12	.23	.04
Hours sport/week				.01	.03	.06	-.02	.02	-.07
CAD				-.06	.07	-.16	-.00	.04	-.01
CSA				.04	.02	.45**	.00	.01	.02
WC							.16	.15	.20
SC							.21	.13	.25
EC							.69	.14	.55***
P							.02	.02	.08
ID							.01	.02	.06
Depr Symptoms							.01	.02	.04
Self-Esteem							.27	.15	.20

Note: CAD=Competition anxiety disposition; CSA=Competition State Anxiety; WC=Weight Concern; SC=Shape Concern; EC=Eating Concern; P=Perfectionism; ID=Interpersonal Distrust; Depr symptoms=Depressive symptoms.

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

Chapter 5

Attachment and bulimic symptoms in elite female adolescent ballet dancers: An intervening role of maladaptive emotion regulation?[1]

Abstract

Objective: While aetiological research on the impact of sport specific risk factors has often been performed in elite female adolescent ballet dancers, research on more general risk factors is scarce. Therefore, the current study investigated the theoretical propositions of the emotion regulation model of attachment, i.e. whether attachment anxiety and attachment avoidance might play a differential contributing role in the development of bulimic symptoms through assumed differences in adopting specific maladaptive emotion regulation strategies. Method: Developmentally appropriate self-report questionnaires were administered to a sample of 78 elite female adolescent ballet dancers (Mean age: 14.29; Mean hours of sport/week: 22.65) and this at two time points with a one year time lag. Results: Results provided partial longitudinal evidence for the emotion regulation model of attachment. More specifically, attachment anxiety seemed to be related to bulimic symptoms through rumination.

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[1] Van Durme, K., Goossens, L., & Braet, C. (submitted). Attachment and bulimic symptoms in elite female adolescent ballet dancers: An intervening role of maladaptive emotion regulation?

Introduction

In the Diagnostic and Statistical Manual for Mental Disorders – 5th edition (DSM-5; American Psychiatric Association (APA), 2013), Bulimia Nervosa (BN) is mainly characterised by episodes of objective binge eating followed by compensatory behaviour to prevent weight gain or to control one's body weight. Both need to occur at least once a week during the past three months. The life time prevalence of BN by age 20 is 2.6% with a peak incidence between the age of 16 and 20 (Stice, Marti, & Rohde, 2013). Subclinical bulimic symptoms are much more prevalent compared to full-blown BN (Goldschmidt, Aspen, Sinton, Tanofsky-Kraff, & Wilfley, 2008; Kjelsås, Bjørnstrøm, & Götestam, 2004; Peebles, Wilson, & Lock, 2006). These bulimic symptoms refer to episodes of binge eating (including both objective and subjective binge eating) and compensatory behaviour, without necessarily fulfilling all criteria for BN (Goldschmidt et al., 2008). The prevalence rate of bulimic symptoms increases throughout adolescence (Field et al., 2003; Slane, Klump, McGue, & Iacono, 2014) and is higher in girls compared to boys (Klein & Walsh, 2003). Furthermore, these symptoms confer a great risk for full-blown BN, Binge Eating Disorder (BED), and weight gain/obesity in young adulthood (Kotler, Cohen, Davies, Pine, & Walsh, 2001; Neumark-Sztainer et al., 2006) and may affect adolescents' physical and psychosocial functioning (Goldschmidt et al., 2008; Waaddegaard, Thoning, & Petersson, 2003).

Although adolescence is generally considered to be a risk period to develop bulimic symptoms, other risk groups can also be distinguished. Moreover, research shows a higher prevalence of subclinical disordered eating attitudes and behaviour, including bulimic symptoms in athletes (13.5%) compared to non-athletes (4.6%) (Martinsen & Sundgot-Borgen, 2013; Sundgot-Borgen & Torstveit, 2004) and the prevalence seems to be

especially high in female athletes (14%) compared to male athletes (3.2%) (Martinsen & Sundgot-Borgen, 2013). Moreover, puberty can be considered as an additional risk factor in this female athlete group, as puberty-related changes in body composition may not only affect attitudes about weight and body shape, but also athletic performances (Byrne & McLean, 2001; Kong & Harris, 2015; Martinsen & Sundgot-Borgen, 2013; Sundgot-Borgen & Torstveit, 2004)

Although female adolescent athletes can be seen as a specific at risk group because of their gender, developmental stage as well as their athlete status, especially those athletes who participate at a high level (elite athletes) in a leanness- or weight dependent sport seem to be at risk. In such sports low body weight/fat percentage is promoted in order to enable a high strength-to-weight ratio to enhance athletic performance, which is conform to the belief 'thin is going to win' (Byrne & McLean, 2001; De Bruin, Oudejans, & Bakker, 2007; Sundgot-Borgen, 1993; Sundgot-Borgen & Torstveit, 2010). In such elite athletes, almost half of the athletes exhibit disordered eating attitudes and behaviours. (Francisco, Narciso, & Alarcao, 2013; Holm-Denoma, Scaringi, Gordon, Van Orden, & Joiner, 2009; Kong & Harris, 2015).

Ballet, a sport belonging to the category of aesthetic sports, can be considered as one such leanness- or weight dependent sport (De Bruin, Oudejans, Bakker, & Woertman, 2011; Sundgot-Borgen, 1993). While leanness/low body weight is believed to lead to better sport performances, there is also an additional aesthetic element related to an aesthetic sport like ballet in such a way that costumes, make-up, femininity, and physical attractiveness are also taken into account during the judging process next to performance (Kong & Harris, 2015; Martinsen & Sundgot-Borgen, 2013). Research already showed that elite female adolescent ballet dancers score higher on disordered eating attitudes and behaviour like drive for

thinness, weight concerns, shape concerns, restraint, and bulimic symptoms compared to both a non-elite ballet group and a non-athlete group (De Bruin et al., 2007; Francisco, Narciso, & Alarcão, 2012; Francisco, Narciso, & Alarcão, 2013; Thomas, Keel, & Heatherton, 2005; Van Durme, Goossens, & Braet, 2012).

As mentioned above, research already investigated the role of certain sport specific risk factors, i.e. sport discipline and sport level, in the development of disordered eating in athletes. Other sport factors have also been considered, such as the impact of the coach: negative coaching style, the pressure of the coach to obtain a certain ideal body weight/fat percentage, and direct negative remarks on the athletes' weight or body shape seem to have a specific influence (De Bruin et al., 2007; Kong & Harris, 2015; Muscat & Long, 2008; Toro, Guerrero, Sentis, Castro, & Puertolas, 2009). However, not all of these at risk athletes develop disordered eating, leading to the belief that certain athletes may be more vulnerable to be influenced by the abovementioned sport specific factors due to some individual psychological risk factors.

Moreover, disordered eating attitudes and/or behaviours are generally considered to be the result of an interaction between several biological, cultural, personality, and family factors (Klein & Walsh, 2003). Although evidence for a link between insecure attachment and eating pathology has been established since 1989 by research of Armstrong and Roth, research on parental attachment and disordered eating attitudes and behaviours in early adolescence is scarce. However, adolescents are particularly at risk due to puberty onset (Klein & Walsh, 2003) and parental factors are still important determinants for personal development in this age group (e.g., Soenens et al., 2008). As elite female adolescent ballet dancers constitute a specific risk group, it might be important to investigate the role of attachment for the development of bulimic

symptoms. More detailed research on the role of attachment for disordered eating attitudes and behaviours may be useful to develop 'two-pathway' etiological models for athletes, including both sport specific and general risk factors.

The attachment system refers to an innate behavioural system with as main goal to achieve a sense of security (Bowlby, 1973, 1982). Secure attachment can only be obtained when, during early child-caregiver interactions, the primary caregiver was available and responsive to the child in times of need. When the primary caregiver was insensitive, inconsequent or unresponsive, no sense of security can be obtained and insecure attachment patterns will emerge (Bowlby, 1988; Waters & Waters, 2006). Insecure attachment is seen as a transdiagnostic risk factor, and related with several forms of psychopathology (Mikulincer & Shaver, 2007a, 2007b), including disordered eating attitudes and behaviour (e.g. Zachrisson & Skarderud, 2010).

Research indicates that two insecure attachment dimensions can be distinguished: attachment anxiety refers to fear of rejection and abandonment while attachment avoidance refers to fear of intimacy and discomfort with closeness and dependence (Brennan, Clark, & Shaver, 1998; Mikulincer & Shaver, 2007a, 2007b). According to the Emotion Regulation model (ER-model) of attachment (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer, Shaver, & Pereg, 2003; Shaver & Mikulincer, 2002), an individual's position on the attachment dimensions affects ones emotion regulation strategies which in turn may affect their psychosocial functioning. When a physical or psychological threat emerges, securely attached individuals apply proximity seeking as ER strategy due to past successful experiences with the availability and responsiveness of the primary caregiver (Dujardin et al., 2016). Securely attached individuals develop constructive ways to cope with challenging emotions and distress.

However, insecurely attached individuals, not acquainted with the responsiveness of attachment figures, develop maladaptive ER strategies to relieve distress. Individuals high on attachment anxiety mostly use hyperactivating strategies to deal with distress whereas those high on attachment avoidance use deactivating strategies. Hyperactivation refers to recurrent attempts to minimize distance from attachment figures and leads to a heightened mental rumination on threat-related concerns (Cassidy, 1994). Deactivation on the other hand refers to recurrent attempts to maximize distance from attachment figures and leads to suppression of distressing thoughts and suppression of painful memories (Mikulincer et al., 2003; Shaver & Mikulincer, 2002). Continued use of these maladaptive emotion regulation strategies (hyperactivation or deactivation) throughout life appears to be associated with psychological problems (Mikulincer & Shaver, 2007a, 2007b). The ER model of attachment and more specific, the mediating role of hyperactivating and deactivating ER strategies, has already been empirically validated for explaining negative mood, interpersonal problems and depression in both adults and adolescents (eg. Brenning, Soenens, Braet, & Bosmans, 2012; Wei, Vogel, Ku, & Zakalik, 2005). Although previous research already found a cross-sectional and longitudinal link between insecure attachment and both subclinical and clinical disordered eating attitudes and behaviours, including bulimic symptoms, in children, adolescents and adults from the general population as well as in clinical groups (eg. Goossens, Braet, Van Durme, Decaluwé, & Bosmans, 2012; Zachrisson & Skarderud, 2010) research on the ER-model of attachment is scarce within the eating disorder domain. In a cross-sectional study with an adult sample of female eating disordered patients, Tasca et al. (2009) found attachment anxiety to be indirectly contributing to eating disorder symptoms through hyperactivating ER strategies, while attachment avoidance was only

directly linked to symptoms (and not through deactivating ER strategies). In a longitudinal study with an adolescent sample from the general population, attachment anxiety was related to bulimic symptoms trough rumination (hyperactivation), while attachment avoidance was related to bulimic symptoms through emotional control (deactivation) (Van Durme, Goossens, Bosmans, Braet, submitted), thereby confirming the hypotheses of the ER-model of attachment.

When looking specifically at research on insecure attachment and emotion regulation in athletes, both anxious and avoidant attachment seemed to be related to eating pathology in adult athletes (Shanmugam, Jowett, & Meyer, 2012); as well as maladaptive emotion regulation strategies (Shriver, Willenberg, & Gates, 2016). However, to our knowledge no research has been performed on the ER-model of attachment in a group of elite female adolescent ballet dancers, a group particularly at risk for eating pathology, even though this may provide guidelines to conduct more adequate prevention and treatment programs. Therefore, the goal of the current study is to investigate whether general risk factors are also of importance in the development of bulimic symptoms in elite female ballet dancers and thus whether the ER-model can be replicated in this group. In sum, the current study wants to investigate whether the two attachment dimensions have a differential longitudinal relationship with bulimic symptoms through specific maladaptive ER strategies. Following the theoretical propositions of the ER-model of attachment, we expect that hyperactivating ER strategies (rumination) serve as a intervening variable in the relationship between attachment anxiety and bulimic symptoms one year later but not in the relationship between attachment avoidance and bulimic symptoms. On the other hand, we expect that deactivation (emotional control) serves as an intervening variable in the relationship between attachment avoidance and

bulimic symptoms one year later but not in the relationship between attachment anxiety and bulimic symptoms.

Method

Participants and Procedure

During 2011, adolescent athletes, i.e. elite dancers, were recruited from secondary schools in Belgium, which provide a specific ballet/dance education as part of their regular school program. These schools are highly selective as auditions/evaluations are organized on a yearly base. In Belgium, only four such schools exist, of which three agreed to participate in the current study. The total sample of this first data wave (time 1; T1) consisted of 140 adolescent elite dancers, of which 82.1% was female and 17.9% male. Based on our particular interest in female adolescent dancers, we excluded the male dancers from our sample, resulting in 115 female adolescent ballet dancers at time 1. During 2012, the second data wave (time 2; T2) was conducted with a one-year time lag between time 1 and time 2. The total sample at time 2 consisted of 78 female elite dancers with a mean age of 14.29 (SD=1.86). These female elite dancers started to dance early in life, with a mean start age of 5.81 (SD=2.41) and practiced their sport on average for about 22.65 hours per week (SD=7.05). Of these participants, 76.9% came from intact two parent families, 20.5% had divorced parents, and 2.6% came from a family in which one of the parents had died. At both time points, participants were exclusively situated in the upper-middle (49.7%), middle (52.5%) or lower middle (7.7%) socio-economical class based on the occupation and education of the parents (Hollingshead, 1975). No participants were situated in the upmost high or low socio-economical class.

At the beginning of the longitudinal study, the schools provided an active informed consent for the administration of the questionnaires during

school hours for both time points. Additionally, information letters and passive informed consents were distributed to the parents. The adolescents themselves received an active informed assent at the beginning of each administration time. Youngster filled in a battery of questionnaires during a regular class period (50 minutes) under the supervision of the researcher. The drop-out rate of elite female dancers at time 2 was 32.2%, which were all study drop-outs. A great number of adolescents left the ballet/dance school, voluntary or involuntary, due to the failure to meet the standards at the yearly auditions/evaluation. This study was approved by the university's research ethics committee.

Instruments

      Adjusted Body Mass Index (Adjusted BMI). Since adolescents can reliably report their height and weight (Field et al., 1999), the self-reported height and weight of the adolescent athletes allowed us to calculate the adjusted BMI by dividing the general BMI (kg/m²) by the 50th percentile of BMI for age and gender, and then multiplying this number by 100. The 50th percentile is based upon Dutch norms from Fredriks, van Buuren, Wit, and Verloove-Vanhorick (2000). Based on the adjusted BMI score, weight status can be determined. An adjusted BMI between 85 and 120 indicates a normal weight, whereas a score below 85 indicates underweight and above 120 overweight (Van Mil & Van Winckel, 2001).

      Attachment. The Experiences of Close Relationships-Revised-Child Version (ECR-R-C; Brenning, Soenens, Braet, & Bosmans, 2011) questionnaire is an adaptation of the ECR (Brennan et al., 1998). The ECR-R-C is a 36-item self-report questionnaire intended to assess a youngster's attachment towards their primary caregiver. In the current study, individual differences with respect to attachment anxiety and

attachment avoidance were measured towards the mother. Attachment anxiety reflects the extent to which adolescents are (in)secure about their mother's availability and responsiveness, and the presence or absence of fear of rejection and abandonment (for example: 'I do not often worry about being abandoned by my mother'); while attachment avoidance reflects the extent to which youngsters are (un)comfortable being close towards the mother (for example: 'I feel comfortable sharing my private thoughts and feelings with my mother'). The ECR-R-C was proven to be a reliable and valid instrument (Brenning et al., 2011). In the present study, cronbach's alphas for attachment anxiety and attachment avoidance at time 1 were .78 and .90 respectively.

Bulimic Symptoms. The Eating Disorder Inventory II (EDI-II; Garner, 1991; Dutch translation: Van Strien, 2002), an adaptation of the original Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983) was used to measure bulimic symptoms. The EDI-II is a self-report questionnaire measuring psychological and behavioral characteristics related to eating disorders such as Anorexia Nervosa and Bulimia Nervosa. In the current study, only the Bulimia (B) subscale was used. This subscale consist of 7 items measuring bulimic symptoms, i.e. episodes of binge eating (including both objective and subjective binge eating) and/or compensatory behaviour, for example 'I sometimes have binges where I lose control over my eating'. Although the outcome measure contains the score on Bulimia at time 2, the baseline score on Bulimia at time 1 will also be taken into account in further analyses. The EDI and EDI-II were found to be reliable and valid instruments (Garner et al., 1983). In the present study, cronbach's alpha for Bulimia was .81 at time 1 and .84 at time 2.

Emotion regulation. The Questionnaire to Assess Children's and Adolescents' Emotion Regulation strategies (FEEL-KJ; Braet, Cracco, &

Theuwis, 2013; Grob & Smolenski, 2005) is a 90-item self-report questionnaire measuring 15 emotion regulation strategies in response to three 'negative' emotions, i.e. anger, anxiety and sadness in children and adolescents between the age of 10 and 20. The FEEL-KJ encompasses 15 primary emotion regulation strategies and two secondary emotion regulation scales confirmed through factor analyses, i.e. an Adaptive emotion regulation scale and a Maladaptive emotion regulation scale. (Cracco, Van Durme, & Braet, 2015). The current study will include two specific maladaptive emotion regulation strategies to measure hyperactivating versus deactivating ER strategies conform with the theoretical assumptions of the attachment theory, namely rumination (for example: 'when I am angry, I can't stop thinking about it/can't get it out if my head') and emotional control (for example: 'when I am angry, I do not show to others that I am angry') (Shaver & Mikulincer, 2002). In previous research in older adolescents, the internal consistency of the primary emotion regulation strategies lies between .69 and .91, with a mean of .77 which indicates good reliability of the FEEL-KJ (Grob & Smolenski, 2005). In the present study, cronbach's alpha was .60 for rumination and .90 for emotional control at time 2.

Data-analysis

   Data-analytic plan. Adjusted BMI, attachment anxiety, attachment avoidance, rumination, emotional control and bulimic symptoms were considered as continuous variables. To start, missing data analyses were performed to investigate whether the data was missing completely at random and could be estimated for further analyses. Next, some drop-out analyses were performed, using ANOVA, in order to detect whether differences could be found between the follow-up participants and the non-participants in terms of attachment, maladaptive ER strategies, and

bulimic symptoms. Also, some preliminary analyses were performed in order to investigate the associations between subject and study variables. Since Shapiro-Wilk normality tests showed non-normality of several of our variables of interest, we used non-parametric tests to investigate preliminary results such as spearman correlation coefficients.

Following the recommendations by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), bootstrapping, a non-parametric resampling procedure, was used to test the different intervening models. This bootstrapping procedure was performed using the SPSS macro 'mediate' developed by Hayes and Preacher (2011), enabling us to enter different independent variables in one model. Bootstrapping is superior to previous approaches, such as the procedure of Baron and Kenny (1986), as it additionally tests the significance of the indirect effects and is non-sensitive to violations of normality in our data (Preacher & Hayes, 2008). The bootstrapping procedure can also take into account the effect of control variables thereby reporting 'pure' intervening effects independent of the influence of other control variables. In the current study, 5000 bootstrap resamples, replacing the original sample (n=78), were used to derive the 95% confidence intervals (CI) for the indirect effects.

Results

Missing Values.

Of all participants at time 2, 76 youngsters (97.4%) provided complete data on all the variables of interest, resulting in 0.2% missing data points. Comparison of means and covariances of all questionnaire variables using Missing Completely At Random (MCAR) test (Little, 1988) revealed a normed χ^2 (χ^2=119.083/df=106) of 1.12, indicating that the data were likely missing at random (Bollen, 1989). As a consequence missing values could be estimated and it was decided to estimate them following the

expectation maximization (EM) algorithm available in SPSS (Schafer, 1997).

Effect of Drop-Out

When comparing the follow-up participants to the participants who dropped out, there were no significant differences in terms of adjusted BMI, rumination and emotional control at time 1 (see table 1). However significant differences in terms of attachment anxiety, attachment avoidance, and bulimic symptoms at time 1 were found. These results showed that youngsters who dropped out scored higher compared to the follow-up participants on attachment anxiety, attachment avoidance and bulimic symptoms at time 1.

Characteristics of the Sample

The mean adjusted BMI in the current sample is 91.87 ($SD = 9.94$) at time 2. Moreover, the weight status is quite similar at both time points, about 20.5% of the athletes were considered underweight, 79.5% had a normal weight and none were considered overweight. The percentage of overweight youngsters was much lower compared to the Health Survey conducted in a community based sample of adolescents in Belgium in 2013 (16%) (Drieskens, 2014), which indicates that female adolescent ballet dancers have a lower adjusted BMI compared to non-athletes.

The mean score of the current sample on bulimic symptoms is 14.11 at time 2 ($SD = 5.86$), which is significantly different from normative data of the EDI-II (Van Strien, 2002), $t(77) = 4.09$, $p < .001$. For the current study, norm groups of female adolescents ($N = 735$, $M = 11.4$, $SD = 4.6$) from the general population were used. Hence, female adolescent ballet dancers show more bulimic symptoms compared to female adolescents from the general population. Of the female adolescent ballet dancers, 33.3% reported binge eating and/or compensatory behaviour based on the

EDI-II bulimia scale (without necessarily fulfilling all criteria for BN) at time 2.

To investigate the impact of sample characteristics on the outcome measure, i.e. bulimic symptoms at time 2, a linear regression was used. This allows detecting possible control variables for further analyses. Results showed a significant effect of bulimic symptoms at time 1 on bulimic symptoms at time 2, $\beta = .61$, $t(77) = 5.80$, $p < .001$, showing high stability of eating pathology over a one-year time period. There was no significant effect of age, $\beta = -.05$, $t(77) = -.52$, $p = .60$, and adjusted BMI, $\beta = .12$, $t(77) = 1.27$, $p = .21$. These results call for the inclusion of bulimic symptoms at time 1 as control variable in further analyses.

Associations between the Study Variables.

Table 2 presents the spearman correlations between the independent, mediator, and dependent variables of the current study. The necessary conditions to enable the investigation of the proposed intervening analyses were mostly fulfilled. Firstly, both insecure attachment dimensions at time 1, i.e. attachment anxiety and attachment avoidance were significantly related to bulimic symptoms at time 2. Secondly, attachment anxiety was associated with the maladaptive emotion regulation strategy of rumination, while attachment avoidance was correlated with rumination and marginally significant related with emotional control. Thirdly, the specific maladaptive emotion regulation strategy rumination was significantly related to bulimic symptoms at time 2 while emotional control was not.

Intervening Analyses

Rumination as intervening variable. Firstly, it was investigated whether rumination (hyperactivating ER strategy) serves as an intervening variable in the relationship between attachment anxiety and bulimic symptoms one year later (see Table 3) while controlling for bulimic

symptoms at time 1. The other attachment dimension, i.e. attachment avoidance, was also taken into account in order to detect specific relationships. First, the direct effect of attachment anxiety (T1) on bulimic symptoms (T2) was marginally significant, $\beta = .17$, $p = .08$. Secondly, attachment anxiety (T1) marginally significantly predicted rumination (T2), $\beta = .24$, $p = .05$; and rumination at T2 was significantly related to bulimic symptoms at T2, $\beta = .30$, $p = .001$. Although the relationship between attachment anxiety and bulimic symptoms one year later (direct effect) was only marginal significant, this marginal effect of attachment anxiety became non-significant when controlling for the indirect effect of rumination, $\beta = .11$, $p = .25$; and the indirect effect was significant with the accelerated-bias-corrected bootstrap interval being 95% CI[.01, .16], S.E. = .04, indicating that rumination serves as a mediating variable in the relation between attachment anxiety and bulimic symptoms one year later. As expected, as concerns attachment avoidance, no indirect effect of rumination could be found since the accelerated-bias-corrected bootstrap interval contained 0; 95% CI[-.01, .16], S.E. = .04. Moreover, the conditions for intervening effect were not fulfilled as attachment avoidance was not significantly related to rumination and bulimic symptoms at time 2. These results indicate that only rumination functions as an intervening variable in the relation between attachment anxiety and bulimic symptoms one year later.

Emotional control as intervening variable. Secondly, it was investigated whether emotional control (deactivating ER strategy) serves as an intervening variable in the relationship between attachment avoidance and bulimic symptoms one year later (see Table 4) while controlling for bulimic symptoms at time 1. The other attachment dimension, attachment anxiety, was also taken into account in order to detect specific relationships. First, the direct effect of attachment

avoidance (T1) on bulimic symptoms (T2) was not significant, $\beta = .13$, $p = .19$. Secondly, attachment avoidance (T1) marginally significantly predicted emotional control (T2), $\beta = .23$, $p = .08$. Third, emotional control (T2) was not related to bulimic symptoms at T2, $\beta = .10$, $p = .28$. These results showed some unfulfilled conditions for an intervening effect and the bootstrapping results indeed showed a non-significant indirect effect of emotional control with the accelerated-bias-corrected bootstrap interval being 95% CI[-.02, .10], S.E. = .03. As concerns attachment anxiety, as expected, no indirect effect of emotional control could be found since the accelerated-bias-corrected bootstrap interval contained 0; 95% CI[-.05, .03], S.E. = .02, even though the marginal direct effect of attachment anxiety at T1 on bulimic symptoms at T2 remained.

Discussion

The goal of the current study was to investigate whether general risk factors are also of importance in the development of bulimic symptoms in elite female adolescent ballet dancers and thus whether the ER-model can be replicated in this group. In sum, the current study wanted to investigate whether two well-known insecure attachment dimensions have a differential longitudinal relationship with bulimic symptoms through specific maladaptive ER strategies.

The results showed that rumination (hyperactivating ER strategy) indeed served as an intervening variable in the relation between attachment anxiety and bulimic symptoms one year later (partial mediation), while emotional control (deactivating ER) did not serve as a intervening variable in the relation between attachment avoidance and bulimic symptoms one year later. Thereby, the current study provides partial empirical evidence for the ER-model of attachment (Shaver & Mikulincer, 2002). This model states that people adopt different strategies

to regulate emotional distress based on their quality of attachment in such way that individuals high on attachment anxiety use hyperactivating strategies whereas those high on attachment avoidance use deactivating strategies. This is conform the results of the current study in which higher levels of attachment anxiety at T1 predicted more rumination at T2, while higher levels of attachment avoidance at T1 predicted more emotional control at T2. Furthermore, according to the model, the use of these maladaptive ER strategies can give short term relief, but continued use is associated with psychological problems (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). However, the results of the current study do not fully confirm this statement in such a way that only rumination and not emotional control was related to bulimic symptoms at time 2.

Finding the intervening effect of rumination in elite female adolescent ballet dancers is consistent with previous cross-sectional and longitudinal empirical research on the intervening role of hyperactivating ER in the relationship between attachment anxiety and psychological problems, such as negative mood, interpersonal problems, depression and disordered eating attitudes and behaviour in different age groups (e.g. Brenning et al., 2012; Wei et al., 2005; Tasca et al., 2009; Van Durme et al., 2015; Van Durme et al., submitted).

The fact that the results of the current study are only conform to the ER-model of attachment regarding attachment anxiety and not attachment avoidance may have several reasons. First, associations between attachment anxiety and disordered eating attitudes and behaviour have been more consistent in previous research (eg. Cash, Theriault, & Annis, 2004; Eggert, Levendosky, & Klump, 2007; Zachrisson & Skarderud, 2010), while regarding the role of attachment avoidance, studies have yielded mixed results (Cash et al., 2004; Kiang & Harter, 2006). This

could possibly be explained by the fact that female adolescents scoring high on attachment anxiety are more other-oriented and constantly try to get accepted and loved by others (Brennan et al., 1998). This may make female adolescent ballet dancers more likely to adhere to standards promoted by their sport environment concerning desired weight and fat percentage, resulting in a preoccupation with eating, weight and shape. However, secondly, not finding this intervening effect of emotional control in the relationship between attachment avoidance and disordered eating attitudes and behaviours that has been found in other studies (e.g. Van Durme et al., submitted) might also be due to the high drop-out rate of the current study. The participants who dropped-out scored significantly higher on attachment avoidance compared to the follow-up participants which may led to biased results. Further research should try to replicate these findings in athletes with more diverse/extreme scores on the insecure attachment dimensions. Thirdly, the processes through which the insecure attachment dimensions lead to bulimic symptoms might be different in an at-risk group compared to a general population in which the ER model of attachment is confirmed for both pathways (Van Durme et al., submitted). In this at-risk group, attachment anxiety might be more predictive for psychological problems compared to attachment avoidance since attachment avoidance might somehow be related to desired personality traits for an athlete and his performance level such as self-reliance, independency, suppression of disturbing thought and pain, while traits like rumination might be more harmful in the sport environment. Whether attachment avoidance and emotional control may have long term negative effects on psychological functioning in this specific group needs to be further investigated.

Next to the intervening analyses, the descriptive analyses showed that 20.5% of the elite female adolescent ballet dancers were considered

underweight, 79.5% had a normal weight and none were considered overweight. Furthermore, 33.3% reported binge eating and/or compensatory behaviour (without necessarily fulfilling all criteria for BN). These results indicate that female adolescent ballet dancers have a lower adjusted BMI compared to non-athletes, as well as a higher prevalence of bulimic symptoms (Drieskens, 2014; Van Strien, 2002). These results are conform to previous studies, finding a lower Body Mass Index (BMI) as well as a higher prevalence of disordered eating attitudes and behaviours in female adolescent ballet dancers compared to their peers from the general population (eg. De Bruin et al., 2007; Francisco et al., 2012; Thomas et al., 2005; Van Durme et al., 2012). Hence, elite female adolescent ballet dancers can be considered as a group particularly at risk.

The present study has several strengths and innovative elements. Firstly, it is one of the first Belgian studies conducted on disordered eating attitudes and behaviours in female adolescent ballet dancers next to the study of Van Durme et al. (2012). Moreover, only elite female adolescent ballet dancers were included in the current study since they are thought to be at the highest risk (Beals & Meyer, 2007; Sundgot-Borgen & Torstveit, 2004). Furthermore, a longitudinal athlete group consisting of 78 elite female ballet dancers is a sufficient sample size, especially with our inclusion criteria being strict to ensure a high sport level and with ballet not being a very popular sport in Belgium. Only four secondary ballet schools exist, of which three agreed to participate.

Secondly, it is the first longitudinal study on the ER model of attachment (Shaver & Mikulincer, 2002) for bulimic symptoms in a group of elite female adolescent dancers. Only few research has been performed on the link between attachment, emotion regulation and disordered eating attitudes and behaviour, and this mainly in the general population (Tasca et al., 2009; Van Durme et al., 2015) and/or in patient populations (Tasca

et al., 2009). This current study focused on elite female adolescent dancers as they are particularly at risk for disordered eating attitudes and behaviour (Sundgot-Borgen & Torstveit, 2004).

Furthermore, the concepts related to the ER-model of attachment were thoroughly operationalised. As concerns attachment, a dimensional view on parental attachment was adopted and the measurement of all concepts, i.e. attachment dimensions (Brenning et al., 2011), maladaptive emotion regulation strategies (Cracco et al., 2015) and bulimic symptoms (Van Strien, 2002) was conducted through age-appropriate, valid and reliable measures.

Next to these strengths, several limitations have to be considered as well. The first limitation is the use of self-report questionnaires to measure disordered eating attitudes and behaviour. The use of self-report may pose concerns about biased reporting, shared method variance and limited control on the comprehension of the items, even though the researcher was present during the administration in order to enhance reliable reporting. Additionally, administration of self-report questionnaires has some additional disadvantages in athletes. Athletes show a tendency of underreporting disordered eating attitudes and behaviour as well as associated psychological features (Johnson, Powers, & Dick, 1999; Sundgot-Borgen, 1994). This tendency of underreporting is much more present in athletes compared to adolescents from the general population (Sundgot-Borgen, 1993). This might lead to false negatives in our study that could possibly be detected by using multiple methods next to self-report, such as the use of clinical interviews and/or multiple informants.

Secondly, we have no data about the athletes who dropped out of the study. However, drop-out analyses showed that these athletes scored higher on both insecure attachment and bulimic symptoms at time 1 compared to the athletes who did remain in the ballet schools. Future

research should investigate why these athletes quit their ballet education: do they decide themselves to leave the ballet school due to their vulnerabilities or are they excluded by the ballet school due to the highly demanding character (not meeting the standards of the yearly evaluation)? And what is the impact of their psychological problems on their sport performance?

Finally, participants in this study were almost exclusively white with a high socio-economic status. Nothing can be said about the generalizability of our findings to female adolescent ballet dancers from other ethnicities. Furthermore, nothing can be said about other weight and leanness dependent sport categories as only ballet, an aesthetic sport, was included in this sample. Further research should extend the results of the current study by including/investigating different weight and leanness dependent sport categories.

As this study confirms the fact that elite female adolescent ballet dancers are an at-risk group for developing bulimic symptoms, we add to the research on specific etiological models of disordered eating attitudes and behaviour in athletes. In these etiological models, it will be important to integrate two pathways, i.e. sport specific risk factors as well as general risk factors will have to be included. Based on this etiological knowledge, it will also be important to develop adequate prevention and screening programs for athletes in the future.

As concerns prevention in the sport context, educational programs have to be developed both for the athletes as for their coaches and parents, and both pathways need to be assessed. First of all, coaches and parents need to be educated about the risk factors, warning signs and symptoms of disordered eating attitudes and behaviour in order to enhance early detection and treatment (Bonci et al., 2008). Furthermore, based on the results of the current study, prevention programs need to take into account

the attachment configuration and consequent emotion regulation skills of the adolescent athlete. Prevention programs may need to include a program to improve the emotion coping skills of the adolescents in order for them to learn to adequately deal with emotional distress. This might make them less vulnerable to develop disordered eating attitudes and behaviours. Next to this focus on the adolescent, mothers could be included in educational programs on the acquisition of responsive and sensitive parenting skills, a necessity to function as a safe haven for their children and to develop a secure parent-child relationship (secure attachment).

Next to addressing sport related risk factors and involving the sport environment in the treatment of bulimic symptoms in an athlete, the results of the current study also stress the importance of addressing the individual's attachment configuration and related emotion regulation strategies in order to provide an individually tailored treatment in combination with the current evidence based treatment for Bulimia Nervosa, i.e. Cognitive Behavioral Therapy (CBT-E; Fairburn, 2008). When insecure attachment dimensions are present in adolescence, principles of Family-Based Therapy (FBT; Lock & le Grange, 2005) or Attachment-Based Family Therapy (ABFT; Diamond, Diamond, & Levy, 2014) can be used to improve the mother-child relationship. Furthermore, since people adopt different emotion regulation strategies based on their attachment, this difference should be reflected in a different approach when working on emotion regulation. In individuals high on attachment anxiety, therapists may focus on teaching them other and more appropriate ways (than hyperactivating) to deal with their overwhelming emotions, whereas in individuals high on avoidance the focus may first be on exposure to emotion and interpersonal closeness in order to learn to

tolerate and recognize emotions rather than on teaching them emotion regulation strategies immediately (Tasca et al., 2009).

To conclude, results show that higher levels of attachment anxiety at T1 predicted more rumination at T2 in elite female adolescent ballet dancers, while higher levels of attachment avoidance at T1 predicted more emotional control at T2. Rumination was in turn related to bulimic symptoms at time 2, indication a partial mediation effect. These results are partially conforming the ER-model of attachment.

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Tables

Table 1.

Follow-up participants versus non-participants (drop-out) at time 1.

Variable	Follow-up (n= 78) (M/SD)	Drop-out (n=36) (M/SD)	Statistic (F)
Adjusted BMI	89.98 (7.78)	91.19 (8.89)	.49
Attachment Anxiety	1.97 (.70)	2.45 (1.05)	8.35**
Attachment Avoidance	2.52 (1.01)	3.41 (1.17)	17.21***
Rumination	13.41 (2.98)	12.34 (3.37)	2.65
Emotional Control	13.01 (2.93)	12.00 (3.53)	2.24
Bulimic Symptoms	12.27 (5.27)	15.25 (6.23)	8.49**

***p < .001; ** p < .01.

Table 2.

Spearman correlations between the different Study Variables.

	1.	2.	3.	4.	5.
1. Anxiety (T1)	1				
2. Avoidance (T1)	.42***	1			
3. Rumination (T2)	.30**	.25*	1		
4. Emo control (T2)	-.04	.19^T	.17	1	
5. B (T2)	.28*	.38**	.34**	.14	1

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Emo control=Emotional control; B=Bulimic Symptoms.

***$p <. 001$;**$p < .01$; *$p < .05$; $^T p < .10$.

Table 3.

Summary of the Bootstrapping Procedure testing the Intervening role of Rumination.

Variables	*B*	*SE (B)*	*β*	*t*
Direct effects on B (T2)[a]				
B (T1)	.61	.10	.55	5.98***
Anxiety (T1)	1.40	.80	.17	1.74[T]
Avoidance (T1)	.78	.59	.13	1.32
Effects of insecure attachment dimensions (T1) on Rumination (T2)[b]				
B (T1)	-.02	.07	-.03	-.23
Anxiety (T1)	1.08	.54	.24	1.98[T]
Avoidance (T1)	.52	.40	.17	1.31
Effects on B (T2) when controlling for Rumination[c]				
B (T1)	.62	.10	.55	6.31***
Anxiety (T1)	.91	.79	.11	1.16
Avoidance (T1)	.54	.57	.09	.95
Rumination (T2)	.45	.17	.24	2.74**

Note: B=Bulimic symptoms; Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; [a] $\eta^2 = .45$; [b] $\eta^2 = .12$, [c] $\eta^2 = .50$.

*** $p < .001;$ ** $p < .01;$ [T] $p < .10$.

Table 4.

Summary of the Bootstrapping Procedure testing the Intervening role of Emotional Control

Variables	*B*	*SE (B)*	*β*	*t*
Direct effects on B (T2)[a]				
B (T1)	.61	.10	.55	5.98***
Anxiety (T1)	1.40	.80	.17	1.74[T]
Avoidance (T1)	.78	.59	.13	1.32
Effects of insecure attachment dimensions (T1) on Emotional control (T2)[b]				
B (T1)	-.03	.08	-.05	-.43
Anxiety (T1)	-.08	.63	-.02	-.13
Avoidance (T1)	.81	.46	.23	1.75[T]
Effects on B (T2) when controlling for Emotional control[c]				
B (T1)	.61	.10	.55	5.98***
Anxiety (T1)	1.41	.81	.17	1.75[T]
Avoidance (T1)	.69	.60	.12	1.15
Emo control (T2)	.10	.15	.06	.69

Note: B=Bulimic symptoms; Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Emo control=Emotional control; [a] $\eta^2 = .45$; [b] $\eta^2 = .05$, [c] $\eta^2 = .46$.

*** $p < .001$; [T] $p < .10$

Chapter 6

The relationship between attachment, emotion regulation and eating disorder symptoms in adolescents with restrictive Anorexia Nervosa?[1]

Abstract

Objective: Following the theoretical propositions of the emotion regulation model of attachment, the current study investigated whether attachment anxiety and attachment avoidance were related to the core symptoms of Anorexia Nervosa of the restricting type, i.e. concerns and dieting, and whether maladaptive emotion regulation strategies might play an intervening role within this association. Method: Developmentally appropriate self-report questionnaires were administered to a clinical sample of female adolescents suffering from Anorexia Nervosa of the restricting type (N = 52; Mean age: 14.38). Results: For concerns, evidence could be found for the emotion regulation model of attachment. Attachment anxiety was related to concerns through rumination while attachment avoidance was related to concerns through emotional control. For dieting, no evidence was found for the model. Conclusion: Future research should replicate these findings as they may hold clinical implications for the treatment of Anorexia Nervosa in adolescents.

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[1] Van Durme, K., Braet, C., Van den Eede, U., Böhler, S., Lampo, A., Van Hooren, F., Simons, A., & Goossens, L. (submitted). The relationship between attachment, emotion regulation and eating disorder symptoms in adolescents with restrictive Anorexia Nervosa?

Introduction

Anorexia Nervosa (AN) is relatively common in girls and young women, with a peak during adolescence (Klein & Walsh, 2003). The female : male ratio for AN is about 10 : 1 (APA, 2013) and the life time prevalence for AN appears to be 0.8% for female adolescent girls by the age of 20 (Stice, Marti, & Rohde, 2013). In Belgium, most patients in specialised eating disorder clinics are aged under 20 (62.5%) and Anorexia Nervosa of the restricting type (AN-R) is the most diagnosed eating disorder (39.5%) (Janssens, 2014).

AN-R may have serious medical complications, which are mainly related to the extreme energy restriction. Extreme energy restriction may lead to loss of menstruation which in turn may lead to infertility and osteoporosis. Especially in adolescents, this may have devastating effects on growth, pubertal development, bone density and cognitive functioning. Hypotension and bradycardia are also common complications of energy restriction, as well as changes in the metabolic functions. Other symptoms that may occur are hair loss, dry skin, anaemia and misbalance in minerals and vitamins. It needs to be noted that medical complications may lead to more severe and irreversible problems during puberty compared to other age groups, stressing the importance of early detection and treatment of AN during and before puberty in children and youngsters (Bravender et al., 2007; Gonzalez, Kohn, & Clarke, 2007; Herpertz-Dahlmann et al., 2015; Mond & Hay, 2007)

Unfortunately, only 33% of AN patients seeks medical and/or psychological treatment and of those who get treatment, full recovery is often not obtained (Hoek & van Hoeken, 2003). Less of half the patients with AN recovers completely, 33% still shows subclinical disordered eating attitudes and behaviours, 20% still fulfils the diagnosis of AN (chronic AN) and 5% of the patients dies due to medical complications or

suicide (Arcelus, Mitchell, Wales, & Nielsen, 2011; Arcelus, Witcomb, & Mitchell, 2014; Berkman, Lohr, & Bulik, 2007; Hoek, 2006; Steinhausen, 2002). Even though early detection and treatment is related to better prognostic outcomes, these numbers show the need of enhancing our aetiological knowledge and treatment programs of AN.

Eating disorders are believed to be multi-causally determined and are seen as the result of an interaction between several biological, personality, sociocultural and family factors (Klein & Walsh, 2003; Polivy & Herman, 2002). As concerns family factors, attachment processes might play a contributing role in the development of eating disorders in general and AN-R in specific (eg. Zachrisson & Skarderud, 2010). Attachment patterns develop during early childhood based on the availability and responsiveness of the attachment figures in times of actual or symbolic threat. Accordingly, no sense of attachment security can be obtained when attachment figures were insensitive, inconsequent or unresponsive in times of need (Ainsworth, 1985; Bowlby, 1973, 1980, 1982, 1988).

The dimensional view on attachment (Brennan, Clark, & Shaver, 1998; Mikulincer & Shaver, 2007a, 2007b; Shaver & Mikulincer, 2002) distinguishes two attachment dimensions. Attachment anxiety develops when the attachment figure is inconsistently available and responsive and refers to the presence of fear of rejection and abandonment as a consequence of this process, whereas attachment avoidance develops when the attachment figure is consistently unavailable and unresponsive and refers to fear of intimacy and discomfort with closeness and dependence (Brennan et al., 1998). Following the Emotion Regulation model (ER-model) of attachment (Bowlby, 1988; Brumariu, 2015; Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer, Shaver, & Pereg, 2003; Shaver & Mikulincer, 2002), an individual's position on the attachment dimensions not only affects a sense of attachment security but

also the development and use of emotion regulation strategies (when stress/threat occurs) which in turn affects social and psychological adjustment throughout life.

More specifically, securely attached individuals have learned to use adaptive emotion regulation strategies, such as proximity and support seeking, due to positive experiences when seeking proximity and support during childhood (Dujardin et al., 2016), whereas insecurely attached individuals, not acquainted with the successfulness of these strategies, had to develop alternative emotion regulation strategies in their effort to relieve distress (Brumariu et al., 2015). Individuals with high levels of attachment anxiety search for relief using hyperactivating strategies which reflect the recurrent frustrating attempts to minimize distance from attachment figures leading to a heightened mental rumination on threat-related concerns (Cassidy, 1994). Individuals with high levels of attachment avoidance search for relief using deactivating strategies which refers to recurrent attempts to maximize distance from attachment figures associated with the suppression of distressing thoughts and painful memories (Mikulincer & Shaver, 2003; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). Continued use of these hyperactivating or deactivating strategies throughout life appears to be maladaptive and is associated with psychological problems (Mikulincer et al., 2003). Hence, this ER-model of attachment assigns a mediation role to emotion regulation strategies in the relationship between the insecure attachment dimensions and psychopathology.

Even though several studies found a higher prevalence of insecure attachment in an adult eating disordered population compared to adult non-clinical samples (eg. Tasca & Balfour, 2014; Zachrisson & Skarderud, 2010) as well as associations between insecure attachment and eating pathology in adult clinical samples (eg. Broberg, Hjalmers, & Nevonen,

2001; Troisi et al., 2006), research on parental attachment and eating pathology is lacking in adolescent clinical eating disordered groups according to a recent review of Jewell et al. (2016). Additionally, research on differential and specific relationships between attachment dimensions and different eating disorder diagnoses or different eating pathology features is scarce and mainly inconsistent in adult research (Shanmugam, Jowett, & Meyer, 2012; van Durme, Braet, & Goossens, 2015). Although some studies found both anxious and avoidant attachment to be related to different kinds of eating pathology such as dieting and binge eating (eg. Shanmugam et al., 2012; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000); others found specific associations. Some studies found anxious attachment (eg. Eggert, Levendosky, & Klump, 2007), others found avoidant attachment to be more related to eating pathology in general (eg. ColeDetke & Kobak, 1996). Still others found avoidant attachment to be associated with symptoms of anorexia nervosa of the restricting type and anxious attachment with symptoms of anorexia nervosa of the purging type and bulimia (Candelori & Ciocca, 1998). On top of that, research on the possible underlying role of emotion regulation strategies, testing the theoretical assumption of the ER-model of attachment is also scarce (Zachrisson & Skarderud, 2010). However, finding a differential relationship between the attachment dimensions and AN pathology features as well as gaining insight in the possible underlying role of emotion regulation may hold new important clinical implications for the treatment of people with AN.

The ER model of attachment has already been empirically confirmed for negative mood, interpersonal problems and depression (eg. Brenning, Soenens, Braet, & Bosmans, 2012; Wei, Vogel, Ku, & Zakalik, 2005), but only few studies have empirically investigated the theoretical assumptions in the eating disorder domain. Tasca et al. (2009) performed a

cross-sectional study in adult female eating disordered patients and found attachment anxiety to be indirectly contributing to eating disorder symptoms through hyperactivating emotion regulation strategies, while attachment avoidance was only directly linked to symptoms (and not through deactivating emotion regulation strategies), thereby providing partial evidence for the ER-model of attachment. As concerns adolescents, the relationships between both attachment anxiety and attachment avoidance on the one hand and restraint and eating-related concerns on the other hand seemed to be partially mediated by maladaptive emotion regulation (Van Durme, Braet, et al., 2015). Although this study confirmed the mediating role of emotion regulation, it made no distinction between hyperactivating and deactivating emotion regulation strategies, making it impossible to investigate differential relationships between the attachment dimensions and specific maladaptive emotion regulation strategies. Hence, studies on the ER-model of attachment in a clinical group of eating disordered adolescents are lacking, even though this may provide proper guidelines to enhance prevention and treatment programs in such a way that differential techniques may have to be applied depending on the individual's score on the attachment dimension and/or emotion regulation strategies.

Based on the high prevalence rate of AN-R in adolescent girls and the severe medical complications in this young age group, the current study aims to provide insights in AN-R by testing the theoretical assumptions of the ER-model of attachment (Mikulincer & Shaver, 2003; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). More specifically, the current study aims to investigate whether the two attachment dimensions are associated with concerns (about weight, shape and eating) and dieting, and whether this association is mediated by specific maladaptive emotion regulation strategies. It is hypothesized that

attachment anxiety will be related to the two AN pathology outcomes through hyperactivating emotion regulation strategies (rumination) while attachment avoidance might be related to AN pathology through deactivating strategies (emotional control).

Method

Participants and Procedure

Adolescent eating disordered patients between the age of 12 and 18 were recruited through two treatment centres for adolescents with an eating disorder in Belgium, which provide inpatient and outpatient treatment. Recruitment took place during the intake process. Since eating disorder treatment centres for adolescents are scarce in Belgium, limited beds are available in these centres, and treatment usually taking several months, data assessment took place from 2011 until 2014 in order to get a sufficient sample size. Diagnoses were assigned by the therapist or psychiatrist in charge of the treatment of the patients, and were based on the DSM-IV criteria (APA, 2000). Before analysing the results, diagnoses were re-evaluated by the first author based on the current DSM-5 criteria (APA, 2013). In total, 77 adolescent patients were screened for the current study. According to the DSM-5 criteria, 50 patients were diagnosed with AN- R (66%), 10 with AN-BP (13%), 4 with BN (5%) and 12 with Other Specified Feeding or Eating Disorders (OSFED) or Unspecified Feeding or Eating Disorders (UFED) (16%). Of those diagnosed with OSFED and UFED, 2 suffered from atypical AN (restricting type), 4 from subthreshold BN, and 6 from UFED. The current study will focus on a homogeneous group of adolescents with AN pathology of the restricting type, as this eating disorder has the most detrimental effects on both physical and psychological functioning of adolescents. Hence, 52 patients with AN-R pathology participated in the current study, i.e. 50 with AN of the

restricting type and two with atypical AN-R, as both share the same core AN-R pathology symptoms of concerns and dieting in which the current study is interested.

The mean age of this AN-R sample was 14.38 (SD = 1.67) and the mean duration of the eating disorder at the start of treatment is 13.10 months (SD = 11.26). Of these patients, 23.1% started an outpatient treatment, 76.9% an inpatient treatment within the specialized unit. As expected, comorbid diagnoses were quite common (42.3% of the patients), with mood and anxiety disorders being the most reported comorbid problems. As concerns the socio-economical class of the patients, they were situated in the upper-middle (38.9%), middle (52.8%) or lower middle socio-economical (8.3%) class based on the occupation and education of the parents (Hollingshead, 1975). No participants were situated in the upmost high or low socio-economical class. The therapist of the eating disorder treatment centres provided an information letter and active informed consents for both the adolescent patient and her parents. The patients filled in a battery of questionnaires during the intake procedure (50 minutes), either at home (outpatient treatment), or at their room at the eating disorder unit (inpatient treatment). This study was approved by the ethics committee of the university faculty and university hospital.

Instruments

Adjusted Body Mass Index (Adjusted BMI). Height and weight of the patients were measured with calibrated instruments in the clinical treatment center on a weekly base. In the current study, the height and weight at intake were used, which allowed us to calculate the adjusted BMI by dividing the general BMI (kg/m²) by the 50th percentile of BMI for age and gender, and then multiplying this number by 100. The 50th

percentile is based upon Dutch norms from Fredriks, van Buuren, Wit, & Verloove-Vanhorick (2000). Based on the adjusted BMI score, weight status can be determined. An adjusted BMI between 85 and 120 indicates a normal weight, whereas a score below 85 indicates underweight and above 120 overweight (Van Mil & Van Winckel, 2001).

Attachment. The Experiences of Close Relationships-Revised-Child Version (ECR-R-C; Brenning, Soenens, Braet, & Bosmans, 2011) questionnaire is an adaptation of the ECR (Brennan et al., 1998). The ECR-R-C is a 36-item self-report questionnaire intended to assess a youngster's attachment towards their primary caregiver. In the current study, individual differences with respect to attachment anxiety and attachment avoidance were measured towards the mother. Attachment anxiety reflects the extent to which adolescents are (in)secure about their mother's availability and responsiveness, and the presence or absence of fear of rejection and abandonment (for example: 'I do not often worry about being abandoned by my mother'); while attachment avoidance reflects the extent to which youngsters are (un)comfortable being close towards the mother (for example: 'I feel comfortable sharing my private thoughts and feelings with my mother'). The following instructions were given to the participants: "Below are a number of statements about your mother. Please indicate to which degree you agree with these statements, thereby picturing your mother as vividly as possible". All items were rated on a 7-point scale ranging from 1 (= "strongly disagree") to 7 (= "strongly agree"). The ECR-R-C was proven to be a reliable and valid instrument (Brenning et al., 2011). In the present study, Cronbach's alphas for attachment anxiety and attachment avoidance were .89 and .91 respectively.

Disordered eating attitudes and behaviour. The Children's Eating Disorder Examination Questionnaire (ChEDE-Q; BryantWaugh, Cooper,

Taylor, & Lask, 1996) is a self-report questionnaire to assess disordered eating attitudes and behaviours in adolescents and is derived from the Eating Disorder Examination interview (ChEDE; BryantWaugh et al., 1996), which is the golden standard for diagnosing eating disorders. In this study, the Dutch version of the ChEDE-Q was used (Decaluwé & Braet, 1999). The ChEDE-Q has a 28-day time frame for each of the thirty items. The questionnaire is divided into four subscales (23 items), i.e. restrained eating (restraint), weight concern, shape concern and eating concern. All items were rated on a 6-point scale ranging from 1 to 6, with 6 referring to a higher frequency/prevalence of a disordered eating attitude or behaviour. As the different concerns were highly correlated in our sample (range r = .66 - .95), we decided to combine them into one measure of eating related concerns (further referred to as concerns). Therefore, and based on the core pathology of AN of the restricting type according to the DSM-5 criteria (APA, 2013), the focus of the study will be on the subscale restraint and the combined subscale concerns. The ChEDE-Q is often used due to its good psychometric qualities and relevance for the clinical practice. Adequate to good internal consistency and stability were found for both the ChEDE-Q total score and scale scores (Goossens & Braet, 2010; Van Durme, Craeynest, Braet, & Goossens, 2015). Within this study, cronbach's alpha for restraint, and concerns were .84 and .91 respectively.

Emotion regulation. The Questionnaire to Assess Children's and Adolescents' Emotion Regulation strategies (FEEL-KJ; Braet, Cracco, & Theuwis, 2013; Cracco, Van Durme, & Braet, 2015; Grob & Smolenski, 2005) is a 90-item self-report questionnaire measuring 15 emotion regulation strategies in response to three 'negative' emotions, i.e. anger, anxiety and sadness in children and adolescents between the age of 10 and 20. The FEEL-KJ encompasses 15 lower-order emotion regulation scales

and two higher order emotion regulation scales confirmed through factor analyses, i.e. an adaptive emotion regulation scale and a maladaptive emotion regulation scale (Cracco et al., 2015). The current study includes two specific emotion regulation strategies (lower order scales) to assess hyperactivating versus deactivating emotion regulation strategies conform with the theoretical assumptions of the emotion regulation model of attachment, namely rumination (6 items; for example: 'when I am angry, I can't stop thinking about it/can't get it out if my head') and emotional control (6 items; for example: 'when I am angry, I do not show to others that I am angry (suppression)) (Shaver & Mikulincer, 2002). All items were rated on a 5-point scale ranging from 1 (= "never") to 5 (= "almost always"). The FEEL-KJ has proven to be a reliable (internal consistency and test-retest reliability) and valid measure (construct, convergent and divergent valid) for emotion regulation (Cracco et al., 2015; Czaja, Rief, & Hilbert, 2009). In previous research in adolescents, the internal consistency of the lower order emotion regulation scales lies between .69 and .91, with a mean of .77 which indicates good reliability of the FEEL-KJ (Grob & Smolenski, 2005). In the present study, cronbach's alpha was .62 for rumination and .79 for emotional control.

Data-analysis

Data-analytic plan. To start, missing data analysis was performed to investigate whether the data was missing completely at random and could be estimated for further analyses. Furthermore, some characteristics of the sample were calculated, i.e. the mean and standard deviation of our variables as interest. Additionally, it was investigated whether treatment related variables (inpatient/outpatient treatment, well/no comorbidity; duration of the eating disorder) had an effect on the attachment dimensions, the maladaptive emotion regulation strategies and the AN

eating pathology features (restraint and concerns) using separate MANOVA or multivariate regression analysis, and this in order to detect possible control variables for further intervening analyses.

Following Holmbeck (1997) two types of intervening variables can be distinguished, i.e. mediation and indirect effects. In both cases, the indirect effect of the intervening variable is significant in explaining the relationship between the independent variable and the dependent variable. However, mediation also entails an initial significant relationship between the independent variable and the dependent variable, whereas an indirect effect does not entail such initial relationship (Zhao, Lynch, & Chen, 2010).

Following the recommendations by MacKinnon, Lockwood, Hoffman, West, & Sheets (2002), bootstrapping, a non-parametric resampling procedure, was used to test the different intervening models. This bootstrapping procedure was performed using PROCESS, which is an add-on utility for SPSS for conditional process modelling (Hayes, 2013). Bootstrapping is superior to previous approaches, such as the procedure of Baron & Kenny (1986), as it additionally tests the significance of the indirect effects and is non-sensitive to violations of normality (Preacher & Hayes, 2008). In the current study, 5000 bootstrap resamples, replacing the original sample (n=52), were used to derive the 95% confidence intervals (CI) for the indirect effects.

Results

Missing Values.

Of all participants, 50 youngsters provided complete data on all the variables of interest, resulting in 0.7% missing data points. Comparison of means and covariances of all questionnaire variables using Missing Completely At Random (MCAR) test (Little, 1988) revealed a normed χ^2

(χ^2=45.720/df=26) of 1.73, indicating that the data were likely missing at random (Bollen, 1989), 1989). As a consequence missing values could be estimated and it was decided to estimate them following the expectation maximization (EM) algorithm available in SPSS (Schafer, 1997).

Characteristics of the Sample

The mean adjusted BMI of the AN-R group is 78.04 (SD = 9.49), which as expected can be situated in the category 'underweight' following Van Winckel and Van Mil (2001). Furthermore, the sample scored high on the subscales of the ChEDE-Q, i.e. restraint (M= 2.93; SD = 1.70) and concerns (M= 3.54; SD = 1.15), reflecting that on average participants suffered from significant problems on these eating disordered related domains on at least half of the days during the past month. There were no significant differences in terms of restraint and eating pathology concerns between inpatient and outpatient adolescents, $F(2, 49) = .47$, $p = .63$, as well as no differences between patients with or without comorbid diagnoses, $F(2, 49) = 2.97$, $p = .11$. Furthermore, the duration of the eating disorder did not have an effect on the severity of the eating pathology, $F(2, 49) = .15$, $p = .86$.

When looking at the attachment dimensions, there were no significant differences between inpatient and outpatient adolescents, $F(2, 49) = 1.03$, $p = .36$, as well as no differences between patients with or without comorbid diagnoses, $F(2, 49) = 1.35$, $p = .27$. Furthermore, the duration of the eating disorder did not have an effect on the attachment dimensions, $F(2, 48) = .37$, $p = .69$.

When looking at maladaptive emotion regulation, there were no significant differences between inpatient and outpatient adolescents, $F(2, 49) = .74$, $p = .48$, as well as no differences between patients with or without comorbid diagnoses, $F(2, 49) = .03$, $p = .97$. Furthermore, the

duration of the eating disorder did not have an effect on maladaptive emotion regulation, $F(2, 48) = .64$, $p = .53$. As a consequence, it was decided not to control for these variables in the subsequent analyses. Table 1 shows the descriptive information on the variables of interest.

Associations between the Study Variables.

Table 2 presents the spearman correlations between the independent, mediator, and dependent variables of the current study. When looking at the dependent variable 'concerns', the necessary conditions to enable the investigation of the proposed intervening analyses were fulfilled. Firstly, insecure attachment, i.e. anxiety (but not avoidance), was significantly related to concerns. Secondly, attachment anxiety was associated with rumination and emotional control, while attachment avoidance was only correlated with emotional control. Thirdly, rumination and emotional control were significantly related to concerns. However, when looking at the dependent variable 'restraint', the necessary conditions to enable the investigation of the proposed intervening analyses were not fulfilled as the attachment dimensions and emotion regulation strategies were not significantly associated with restraint. For this reason, we will limit the further investigations the proposed intervening analyses for concerns as dependent variable.

Intervening Analyses

Rumination as intervening variable (see table 3). First, attachment anxiety was significantly associated with concerns ($\beta = .34$, $p < .05$). Secondly, attachment anxiety was also significantly related to rumination ($\beta = .32$, $p < .05$) and rumination was significantly related to concerns ($\beta = .33$, $p < .05$). Finally, when controlling for the indirect effect of rumination, the direct effect of attachment anxiety on concerns diminished but remained trendsignificant ($\beta = .26$, $p < .10$) ; and the

indirect effect was significant with the accelerated-bias-corrected bootstrap interval being 95% CI[.01, .21], S.E. = .01, $p < .05$. These results are an indication of a partial mediation.

Emotional control as intervening variable (see table 4). First, attachment avoidance was not significantly associated with concerns (β = .03, $p > .05$). Secondly, attachment avoidance was significantly related to emotional control (β = .49, $p < .001$) and emotional control was significantly related to concerns (β = .28, $p < .05$). Although the relationship between attachment avoidance and concerns was non-significant, there was a significant indirect effect of emotional control with the accelerated-bias-corrected bootstrap interval being, 95% CI[.04, .44], S.E. = .01, $p < .01$. These results are an indication of an indirect effect of emotional control.

Discussion

The goal of the current study was to provide insights in the understanding of AN-R by testing the theoretical assumptions of the ER model of attachment (Mikulincer & Shaver, 2003; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). More specifically, the current study aimed to investigate whether the two attachment dimensions were associated with concerns (about weight, shape and eating) and dieting, and whether this association was mediated by specific maladaptive emotion regulation strategies. It was hypothesized that attachment anxiety would be related to the two AN pathology outcomes through hyperactivating ER strategies (rumination) while attachment avoidance might be related to AN pathology through deactivating strategies (emotional control).

When looking at concerns, evidence could be found for the ER-model of attachment (Shaver & Mikulincer, 2002). Attachment anxiety was related to concerns through rumination (partial mediation) while

attachment avoidance was related to concerns through emotional control (indirect effect). The results for concerns are conform with the ER model of attachment in such a way that adolescents seem to display different strategies to regulate emotional distress based on their quality of attachment. Individuals high on attachment anxiety use hyperactivating strategies (rumination) whereas those high on attachment avoidance rather use deactivating strategies (emotional control). The use of those maladaptive ER strategies can give short term relief, but continued use seem to associated with elevated levels of concerns about eating, weight, and shape on long term in the current study.

The results of the current study further elaborate on previous research on the emotion regulation model of attachment for disordered eating attitudes and behaviour in adult female patients (Tasca et al., 2009). In line with this study, the current study also found attachment anxiety to be indirectly related to eating disorder symptoms (concerns) through hyperactivating ER strategies. However, where Tasca et al. (2009) only found a direct effect of attachment avoidance, the current study also found an indirect effect through deactivating ER. This might possibly be due to the difference in dependent variable; the current study specifically looked at concerns whereas the study of Tasca et al. (2009) used a general eating pathology measure which may have led to other results. In sum, the findings of the current study extends contemporary research by providing evidence for the emotion regulation model explaining concerns (not dieting) in female adolescents with AN of the restricting type.

In contrast to our hypotheses, dieting was not related to insecure attachment dimensions and maladaptive emotion regulation strategies. This is somewhat unexpected as both concerns and dieting are diagnostic characteristics of AN pathology and were highly correlated in the current study. One possible explanation might be that concerns reflect the core

pathology of AN-R, namely the dysfunctional system of self-evaluation, while dieting might be a more distal factor that develops as a consequence of concerns. This assumption is conform with the transdiagnostic model of eating disorders (Fairburn, Cooper, & Shafran, 2003) as well as with empirical research often showing concerns to be a preceding factor of dieting behaviour in adolescents (eg. Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006).

The current study has several strengths. First of all, a sample size of 52 adolescents with AN-R pathology with a mean age of 14 is rather unique in Belgium as eating disorder units providing specialised psychological treatment for adolescents with eating disorders are limited. Secondly, it is the first study on the ER model of attachment (Shaver & Mikulincer, 2002) in a clinical group of adolescents diagnosed with AN-R. Both the clinical sample researched in this study as well as the focus on adolescents are an asset to this study. AN-R has severe medical complications, especially during adolescence and early detection and treatment can have a positive effect on prognostic outcomes. Hence, the results of this study may provide guidelines to enhance early detection, prevention and treatment programs for adolescents with AN of the restricting type (see further clinical implication). Furthermore, the concepts related to the emotion regulation model of attachment were thoroughly operationalised. Concerning attachment, a dimensional view on parental attachment was adopted and the measurement of all concepts, i.e. attachment dimensions (Brenning et al., 2011), maladaptive emotion regulation strategies (Cracco et al., 2015) and eating disorder symptoms (Decaluwé & Braet, 1999) was conducted through age-appropriate, valid and reliable measures.

Next to abovementioned strengths, the current study also has some limitations. First of all, all measures were assessed during treatment

intake. This cross-sectional design makes causal interpretations difficult. Further research should ideally contain multiple time points in order to entangle the precise relationships over time between insecure attachment, maladaptive emotion regulation and eating disorder symptoms. Furthermore, since comorbidity did not have an effect on our variables of interest, we did not control for them. However, future research should further investigate this in order to entangle whether or not comorbid diagnoses have an impact on the treatment of eating disorders and which comorbid diagnoses may possibly have an impact. Another limitation is that only attachment toward mother was included in the current study, because the mother is considered to be the primary caregiver with most responsibility and influence on the eating behaviour of the adolescent (Goossens, Braet, Van Durme, Decaluwe, & Bosmans, 2012). However, the father–child relationship might have a differential impact, emphasizing the necessity for future research to investigate whether the same mediation effects can be found when attachment toward father is taken into account.

Finally, the generalizability of the results may be compromised due to several reasons. First of all, the sample of this study was rather homogeneous as the adolescent patients were mainly white with middle to high socio-economic status. Further research should replicate the findings in patients with AN of the restricting type from other ethnic backgrounds and lower socio-economic status. Further research should also investigate samples of adolescents with other eating disorder diagnoses in order to detect whether the same intervening effects can be found or whether the different emotion regulation strategies may be related to different forms of eating disorder symptoms.

The empirical evidence for the ER-model of attachment for explaining concerns about weight, shape and eating may have clinical implications. When an adolescent presents with concerns about weight,

shape and eating, which can be seen as the core pathology of an eating disorder (dysfunctional system of self-evaluation), the individual's attachment configuration and related emotion regulation strategies should be thoroughly assessed and targeted. Interpersonal Psychotherapy for adolescents (IPT; Tanofsky-Kraff et al., 2007), Family-Based Therapy (FBT; Lock & le Grange, 2005) or Attachment-Based Family Therapy (ABFT; Diamond, Diamond, & Levy, 2014) can be used in case insecure attachment is present in order to improve the relationship between the mother and the adolescent. As the adolescent's attachment configuration also determines their emotion regulation skills, these intervening characteristics could also be the focus of treatment. In individuals high on attachment anxiety, focus should be on the acquisition of other and more appropriate ways (than hyperactivating) to deal with overwhelming emotions, whereas in individuals high on avoidance focus should be on exposure to emotion and interpersonal closeness in order to learn to tolerate and recognize emotions rather than on teaching them emotion regulation strategies immediately (Tasca et al., 2009).

To conclude, attachment anxiety was related to concerns about weight, shape and eating through rumination while attachment avoidance was related to concerns through emotional control in adolescents with AN of the restrictive type. These results for concerns are conform with the ER model of attachment showing that insecure attachment processes might play a differential contributing role in the development of eating disorder symptoms through their effect on specific maladaptive emotion regulation.

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Tables

Table 1.

Descriptive Information Study Variables and Sample Characteristics.

Variables	*M*	*SD*	*Range*
Adjusted BMI	78.04	9.49	62.46 - 117.20
Duration AN-R	13.10	11.26	3 - 60
Anxiety	2.70	.99	1.11 - 6.11
Avoidance	3.02	1.02	1.00 - 5.78
Rumination	20.58	3.76	9 - 27
Emo control	20.02	5.25	7 - 29
Restraint	2.93	1.69	.20 - 6.00
Concerns	3.54	1.14	1.09 – 5.48

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Emo control=Emotional control; Concerns= weight, shape and eating concerns.

Table 2.

Spearman correlations between the different Study Variables.

	1.	2.	3.	4.	5.	6.
1. Anxiety	1					
2. Avoidance	.38**	1				
3. Rumination	.32*	-.07	1			
4. Emo control	.36**	.49***	.13	1		
5. Restraint	.16	.11	.11	.18	1	
6. Concerns	.34*	.03	.33*	.28*	.71***	1

Note: Anxiety=Attachment Anxiety; Avoidance=Attachment Avoidance; Emo control=Emotional control; Concerns= weight, shape and eating concerns.
***p<.001;**p<.01;*p<.05.

Table 3.

Summary of the Process Procedure testing the Intervening role of Rumination in the Relationship between Anxiety and Concerns.

Variables	*B*	*SE (B)*	*β*	*t*
Direct effect on Concerns[a.]				
Anxiety	.39	.15	.34	2.52*
Effect of Anxiety on Rumination [b]				
Anxiety	1.21	.51	.32	2.38*
Effect of Anxiety on Concerns when controlling for Rumination[c]				
Anxiety	.30	.16	.26	1.88[T]
Rumination	.07	.04	.24	1.76[T]

Note: Anxiety=Attachment Anxiety; [a] $\eta^2 = .11$; [b] $\eta^2 = .10$, [c] $\eta^2 = .17$

*$p<.05$;[T]$p<.10$.

Table 4.

Summary of the Process Procedure testing the Intervening role of Emotional Control in the Relationship between Avoidance and Concerns.

Variables	*B*	*SE (B)*	*β*	*t*
Direct effect on Concerns[a]				
Avoidance	.03	.16	.03	.20
Effect of Avoidance on Emotional Control [b]				
Avoidance	2.54	.63	.49	4.02***
Effect of Avoidance on Concerns when controlling for Emotional Control[c]				
Avoidance	-.16	.18	-.15	-.93
Emo control	.08	.03	.35	2.25*

Note: Avoidance=Attachment Avoidance; [a] $\eta^2 = .00$; [b] $\eta^2 = .24$, [c] $\eta^2 = .09$

***$p<.001$;*$p<.05$; [T]$p<.10$.

Chapter 7

Do changes in affect moderate the association between attachment anxiety and body dissatisfaction in children? An experimental study by means of the Trier Social Stress Test.[1]

Abstract

Objective: Previous studies already found a positive association between attachment and disordered eating attitudes and behaviors in children and adolescents. However, to our knowledge no experimental studies have examined whether changes in negative and/or positive affect moderate the association between attachment anxiety and body dissatisfaction in children. Method: A controlled laboratory setting was used to investigate whether changes in state negative and/or positive affect moderate the association between attachment anxiety and body satisfaction in a sample of 81 children (Mean age: 11.74). The changes in state affect were caused by the exposure to an interpersonal stressor using the Trier Social Stress Test for Children. Results: A decrease in positive affect after stress induction with the TSST-C led to a decrease in body satisfaction in children with high levels of attachment anxiety. Conclusion: Early detection and intervention programs may have to address insecure attachment and maladaptive emotion regulation.

Introduction

In Western society, awareness has grown regarding the prevalence of body dissatisfaction in children (Ricciardelli & McCabe, 2001). For example, researchers found that 35% of 9-year-old girls selected ideal body figures that were smaller than their own body figure (DeLeel, Hughes, Miller, Hipwell, & Theodore, 2009). Recently, researchers examined a sample of 9- to 14-year-olds and found that 50.5% of the girls and 35.9% of the boys were dissatisfied with their body (Dion et al., 2016). Prospective studies have demonstrated that body dissatisfaction in children can have several serious consequences such as low self-esteem, depression, eating disorder pathology, and obesity (Herpertz-Dahlmann et al., 2015; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006; Slane, Klump, McGue, & Iacono, 2014). Therefore, investigating factors that contribute to the development of body dissatisfaction in these young children is necessary as it may help us to identify components which are important to include in early detection and intervention programs (Patton, Beaujean, & Benedict, 2014).

According to the Interpersonal Vulnerability Model (Wilfley, Pike, & Striegel-Moore, 1997), difficulties in interpersonal functioning, and more specifically insecure attachment, increase a child's vulnerability to develop disordered eating attitudes and behaviors, such as body dissatisfaction. In past research, numerous studies have found evidence for a positive association between insecure attachment and disordered eating attitudes and behaviors in adults (for an overview see: Tasca & Balfour, 2014).

However, to date only a limited number of studies have examined the associations between attachment and disordered eating attitudes and behaviors like body dissatisfaction in children and adolescents (see Jewell et al., 2016 for a review). Jewell et al. (2016), for example, underscores

the robust cross-sectional association between insecure attachment and disordered eating attitudes and behaviors (like body dissatisfaction) in children and adolescents. However, it remains unclear how insecure attachment may increase youngsters' vulnerability for disordered eating attitudes and behaviors. Recently in a study by Van Durme, Braet, and Goossens (2015) it was found that the association between insecure attachment and body dissatisfaction in 10 to 15 years old was mediated by the use of maladaptive emotion regulation strategies. This finding seems to indicate that difficulties in regulating affective states may help to explain the association between insecure attachment and body image concerns in youth. Unfortunately, the cross-sectional nature of this study precludes causal conclusions, so other study designs are needed to demonstrate whether insecurely attached children are more vulnerable to develop body dissatisfaction after changes in their affective states? In other words, it needs to be investigated whether the association between insecure attachment and body dissatisfaction is moderated by changes in affect?

Previous studies have already shown a positive association between insecure attachment and negative affect/depressive symptoms in children and adolescents (Dujardin et al., 2016; Wilkinson, 2004). Moreover, a recent study in undergraduates found that elevated levels of attachment anxiety were not only associated with higher levels of state negative affect, but also with less state positive affect (Schiffrin, 2014). Additionally, increased negative affect has been found as a robust predictor of body dissatisfaction in adolescents (Presnell, Bearman, & Stice, 2004), whereas decreased positive affect has been related to poorer social, physical, and psychological outcomes in undergraduates cross-sectional studies (Schiffrin, 2014). Since previous studies that examine the role of affect in eating disorder symptoms usually focus on how changes in negative affect are associated with eating pathology (including

body dissatisfaction), more research is needed to evaluate whether eating pathology may also be explained by changes in positive affect (Haedt-Matt & Keel, 2011). To our knowledge no experimental studies have examined whether changes in negative and/or positive affect moderate the association between insecure attachment and body dissatisfaction in children.

Although from a dimensional view on attachment, two dimensions of insecure attachment can be distinguished (Mikulincer & Shaver, 2007a, 2007b), most evidence from studies in the eating disorder domain point to a more pronounced role of the attachment anxiety dimension compared to the attachment avoidance dimension (Cash, Theriault, & Annis, 2004; Tereno, Soares, Martins, Celani, & Sarnpaio, 2008). Where the dimension of attachment anxiety refers to a strong need for closeness, concerns about the unavailability of others and fear of being rejected, the dimension of attachment avoidance refers to striving to independence and emotional distancing from others (Brennan, Clark, & Shaver, 1998). Also in the study of Van Durme et al. (2015) results showed a stronger role of attachment anxiety than of attachment avoidance in the emotion regulation pathway to eating, weight, and shape concerns. This finding is in line with the study of Tasca et al. (2009) where maladaptive emotion regulation only mediated the association between attachment anxiety, but not attachment avoidance, and eating pathology.

The stronger effects of attachment anxiety that were found in previous literature may be explained by the specific maladaptive emotion regulation strategies that seem to be related with attachment anxiety. Where according to the emotion regulation model of attachment, attachment avoidance is assumed to be related to the use of deactivating emotion regulation strategies like emotional suppression, attachment anxiety is assumed to be related to the use of hyperactivating emotion

regulation strategies such as rumination (Brenning, Soenens, Braet, & Bosmans, 2011b; Shaver & Mikulincer, 2002). Taking this into account, it may be assumed that especially those children with higher levels of attachment anxiety are at risk for developing body dissatisfaction since these children will use more hyper-activating strategies to regulate emotional distress. In other words, when their attachment system gets activated under stressful circumstances their fear of being rejected may make them try everything to be accepted and loved by their environment. Since middle childhood and early adolescence is characterized by increasing importance of physical appearance in self-esteem (Clay, Vignoles, & Dittmar, 2005; Phares, Steinberg, & Thompson, 2004; Ricciardelli & McCabe, 2001), strategies like ruminating about unattainable beauty ideals that are imposed by the environment thereby may increase the risk for changes in body satisfaction in anxiously attached children.

It was the aim of the present study to use a controlled laboratory setting to investigate whether changes in state negative and/or positive affect (caused by the exposure to an interpersonal stressor using the Trier Social Stress Test for Children (TSST-C; Kirschbaum, Pirke, & Hellhammer, 1993) moderate the association between attachment anxiety and body dissatisfaction in 9- to 14-year old children. More specifically, it is hypothesized that in children with higher levels of attachment anxiety, increases in negative affect and/or decreases in positive affect after exposure to stress will cause decreases in their body satisfaction.

Method

Participants

In total, 82 children were recruited (Mage= 11.74, SD = 1.54) from primary and secondary schools. Half of the sample was female, half was

male. However, one female participant was excluded from analyses due to an outlier for body satisfaction (mean +/- 3 SD). Of the remaining 81 participants (Mage= 11.78, SD = 1.52), i.e. 41 boys (Mage= 11.83, SD = 1.61) and 40 girls (Mage= 11.73, SD = 1.43) , 81.4% came from intact two-parent families, 14.9% had divorced parents, 3.7% came from a family in which one of the parents had died. The majority of the sample had an upper middle (29.3%) or middle class (52.4%) socioeconomic status based on the parents' educational level and current occupation (Hollingshead, 1975). Only 1.2% was situated in the highest class and 6.1% in the lowest class.

Procedure

The current study was part of a larger project on inter- and intrapersonal factors affecting children's behavior entitled "Environmental influences on the behavior of boys and girls". The protocol of this project was approved by the ethical committee of our institution. Children between 9 and 14 years old were recruited with the use of flyers, which were distributed in several primary (4th to 6th grade) and secondary schools (1st and 2nd grade) as well as in youth organizations in Belgium. For participation, access to internet at home was required. Children (or parents) who were interested in participating could write their personal data (i.e., name, telephone number) on the flyer and return it to the participating school or youth organization. All leaflets were collected by a research assistant at the end of the recruitment-phase. In a second step, parents were contacted personally by telephone by a research assistant in order to provide them with information about the further procedure of the study. If they still agreed to participate, they received a secured internet link and a personal code by which the child could log on to complete an online questionnaire tool consisting of an online questionnaire battery and

a 7-day daily diary. On day 8, the day after completing the diary, the participants were invited to come to the university to complete the second part of the study by taking part in our lab study which consisted of a pre-test, the administration of the Trier Social Stress Test for Children (Kirschbaum et al., 1993), and a post-test (see further for description of the lab study). Prior to the study, written consent from the parents and assent from the children were obtained. Next, a description is provided of the instruments that are relevant for current study's purpose.

Instruments

Adjusted Body Mass Index (Adjusted BMI). The height and weight of the child (objectively measured by a research assistant in the lab) allowed us to calculate the adjusted BMI by dividing the general BMI (kg/m²) by the 50th percentile of BMI for age and gender, and then multiplying this number by 100. The 50th percentile is based upon Dutch norms from Fredriks, van Buuren, Wit, and Verloove-Vanhorick (2000). Based on the adjusted BMI score, weight status can be determined. An adjusted BMI between 85 and 120 indicates a normal weight, whereas a score below 85 indicates underweight and above 120 overweight (Van Mil & Van Winckel, 2001).

Attachment. All participants reported on their attachment towards mother seven days before their appointment in the lab. The Experiences of Close Relationships-Revised-Child Version questionnaire (ECR-R-C; Brenning, Soenens, Braet, & Bosmans, 2011a) is an adaptation of the ECR questionnaire (Brennan et al., 1998). The ECR was originally developed to measure adult romantic attachment towards the partner, while the ECR-R-C is a 36-item self-report questionnaire developed to assess a child's and early adolescent's attachment towards their primary caregiver. Since traditionally, mothers are regarded as primary caregivers and as the main

attachment figures, we opted to only question about attachment towards mother. Moreover, the questionnaire in this study assesses individual differences with respect to attachment anxiety (e.g. "I'm worried that my mother does not really love me") and attachment avoidance (e.g. "It's not easy for me to tell my mother a lot about myself") towards the mother.. The following instructions are given to the participants: "Below are a number of statements about your mother. Please indicate to which degree you agree with these statements, thereby picturing your mother as vividly as possible". All items are rated on a 7-point scale ranging from 1 (= "strongly disagree") to 7 (= "strongly agree"). The ECR-R-C was proven to be a reliable and valid instrument since the internal structure, construct validity and predictive validity (for depressive symptoms and emotion regulation) are adequate (Brenning et al., 2011). In the current study, focus will be on attachment anxiety as previous research found the strongest link between attachment anxiety and eating pathology. Cronbach's alpha for Attachment Anxiety is .89.

Lab study. Participants were invited for the lab study at the faculty of psychology. At the beginning of the lab study, participants were guided to a computer screen, to start with the online administration of the pre-measures. These measures included 10 items about their current mood state. They were asked whether at the present time, they felt sad, happy, nervous, scared, energetic, calm, cheerful, lonely, stressed, and joyful. These mood items were selected from the Positive and Negative Affect Scale for Children (PANAS; Laurent et al., 1999). All mood items had to be rated on a 5-point Likert scale with 1 being 'very slightly or not at all' and 5 being 'extremely'. The pre- (and post-) measures also included a stress VAS scale, allowing a manipulation check of whether the children experienced stress during the TSST-C. Next to these mood items, their present attitude/satisfaction towards body shape, i.e. body satisfaction, was

also administered on a VAS-scale with 0 being 'not at all satisfied/pleased' and 10 being 'very satisfied/pleased'. This item was based on items of the weight and shape concerns subscale of the Children's Eating Disorder Examination Questionnaire (ChEDE-Q; Decaluwé & Braet, 1999). To administer the items, instructions were presented on the computer, but the research assistant (lead by the first and second author as main researchers) remained close by in case the children would have any questions.

In a next step, the TSST-C was conducted. The TSST-C is a validated child-version of the TSST (Kirschbaum et al., 1993). The TSST-C is a protocol for the induction of moderate psychological distress in laboratory settings, and has been proven to induce psychobiological stress (Buske-Kirschbaum et al., 1997). During the test, participants have to deliver a free speech and perform mental arithmetic in front of a camera.

The TSST-C was performed as follows: In the laboratory room, the research assistant was sitting behind a table, and a video camera and a microphone were installed. Next, the children received the beginning of a story. They were told that after a preparation period of 5 minutes in another room, they should finish telling the story as exciting as possible in front of the research assistant and the camera. They were told that the records would be watched by other colleagues to judge how well they did and that they should try to perform better than the other children. The unfinished story used in this study was the following: "Yesterday my best friend Robert and I went home from school. Suddenly, we had the idea to visit Mr. Greg who lived in the big old house located in the dark forest near our town. Mr. Greg was a crazy old man and our parents didn't like the idea that we sometimes went visiting him. There was a rumor in town that there was a mystery about the old house. When we arrived at the house we were surprised that the door was open. Suddenly we heard a

strange noise and cautiously, we entered the dark hall...". After the preparation period (5 minutes) the subjects were again escorted to the laboratory room and were asked to stand behind the microphone, which was placed right in front of the research assistant and the camera, and to finish the story in a free speech of 5 minutes' duration. Whenever children finished the story in less than 5 minutes, they were asked to continue in a friendly, supportive manner.

Next, the researcher asked the subjects to serially subtract the number 7 from 758 (9 to 11 years) or the number 13 from 1023 (12 to 14 years) as fast and as accurately as possible. On every failure, the subjects had to restart at 758 or 1023, respectively, with one member of the committee interfering "Stop, please start again."

The total duration of the TSST-C was about 15 minutes. Afterwards, the children were again guided to the computer to complete the post-measures. These included the same current mood items as in the pre-test, as well as the same item on body satisfaction. Just as the pre-measures, the post- measures included a stress VAS scale, allowing a manipulation check of whether the children experienced stress during the free speech and the arithmetic tasks in front of the research assistant and the camera.

Finally, participants were instructed to wait in the lab for some minutes while the research assistant would go and check if all data were saved adequately. While waiting, they were allowed to eat and drink. Afterwards, the children had the opportunity to ask questions and the stressful situation was discussed. Every child was told that he or she had performed as well as the other participants and that the stern behavior was pretended in order to induce competitive conditions. The research assistant then escorted the participants back to his/her parents in the waiting room and they received a debriefing and two cinema tickets.

Data-analytic Plan

First, in order to investigate whether the TSST-C significantly induced stress in the participants, a repeated-measures ANOVA will be used to conduct a manipulation check, with time as a within subject factor (stress prior to the TSST-C versus post). Second, a factor analysis (PFA) will be conducted on the 10 mood items, included in the study, in order to detect significant mood factors that could potentially moderate the proposed relationship. In order to conduct our main analyses, we plan to compute difference scores for the mood factors as well as for body satisfaction, by subtracting the pre-measure score from the post-measure score. A positive score on a mood factor will consequently reflect an increase in state affect after the TSST-C, while a negative score will reflect a decrease in state affect. A positive score on body satisfaction will reflect an increase in body satisfaction after the TSST-C, while a negative score will reflect a decrease in body satisfaction.

Lastly, to test the moderation effect, regression analyses on body satisfaction will be conducted hierarchically, with attachment anxiety and separate mood factor(s) entered in Step 1, and the attachment anxiety x mood factor(s) interaction entered in Step 2. The two-way interaction(s) will be interpreted using PROCESS, which is an add-on utility for SPSS for conditional process modelling (Hayes, 2013). Model one includes the option of testing a two-way interaction in predicting the dependent variable (DV). In the model the conditional effects of the independent variable (IV) on the DV can be formally compared with a statistical test. Alpha for these tests will be set at .05. The difference score of body satisfaction will be entered as the dependent variable (Y), attachment anxiety will be entered in the independent variable (X) box, whereas the mood factor(s) will be put into the proposed moderator (W) box separately. We conduct bootstrapped (5000 resamples) tests of attachment

anxiety at levels of the mood factor variable(s). The two-way interaction will be interpreted by examining regions of significance for the IV. We will also test the simple slopes for each relation between attachment anxiety with body satisfaction at low (- 1 SD) and high levels (+ 1 SD) of each mood cluster variable. To ease interpretation, all variables will be standardized prior to computing our analyses.

Results

Missing Values.

When looking at the data of the current sample, 2.74% of the data points are missing. Comparison of means and covariances of all questionnaire variables using Missing Completely At Random (MCAR) test (Little, 1988) revealed a normed χ^2 ($\chi^2=27.18/df=27$) of 1.01, indicating that the data were likely missing at random (Bollen, 1989). As a consequence, missing values could be estimated and it was decided to estimate them following the expectation maximization (EM) algorithm available in SPSS (Schafer, 1997).

Manipulation Check

The results of the repeated-measures ANOVA conducted on the stress VAS scale showed a significant main effect for the within subject factor 'time' ($F(1,80) = 97.86$, $p < .001$), indicating that the children's stress level was significantly higher at the post-test ($M = 5.11$, $SD = 2.86$), after conducting the TSST-C than prior to the TSST-C ($M = 2.40$, $SD = 2.04$).

Factor Analysis (PFA) of the Mood Items

First, a Principal Factor Analysis (PFA) was performed on the 10 mood items with oblimin rotation. These items included the following moods: sad, happy, nervous, scared, energetic, calm, cheerful, lonely,

stressed, and joyful. The Kaiser-Meyer Olkin measure verified the sampling adequacy for the analysis, KMO = .74 ("Middling" according to Hutcheson & Sofroniou, 1999), and all KMO values for individual items were > .56, which is above the acceptable lower limit of .50 (Field, 2013). Bartlett's test of sphericity indicated that correlations between items were sufficiently large for PFA with $\chi^2 (45) = 224.19$, $p < .001$. After analyzing initial analyses with Kaiser Criterion and the Scree-test; the cleanest structure was obtained with three factors explaining 46.49% of the variance before rotation. However, when inspecting the data, the communality of the 'lonely' item was .14, therefore this item was deleted and the analysis was done again, explaining 49.77% before rotation. For each item, the conclusion held that it loaded highly (<.40) on one factor. However, for two items cross-loadings were found. Table 1 shows the factor loadings after rotation. The items that cluster on the same factor suggest that factor 1 represents positive affect/absence of negative affect, factor 2 represents individual levels of anxiety related negative affect, factor 3 represents individual energy levels.

In a second step, three subscales were computed from these factors and this for the mood items prior as well as after the TSST-C. Reliability analysis revealed alpha levels of .74 and .81 for the Positive Affect scale; .43 and .77 for the Negative Affect Scale, and .11 and -.32 for the Energy subscale respectively. Since the internal consistency coefficient was only acceptable to good for the Positive Affect subscale, both pre and post to the TSST-C, we decided to conduct further analysis using only this subscale.

Moderation of Positive Affect between Attachment Anxiety and Body Satisfaction

Table 2 presents the descriptive information on the variables of interest, i.e. positive affect (difference score), attachment anxiety and body satisfaction (difference score). Since there was no significant effect of age, $F(1,78) = 2.82$, $p > .05$, and gender, $F(1,78) = 3.64$, $p > .05$, on the difference score of body satisfaction, these variables did not have to be included as control variables in the moderation analyses. As a result, a hierarchical regression analysis was conducted to examine the role of positive affect as a moderator of the relationship between attachment anxiety and body satisfaction (see Table 3). Results showed a marginally significant model, $F(3,77) = 2.58$, $p = .06$, explaining approximately 10% of variance in body satisfaction. The main effects of both the IV attachment anxiety and the moderator positive affect were marginally significant, $p < .10$, while the interaction between attachment anxiety and positive affect was significant, $p < .05$ (see Figure 1). To further examine the significant two-way interaction, simple slopes for the relation between attachment anxiety with body satisfaction were inspected and showed to be significant at low ($\beta = -.47$, $t(77) = -2.62$, $p < .05$) but not at mean ($\beta = -.18$, $t(77) = -1.68$, $p = .10$) and high levels ($\beta = .11$, $t(77) = .53$, $p = .53$) of positive affect. Furthermore, when considering the conditional effects of the interaction using the Johnson-Neyman technique provided by PROCESS (Hayes & Matthes, 2009), we found that the effect of the IV attachment anxiety transitioned from statistically significant to non-significant at a positive affect level with z-score -.14 (representing a difference score on positive affect of -.51, with scores ranging from -11 to 3), $p < .05$. Figure 1 depicts the interaction, showing that a decrease in positive affect after the TSST-C leads to a decrease in body satisfaction in adolescents with high levels of attachment anxiety and not in those with low levels of attachment anxiety.

Discussion

It was the aim of the present study to investigate, in a controlled laboratory setting, whether changes in state affect after exposure to an interpersonal stressor moderate the association between attachment anxiety and body satisfaction in children. In line with our hypothesis, results demonstrated that a decrease in positive affect after the stress induction with the TSST-C was associated with a decrease in body satisfaction in those children with high levels of attachment anxiety, but not in those with low levels of attachment anxiety. This finding extends the results of previous cross-sectional studies that found a positive association between insecure attachment and disordered eating attitudes and behaviors in children and adolescents (Jewell et al., 2016).

Results of the present study demonstrate that in stressful circumstances higher levels of attachment anxiety seem to increase children's vulnerability for body dissatisfaction. This may be explained by the fact that in anxiously attached children, exposure to stress may lead them to use hyperactivating strategies such as rumination to regulate their emotions (Shaver & Mikulincer, 2002). Although positive affect has been proposed to break the cycle of rumination (Lyubomirsky, Boehm, Kasri, & Zehm, 2011) and even undo the negative physiological effects of negative emotions (Frederickson, Mancuso, Branigan, & Tugade, 2000), results of the present study demonstrate that when levels of positive affect decrease after stress induction, the hyperactivating emotion regulation strategies may lose their buffer, and these anxiously attached children's fear of being rejected may make them try everything to be accepted and loved by their environment. In a developmental period that is characterized by increasing importance of physical appearance in self-esteem (Clay et al., 2005; Phares et al., 2004; Ricciardelli & McCabe, 2001), strategies like ruminating about unattainable beauty ideals that are imposed by the

environment thereby may increase their body dissatisfaction. Thereby, this finding adds to the results of the few studies that have already examined the role of difficulties in emotion regulation to explain the association between insecure attachment and disordered eating attitudes and behaviors in children (Van Durme et al., 2015) and adults (Tasca et al., 2009), as well as with the assumptions of the emotion regulation model of attachment (Shaver & Mikulincer, 2002).

Notably, results also indicate that higher levels of attachment anxiety are only associated with decreases in body satisfaction when the exposure to stress leads to a decrease in positive affect. In other words, in those youngsters who are characterized by higher levels of attachment anxiety but who do not experience a decrease in positive affect after the exposure to stress, no decrease in body satisfaction was found. This finding is interesting since it shows that under stressful circumstances and despite their vulnerability, some youngsters seem to manage to maintain a certain degree of positive affect which may protect them against the development of body image problems. Future research is needed to replicate this finding.

This study has several strengths. To our knowledge, this is the first study to examine the association between attachment and body dissatisfaction in children and whether this association is moderated by changes in affect in a controlled laboratory setting. Second, a specific strength of the current study's methodology is the potential for causal inferences regarding the nature of the relation between changes in affect after stress induction and children's body image. Third, in the present study the TSST-C was used which is a valid protocol to induce stress in children (Kirschbaum et al., 1993). Also, as our manipulation check demonstrated the TSST-C protocol was effective in inducing stress to the participants in the present study. Fourth, we used the ECR-R-C to assess

the attachment anxiety dimension in the children, which is considered a reliable, valid, and developmentally appropriate instrument (Brenning et al., 2011a). And finally, this study demonstrates the importance of including positive affect when examining emotion regulation and disordered eating attitudes and behaviors in children.

Clinically, our results show that children with elevated levels of attachment anxiety may lack strategies to adequately regulate (interpersonal) stressors. More specifically it seems that in those children decreases in positive affect after stress induction increase the risk for changes in their body satisfaction. If the findings of the current study can be replicated, early detection and intervention programs may have to address insecure attachment problems as well as emotion regulation skills.

Several limitations have to be considered as well. First, 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. Second, we only assessed attachment anxiety towards one attachment figure (namely the mother) since the participants already had to complete a large amount of questionnaires. However, some evidence already exists that also attachment towards father may be differently related to eating pathology in children (Goossens, Braet, Van Durme, Decaluwe, & Bosmans, 2012). Therefore, future studies may have to include attachment towards the father as possible vulnerability factor as well. Third, the alpha coefficient for the negative mood factor was low, so we were only able to investigate the effect of changes in positive mood on body satisfaction. Therefore, future research is needed using a more reliable assessment of negative mood in order to examine whether changes in negative affect are also related to body dissatisfaction. Finally, experimental designs are often criticized as having low external validity.

This might be due to the fact that only a brief exposure to the target stimuli (stress) takes place during the TSST-C and only an assessment of short-term (state) effects is conducted. Therefore, prospective studies in naturalistic settings are needed to examine the temporal associations between interpersonal problems (like insecure attachment), affective states and disordered eating attitudes and behaviors in children during stressful moments by means of for example Ecological Momentary Assessment.

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Tables

Table 1.

Summary of Principal Factor Analysis results. Rotated Component Loadings

Item	Positive Affect	Negative Affect	Energy
Joyful	**.90**	.00	-.06
Cheerful	**.87**	-.02	.06
Happy	**.66**	.03	.08
Guilty	**-.48**	-.05	.03
Sad	**-.42**	.37	-.05
Scared	.01	**.76**	.14
Nervous	.11	**.61**	-.38
Calm	.22	-.09	**.57**
Energetic	.29	-.13	**-.42**
Initial Eigenvalues	3.23	1.62	1.10
% of variance	31.38	12.58	5.82

Table 2.

Descriptive Information Study Variables.

Variables	*M*	*SD*
Anxiety	1.95	.81
PA	-.94	2.27
Body Satisfaction	-.18	1.87

Note: Anxiety = Attachment Anxiety; PA = Positive Affect; for PA and Body Satisfaction difference scores were used (POST – PRE).

Table 3.

Summary of Regression Analysis for Variables Predicting Body Satisfaction

Variable	*B*	*SE B*	*β*	*t*
Anxiety	-.18	.11	-.18	-1.68[T]
Positive Affect	.21	.12	.21	1.75[T]
Anxiety x PA	.29	.14	.25	.038*

Note: Anxiety = Attachment Anxiety; Anxiety x PA = Attachment Anxiety x Positive Affect (interaction term); all variables were entered as standardizes values (*z*-values). [T]p < .10; *p < .05.

Figure 1.

The interaction effect between attachment anxiety and positive affect on body satisfaction.
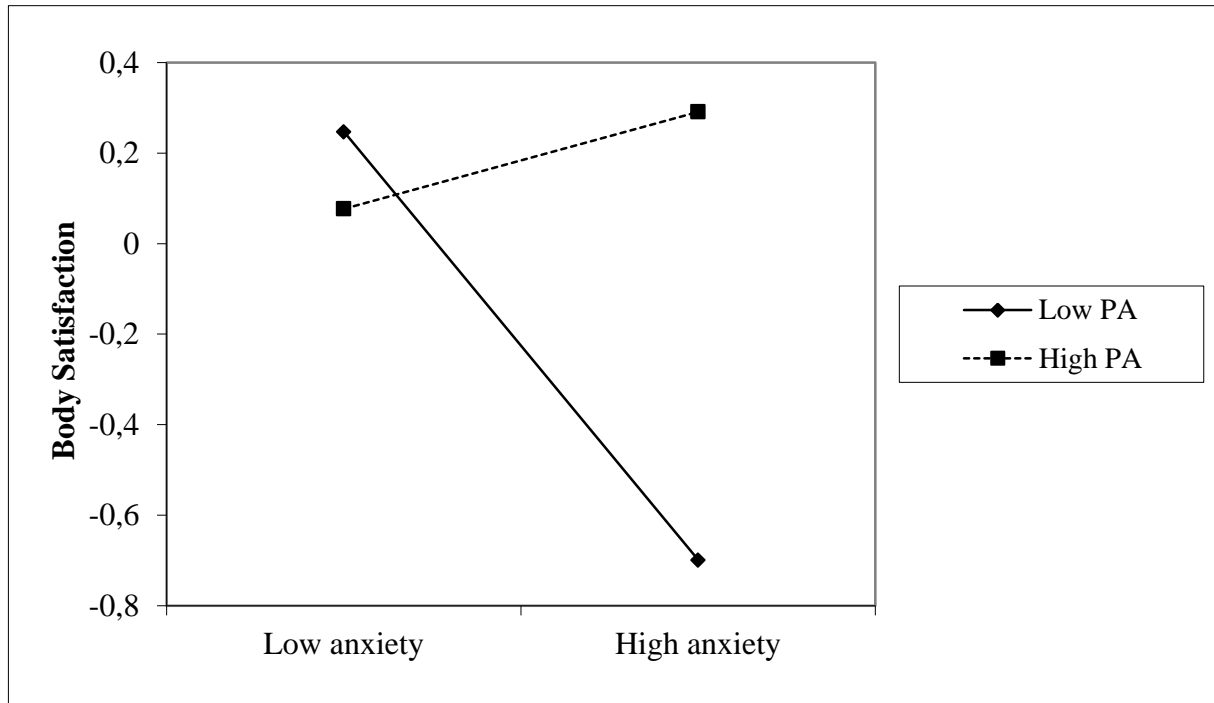
Chapter 8

General Discussion

In this final chapter, the main findings of the several empirical studies are presented, integrated and discussed. Further, attention is paid to the strengths, limitations, clinical implications and suggestions for future research.

An Overview of the Research Findings

It can be considered as the general purpose of the present doctoral dissertation, which started in 2010, to expand the knowledge with regard to the role of insecure attachment and maladaptive emotion regulation in the development and maintenance of eating pathology in adolescents.

Chapter 2 aimed to add to the limited research on this topic by investigating the theoretical assumptions of the interpersonal vulnerability (IPV) model (Wilfley, Pike, & Striegel-Moore, 1997) in a cross-sectional community-based study of early adolescents (N = 952; Mage = 12.19). More specifically, the goal was to investigate the association between insecure attachment and disordered eating attitudes and behaviours (in terms of concerns about eating, weight and shape and dietary restraint) using a dimensional view on parental attachment by administering the Experiences of Close Relationships-Revised-Child Version (ECR-RC; Brenning, Soenens, Braet, & Bosmans, 2011). Also, it was the aim to investigate whether maladaptive emotion regulation may function as an intervening variable in this association by using the Questionnaire to Assess Children's and Adolescents' Emotion Regulation strategies (FEEL-KJ; Braet, Cracco, & Theuwis, 2013; Cracco, Van Durme, & Braet, 2015; Grob & Smolenski, 2005). Results showed the relationships between both attachment anxiety and attachment avoidance toward mother on the one hand and restraint and concerns on the other hand, to be partially mediated by maladaptive emotion regulation after controlling for gender, age, adjusted BMI, and pubertal stage.

Although the IPV-model (Rieger et al., 2010; Wilfley et al., 1997) points to maladaptive emotion regulation as an intervening factor in the relationship between insecure attachment and eating pathology, this model makes no distinction between different insecure attachment dimensions or

emotion regulation strategies. However, finding differential relationships between the attachment dimensions and specific maladaptive emotion regulation strategies may be interesting as it may have clinical implications for the treatment of people with eating pathology in such a way that different techniques may have to be applied dependent on the individual's attachment configuration and consequent maladaptive emotion regulation strategies. To test hypotheses on possible specific and differential relationships between insecure attachment, maladaptive emotion regulation and eating pathology, the emotion regulation model of attachment (Shaver & Mikulincer, 2002) may be used, according to which people adopt different strategies to regulate emotional distress based on their quality of attachment. Since only few, cross-sectional, studies have empirically investigated the possibility of these assumed intervening effects in the eating disorder domain (e.g. Tasca et al., 2009), and this mainly in adults, chapter 3 aimed to add to the research on this topic by investigating the emotion regulation model of attachment in a longitudinal study in a community-based sample of adolescents ($N = 397$; Mage = 14.02). In chapter 3, a one-year follow-up study was performed only on the oldest age cohort of chapter 2, thereby increasing the mean age up to 14.19. Furthermore, the Eating Disorder Inventory-II (EDI-II; Garner, 1991; Van Strien, 2002) was used to measure bulimic symptoms (binge eating and/or purging behavior), in contrast to the ChEDE-Q in chapter 2, thereby applying a more dimensional approach with a focus on the severity of symptoms rather than on the mere presence/absence of symptoms. Results of chapter 3 provided longitudinal evidence for the emotion regulation model of attachment by confirming the differential contributing role of the attachment dimensions on increases in bulimic symptoms over a 1-year period in a sample of early adolescents. More specifically, higher levels of attachment anxiety were related to more

bulimic symptoms one year later through increased use of hyperactivating emotion regulation strategies (operationalized as rumination) (indirect effect) while higher levels of attachment avoidance were related to more bulimic symptoms one year later through increased use of deactivating emotion regulation strategies (operationalized as emotional control) (partial mediation), after controlling for gender, adjusted BMI and bulimic symptoms at baseline.

After having obtained more knowledge regarding the applicability of the IPV-model and emotion regulation model of attachment in early adolescents from the general population, chapters 4 and 5 aimed at targeting an at risk group of adolescents, i.e. adolescent aesthetic athletes, in order to investigate whether the same relationships can be found as well. However, information on disordered eating attitudes and behaviours in Flemish aesthetic athletes and whether or not they indeed confer a risk were, to our knowledge, non-existent. Therefore, the 4th chapter aimed to add to this gap in the literature by investigating whether male and female elite adolescent aesthetic athletes in Flandres, i.e. figure skaters and ballet dancers, exhibit more disordered eating attitudes and behaviours compared to normative data of adolescents from the general population (N = 68; Mage = 14.29). Results showed that only female, not male, aesthetic athletes show more disordered eating attitudes (concerns about weight and shape) and behaviours (dieting, binge eating and compensatory behaviours) compared to adolescents from the general population.

Based on the results of chapter 4, i.e. that female adolescent aesthetic athletes constitute an at risk group to develop eating pathology, chapter 5 aimed to longitudinally investigate the role of attachment and emotion regulation for the increase of bulimic symptoms over a 1-year time period in elite female adolescent ballet dancers (N = 78; Mage = 14.19). In other words, the aim of this study was to test the theoretical

assumptions of the emotion regulation model in elite female adolescent ballet dancers. Results provided partial evidence for the emotion regulation model of attachment. More specifically, higher levels of attachment anxiety were related to more bulimic symptoms one year later through increased levels of rumination (mediation). Higher levels attachment avoidance were not related to more bulimic symptoms one year later after controlling for bulimic symptoms at time 1, and no intervening role of emotional control was found. These results are somewhat distinct from the results in the general population, a discrepancy that will be more thoroughly discussed in the following paragraphs on the link between insecure attachment and eating pathology and the underlying role of maladaptive emotion regulation.

Previous chapters provided insights on the role of insecure attachment and maladaptive emotion regulation in explaining increases in disordered eating attitudes (concerns) and behaviours (dieting and bulimic symptoms), in order to improve our understanding of which factors are implicated in the development of subclinical eating pathology in adolescents and may thus increase the risk for developing clinical levels of eating pathology. However, the question remains whether the theoretical assumptions of the emotion regulation model of attachment also hold for a clinical group of adolescent patients at the start of treatment and whether even stronger associations may be present. Hence, chapter 6 wanted to extend the research of chapter 2, 3, and 5 by investigating whether the same relationships hold for a clinical group of female adolescents with Anorexia Nervosa of the restricting type (AN-R) ($N = 52$; Mage $= 14.38$). More specifically, chapter 6 investigated the associations between insecure attachment, maladaptive emotion regulation and the core features of AN-R (concerns and dieting). Results showed some evidence for the emotion regulation model of attachment (Shaver & Mikulincer, 2002), i.e.

attachment anxiety was related to concerns through rumination (partial mediation) while attachment avoidance was related to concerns through emotional control (indirect effect). In contrast to our hypotheses, dieting was not significantly explained by insecure attachment dimensions and maladaptive emotion regulation strategies. This latter finding is somewhat unexpected as both concerns and dieting are diagnostic characteristics of AN pathology and were highly correlated in the current study, a discrepancy which will be more thoroughly discussed in the following paragraphs on the link between insecure attachment and eating pathology and the underlying role of maladaptive emotion regulation.

All previous chapters use self-reported emotion regulation to investigate its role in the association between insecure attachment and eating pathology features, and focus on cross-sectional and longitudinal study designs. To our knowledge, no experimental studies have examined whether the association between insecure attachment and disordered eating attitudes may be explained by changes in affect. Chapter 7 therefore aimed to investigate whether attachment anxiety increases children's and early adolescents' vulnerability for body image dissatisfaction in stressful circumstances by using a controlled laboratory setting. It was aimed to investigate whether changes in state affect (caused by the exposure to an interpersonal stressor using the Trier Social Stress Test for Children (TSST-C; Buske-Kirschbaum et al., 1997; Kirschbaum, Pirke, & Hellhammer, 1993) moderate the association between attachment anxiety and body satisfaction in children and early adolesecents ($N = 81$; Mage = 11.74). Results showed that a decrease in positive affect after the TSST-C led to a decrease in body satisfaction in children and early adolescents with high levels of attachment anxiety and not in those with low levels of attachment anxiety. This finding extends the results of previous studies and chapters finding a positive association between insecure attachment

and disordered eating attitudes and behaviors in children and adolescents (Jewell et al., 2016). Moreover, this finding may be explained by the emotion regulation model of attachment as well, which will be further discussed in the following paragraphs.

So far a concise overview of the main findings of the six empirical studies. In the following section, these main results are integrated and critically evaluated. First, the association between insecure attachment and eating pathology will be discussed. Next, light is casted on our results regarding the possible underlying role of emotion regulation within this association.

Link between Insecure Attachment Dimensions and Eating Pathology

Even though before the start of the present doctoral dissertation associations were already found between insecure attachment (mostly romantic attachment) and eating pathology in adults, research on the association between parental attachment and eating pathology in early adolescence was scarce. Furthermore, the few available studies on parental attachment and eating pathology in early adolescents were mainly conducted in overweight youngsters (e.g. Bosmans, Goossens, & Braet, 2009) and small samples of young children (Sharpe et al., 1998). Also, these studies did not adopt a dimensional view on attachment, even though research confirmed that the attachment styles are better conceptualized as regions in a two-dimensional space (Fraley and Waller, 1998). Based on these shortcomings, the current dissertation wanted to examine the relationship between insecure attachment towards mother and eating pathology in early adolescence by adhering to a dimensional view on parental attachment (distinguishing attachment anxiety and attachment avoidance). This approach allows to investigate whether specific associations arise between the specific attachment dimensions and

different disordered eating attitudes and behaviours which may hold both theoretical (information for aetiological models of eating pathology) and clinical implications (information for the prevention and treatment of eating pathology). Furthermore, the current dissertation aimed at investigating adolescents from different populations, i.e. the general population (chapters 2 and 3), an at risk group (chapters 4 and 5: aesthetic adolescent athletes) and a clinical group (chapter 6: female adolescents with Anorexia Nervosa of the restricting type), in order to investigate whether the same relationships could be found, which may also hold theoretical and clinical implications tailored to specific adolescent groups.

In the present dissertation, results of chapter 2 cross-sectionally confirmed our hypotheses regarding the association between both attachment anxiety and attachment avoidance on the one hand and concerns (about weight, shape and eating) and restraint on the other hand in early adolescents from the general population. These findings are in line with previous research finding an association between insecure attachment and both concerns and restraint in young children (Goossens, Braet, Van Durme, Decaluwé, & Bosmans, 2012) and overweight youngsters (Bosmans et al., 2009), as well as with research finding an association between both attachment dimensions and eating pathology in adult athletes (Shanmugam, Jowett, & Meyer, 2012). Since no differential relationships emerge between the two attachment dimensions and the disordered eating attitudes (concerns) and behaviours (restraint) in the current chapter, this may indicate that perhaps different disordered eating attitudes and behaviours may have similar underlying mechanisms (e.g. Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000).

Although the initial goal of chapter 2 was to include binge eating and purging as well, the prevalence rate was rather low for both objective

binge eating and purging, which would make it difficult to detect effects. This might be due to the low mean age of the study (Mage = 12.19). Concerns about eating, weight, and shape, which is considered the core pathology of eating pathology, often manifests as first symptoms. These concerns may then trigger the start of restrained eating/dieting behavior, which in turn may cause more extreme features to develop, such as objective binge eating and compensatory behavior according to the transdiagnostic model of eating disorders (Fairburn, Cooper, & Shafran, 2003). Hence, this young age group of chapter 2 may not yet have developed these extreme disordered eating behaviours as these seem to gradually expand throughout adolescence (Kaneko, Kiriike, Ikenaga, Miyawaki, & Yamagami, 1999). Furthermore, the dichotomous items of the ChEDE-Q were used to measure the presence of objective binge eating and purging behaviour, whereas a more dimensional measure might be more appropriate in this early adolescent sample of the general population as it allows a focus on the severity of the symptoms and is more in line with the finding that initial presentations of disordered eating attitudes and behaviour are often subclinical.

In chapter 3, a one-year follow-up study was performed only on the oldest age cohort of chapter 2, using the EDI-II to measure bulimic symptoms. Chapter 5 longitudinally investigated whether the same associations between the attachment dimensions and bulimic symptoms would be of significance in female adolescent aesthetic athletes, a proven at risk group in both chapters 4 and 5, compared to the general population. Results of both samples showed initial significant positive correlations between attachment anxiety and attachment avoidance on the one hand and bulimic symptoms one year later, indicating that those youngsters who were more insecurely attached at baseline reported more bulimic symptoms one year later. These findings are in line with previous cross-

sectional research finding both anxious and avoidant attachment dimensions to be related to different forms of disordered eating attitudes and behaviours (e.g. Ward, et al., 2000) as well as with research finding an association both attachment dimensions and eating pathology in adult athletes (Shanmugan et al., 2012).

However, when looking at regression analyses controlling for bulimic symptoms at baseline, only the direct effect of attachment avoidance on bulimic symptoms one year later remained of significance in adolescents from the general population (chapter 3). In the female adolescent ballet dancers (chapter 5) only the direct effect of attachment anxiety on bulimic symptoms one year later remained marginally significant. The differences in results between the correlations and the regressions in both studies might be explained by the inclusion of bulimic symptoms at baseline as a control variable in the regressions, as bulimic symptoms at baseline were highly correlated to bulimic symptoms one year later (over .50), thereby confirming the stability/increase of eating pathology over time (Matton, Goossens, Braet, & Van Durme, 2013).

Results of the present dissertation show that the associations between the insecure attachment dimensions and bulimic symptoms seem to be different in an at risk group compared to a sample of the general population. In athletes attachment anxiety might be more predictive for psychological problems compared to attachment avoidance since attachment avoidance might somehow be related to desired personality traits for an athlete and his/her performance level such as self-reliance, independency, suppression of disturbing thought and pain. In contrast, female adolescent ballet dancers scoring high on attachment anxiety are possibly more other-oriented and constantly try to be accepted and loved by others (Brennan, Clark, & Shaver, 1998). This may make these female adolescent ballet dancers more likely to adhere to standards promoted by

their sports environment concerning desired weight and fat percentage, resulting in a preoccupation with eating, weight and shape. However, not finding a relationship between attachment avoidance and bulimic symptoms in the athletes might also be due to small sample size and the high dropout rate of the current study. The participants who dropped-out further scored significantly higher on attachment avoidance compared to the follow-up participants, which may also have led to biased results.

The contradictory findings of chapters 3 and 5 are difficult to interpret and compare with previous research due to different conceptualization and operationalization of both the attachment and eating pathology concept in past research. However, finding only a direct effect of attachment anxiety in elite female adolescent ballet dancers is in line with previous research showing the most consistent associations between attachment anxiety and disordered eating attitudes and behaviours in adults (e.g. Cash, Theriault, & Annis, 2004; Eggert, Levendosky, & Klump, 2007; Zachrisson & Skarderud, 2010), while regarding the role of attachment avoidance, studies have yielded mixed results (Cash et al., 2004; Kiang & Harter, 2006). As both chapters found specific and differential relationships between the attachment dimensions and bulimic symptoms, it is possible that differential sample-specific relationships may exist. This is in contrast with previous research finding similar underlying mechanisms for different form of disordered eating attitudes and behaviours in adult samples (cfr chapter 2) (e.g. Ward, et al., 2000).

Results of chapter 6 showed a significant positive association between attachment anxiety, and not avoidance, and concerns in adolescents with Anorexia Nervosa of the restricting type, indicating that in a clinical sample of treatment seeking adolescents those with the highest levels of attachment anxiety also report the highest levels of what is called the core pathology of eating disorders. This is in line with previous

research showing consistent associations between attachment anxiety and disordered eating attitudes and behaviour in adults (e.g. Cash et al., 2004; Eggert et al., 2007; Zachrisson & Skarderud, 2010), even though it is in contrast to other research finding avoidant attachment styles to be most strongly associated with symptoms of anorexia nervosa of the restricting type (Candelori & Ciocca, 1998). Adolescents scoring high on attachment avoidance may initially be reluctant to seek help, while when their symptoms progress throughout time and cause serious impairment by adulthood, they do end up in an eating disorder unit (voluntary or involuntary). This may possibly explain why previous research found an association between avoidance attachment and anorexia nervosa of the restricting type in a somewhat older sample, whereas this association seems absent in adolescents. When looking at restraint, no associations with the insecure attachment dimensions were found. This is somewhat unexpected as both concerns and dieting are diagnostic characteristics of AN pathology and were highly correlated in the current study. One possible explanation might be that concerns reflect the core pathology of AN-R, namely the dysfunctional system of self-evaluation, while dieting might be a more distal factor that develops as a consequence of concerns. This assumption is conform with the transdiagnostic model of eating disorders (Fairburn et al., 2003) as well as with empirical research often showing concerns to be a preceding factor of dieting behaviour in adolescents (Neumark-Sztainer et al., 2006). Secondly, even though the patients agreed to participate during the treatment intake, it sometimes took a week until the questionnaires were filled in and returned by the patients. This may in some instances have had some consequences for their eating pattern as some obligatory dietary changes may have been induced during the inpatient or outpatient treatment due to the severity of the energy restriction possibly influencing the scores on our dieting scale,

while the underlying concerns were not yet targeted/changed by treatment, making concerns a more robust outcome measure, which is conform with the abovementioned explanation.

The contradictory findings of chapter 3, 5 and 6 are difficult to interpret with certainty. Therefore, future research is needed using the dimensional view on parental attachment and eating pathology in adolescence in order to entangle and shed a light on whether or not specific, differential and sample specific relationships can be found between the attachment dimensions and different forms of disordered eating attitudes and behaviours. If future research replicates the current findings, the results of chapter 3, 5 will and 6 provide different implications for prevention and treatment dependent on the nature of adolescent sample (see paragraph on clinical implication and future directions of the current research).

In sum, associations were found between insecure attachment and disordered eating attitudes and behaviours throughout the different chapters of the current dissertation. However, some discrepancies emerge. In early adolescents from the general population (chapter 2), both attachment anxiety and attachment avoidance were cross-sectionally associated with concerns (about weight, shape and eating) and restraint. In a longitudinal adolescent community study (chapter 3) only attachment avoidance had a direct effect on the increase of bulimic symptoms one year later, while in an at risk group of female adolescent ballet dancers (chapter 5) only attachment anxiety seem to have an effect on bulimic symptoms one year later when controlling for bulimic symptoms at time 1. Additionally, in a clinical group of female adolescents with AN of the restricting type (chapter 6), only attachment anxiety seemed to be related to concerns, the core pathology of AN-R (and not to restraint). Associations between the insecure attachment dimensions and eating

pathology features thus seem to be different in an at risk and clinical group compared to a general population explaining the discrepancy in the results. In the general population both attachment dimensions, but especially attachment avoidance for bulimic symptoms, seem to be of importance and play a role in de development/increase of symptoms while in the at-risk and clinical group, attachment anxiety seems to play a more prominent role compared to attachment avoidance. The latter is consistent with previous research (e.g. Cash et al., 2004; Eggert et al., 2007; Zachrisson & Skarderud, 2010) and might be rooted in the characteristics of both insecure attachment dimensions. High scores on attachment anxiety might be related to a need for approval as a consequence of the fear of being rejected, making adolescents vulnerable for sociocultural influences concerning appearance (a known risk factor for eating pathology). This in contrast to those scoring high on attachment avoidance who might be less vulnerable for external influences as they try to distance themselves from others (Collins & Read, 1990). However, this finding might also be an artefact of the study characteristics in athlete and clinical samples. In athletes, attachment anxiety might be more predictive for psychological problems compared to attachment avoidance since attachment avoidance might somehow be related to desired personality traits for an athlete and his performance level; while patients scoring high on attachment avoidance may be less likely to participate/seek help (especially at young age when the impairment level is still somewhat manageable) and may therefore be underrepresented in the current study. This in contrast to the community based studies where entire classes participated in the studies. Future research must elaborate on this research in order to provide conclusions that are more decisive.

Underlying Role of Emotion Regulation

The existence of an association between insecure attachment and eating pathology does not explain how insecure attachment is theoretically and empirically linked to eating pathology. Based on the theoretical propositions of both the IPV- model (Wilfley et al., 1997) and the emotion regulation model of attachment (Shaver & Mikulincer, 2002), emotion regulation may act as a possible intervening variable in the relationship between the insecure attachment dimensions and eating pathology. Consequently, it was the goal of the current dissertation to test the assumptions of both models, i.e. whether maladaptive emotion regulation explains the association between insecure attachment and eating pathology in different adolescent samples.

In the present dissertation, results of chapter 2 provided cross-sectional evidence for the IPV-model (Wilfley et al., 1997) for adolescents in the general population since the relationships between both attachment anxiety and attachment avoidance toward mother on the one hand and restraint and concerns on the other hand, were partially mediated by the use of maladaptive emotion regulation strategies. However, given the exploratory nature of chapter 2, only a general measure of maladaptive emotion regulation was used. It was impossible to conclude whether the attachment dimensions were differentially related to specific maladaptive (hyperactivating or deactivating) emotion regulation strategies as hypothesised by the emotion regulation model of attachment (Shaver & Mikulincer, 2002). However, finding differential relationships between the attachment dimensions and specific maladaptive emotion regulation strategies may be interesting as it may have clinical implications for the prevention and treatment of people with eating pathology in such a way that different techniques may have to be applied dependent on the individual's attachment configuration and consequent maladaptive

emotion regulation strategies. Therefore, the consequent chapters of the present dissertation made a differentiation between hyperactivating (rumination) and deactivating (emotional control) emotion regulation strategies.

Chapter 3 and 5 provided partial longitudinal evidence for the emotion regulation model of attachment for bulimic symptoms. Sound evidence was found for the intervening role of rumination in the relationship between attachment anxiety and bulimic symptoms one year later in both adolescents from the general population (indirect effect) and the at risk group of elite female adolescent ballet dancers (mediation). This is theoretically in line with the emotion regulation model of attachment stating that hyperactivating emotion regulation strategies mediate the relationship between attachment anxiety and psychological problems, as well as empirically in line with the research of Tasca et al. (2009) finding attachment anxiety to be contributing to eating pathology symptoms through hyperactivating emotion regulation strategies in a cross-sectional study in adult female eating disordered patients. However, mixed results were found regarding the intervening role of emotional control in the relationship between attachment avoidance and bulimic symptoms. In the general population, the intervening role of emotional control was found (partial mediation), while in the at risk group it was not. Hence, the results of the general population were fully conform to the emotion regulation model of the attachment, whereas those of the at risk group were not.

Not finding an intervening effect of deactivating emotion regulation in the association between the insecure attachment dimensions and bulimic symptoms in the elite female adolescent ballet dancers might be an artefact of the study which might again be due to small sample size and the participant who dropped-out scoring higher on attachment avoidance compared to the follow-up participants leading to restricted range on our

attachment avoidance measure. This in contrast to the general population, where both attachment dimensions are more diversely distributed leading to a greater range and greater possibility to detect effects. However, attachment anxiety and consequently related rumination seems to be more predictive for bulimic symptoms in athletes compared to attachment avoidance and consequently related emotion control. This might be because attachment avoidance and emotional control might somehow be related to desired personality traits for an athlete and his performance level such as self-reliance, independency, suppression of disturbing thought and pain, while traits like rumination might be more harmful in the sport environment. Whether attachment avoidance and emotional control may have possible long-term negative effects on psychological functioning in this specific group needs to be further investigated. Hence, it seems that the associations between the insecure attachment dimensions and bulimic symptoms are different in an at-risk group compared to a general population explaining the discrepancy in the results.

Conform with the cross-sectional results for concerns in an adolescent community based sample (chapter 2), chapter 6 found evidence for the emotion regulation model of attachment for explaining concerns (about eating, weight and shape) in a clinical group of female adolescents with AN of the restricting type. More specifically, attachment anxiety was related to concerns through rumination (partial mediation) while attachment avoidance was related to concerns through emotional control (indirect effect). This is somewhat distinct from the empirical research of Tasca et al. (2009) in an adult eating disordered population, which finds only found a direct effect for attachment avoidance. Remarkably, and in contrast to chapter 2, the emotion regulation model of attachment could not be confirmed for explaining restraint. The explanations that can be put forward for this are similar as those in the abovementioned section for not

finding an association between insecure attachment and restraint in the clinical sample.

In line with the cross-sectional results of chapter 2 and chapter 6, chapter 7 provided experimental evidence for the link between attachment anxiety and concerns. Moreover, in a controlled laboratory setting, changes in positive state affect after exposure to an interpersonal stressor moderated the association between attachment anxiety and body satisfaction in children. This finding extends the results of chapter 2 as well as previous cross-sectional studies that found a positive association between insecure attachment and disordered eating attitudes and behaviours in children and adolescents (Jewell et al., 2016). These results might again be explained by the emotion regulation model of attachment and are possibly in line with previous chapters finding rumination as intervening variable in the relationship between attachment anxiety and disordered eating attitudes and behaviours. In anxiously attached children, exposure to stress may lead them to use hyperactivating strategies such as rumination to regulate their emotions (Shaver & Mikulincer, 2002), which causes a decrease in positive affect after stress induction. These anxiously attached children's fear of being rejected may make them try everything to be accepted and loved by their environment. In a developmental period that is characterized by increasing importance of physical appearance in self-esteem (Clay, Vignoles, & Dittmar, 2005; Phares, Steinberg, & Thompson, 2004; Ricciardelli & McCabe, 2001), strategies like ruminating about unattainable beauty ideals that are imposed by the environment thereby may increase their body dissatisfaction. Future research should investigate the role of rumination more thoroughly to confirm the abovementioned hypothesis.

In sum, the current dissertation provided cross-sectional evidence for the IPV- model and the emotion regulation model for explaining

concerns in both adolescents from the general population (chapter 2) and from a clinical sample suffering from AN of the restricting type (chapter 6). In the general population, the IPV model was also cross-sectionally confirmed for restraint, which was not the case for the clinical group (see supra). In line with the cross-sectional results of chapter 2 and chapter 6, chapter 7 provided experimental evidence for the link between attachment anxiety and concerns. Moreover, changes in state affect after exposure to an interpersonal stressor (TSST-C) moderated the association between attachment anxiety and body satisfaction in children. Further, longitudinal evidence was found for rumination as intervening variable in the relationship between attachment anxiety and bulimic symptoms, both in the general population (chapter 3) and in the at risk group of elite female adolescent ballet dancers (chapter 5). Regarding the intervening role of emotional control in the relationship between attachment avoidance and bulimic symptoms, mixed results were found. In the general population, the proposed relationship was found, while in the at risk group, it was not (see supra). Overall, throughout the different chapters of the current dissertation, the effect of attachment anxiety on disordered eating attitudes and behaviours (through the hyperactivating strategy of rumination) tends to be the most robust throughout the different samples of adolescents. This might be rooted in the characteristics of both insecure attachment patterns. High scores on attachment anxiety might be related to a need for approval as a consequence of their fear of being rejected, making them vulnerable for influences from media and peers concerning appearance (a known risk factor for eating pathology). This in contrast to those adolescents scoring high on attachment avoidance who might be less vulnerable for external influences as they try to distance themselves from others (Collins & Read, 1990). Adolescents scoring high on attachment avoidance may initially be reluctant to seek help, while when their symptoms progress throughout

time and cause serious impairment by adulthood, they do end up in an eating disorder unit (voluntary or involuntary). This may possibly explain why previous research found an association between avoidance attachment and anorexia nervosa of the restricting type in a somewhat older sample, whereas this association seems absent in adolescents.

However, some of the chapters did found an effect of attachment avoidance and consequently related emotional control. Although this might be related to sample specific characteristics as mentioved above, it is also possible that other mediating or moderating factors may be of importance in determining whether or not attachment avoidance may have an impact in certain samples such as genetic, biological (e.g. temperament), social (e.g. social comparison) and other psychological factors (e.g. personality, perfectionism).This is conform to the multicausal (e.g. Jansen, 2001) and diathesis-stress model (Ingram & Luxton, 2005). The current dissertation showed that both insecure attachment and maladaptive emotion regulation may be considered as two important psychological risk factors (vulnerabilities) that need to be included in aetiological models of eating pathology. Chapter 7 further showed that higher levels of attachment anxiety are only associated with decreases in body satisfaction when the exposure to stress leads to a decrease in positive affect. This finding is interesting since it shows that when youngsters manage to cope with stressful circumstances, this may protect them against the development of body image problems despite their vulnerability (attachment anxiety), thereby implying the importance of emotional resilience as a buffer against problems. Emotional resilience can be defined as 'the capacity to emotionally adjust to life-stressors and maintain stable psychological functioning'. Hence, the current dissertation generates some important theoretical implication that consequently leads to clinical implications as well.

Clinical Implications

In the previous paragraphs, the relevance of our findings is discussed with regard to the relationship between insecure attachment and eating pathology as well as the underlying role of maladaptive emotion regulation strategies. Some of the findings of our empirical studies are also specifically applicable in clinical practice. In the next paragraphs, the possible value our results will be evaluated concerning the detection, prevention and treatment of eating pathology in adolescents.

Implications for the Detection and Prevention of Eating Pathology in Adolescence

General implications. Initial presentations of disordered eating attitudes (weight, shape and eating concerns) and behaviours (dieting, binge eating and compensatory behaviours) are often subclinical without fulfilling all the criteria of a DSM- diagnosis, especially in adolescence (Bravender et al., 2007; Bravender et al., 2010). This explains the focus of the current dissertation on disordered eating attitudes and behaviours as outcome measure in the adolescent samples, rather than on categorical diagnoses. The prevalence numbers found in chapters 2 and 3 do indeed show a much higher prevalence of disordered eating attitudes and behaviours in adolescence compared to the prevalence numbers of full-blown eating disorders in adolescence found in previous research, ranging from 0.8% to 3% (Stice, Marti, & Rohde, 2013). This finding is also reflected in the in the prevalence rate of subclinical and clinical scores on the eating pathology features. Within a community sample of adolescents (n = 952; Mage=12.19) (chapter 2), 25% of the youngsters self-reported features of restrained eating for at least 1 to 5 days during the past month (subclinical score). A clinical score was obtained by 1.8% of the group, which means these adolescents reported restrained eating for more than

half of the days during the past month. When looking at the prevalence of eating, weight and shape concerns, 43.6% showed concerns for at least 1 to 5 days. A clinical score on concerns was obtained by 2.4% of the youngsters. Regarding more pathological features, 14% of the youngsters reported objective binge eating at least once during the past month, while 4.9% of adolescents obtained a clinical score, which means they self-reported objective binges at least once a week during the past month. As concerns purging, 4.9% of the youngsters reported purging behaviour at least once during the past month, while 1.6% of them obtained a clinical score.

These high prevalence numbers of disordered eating attitudes and behaviours found in the community based samples of the present dissertation, in combination with their relative stability and tendency to increase throughout adolescence (Goossens et al., 2012; Kotler, Cohen, Davies, Pine, & Walsh, 2001; Matton et al., 2013) as well as their predictability for the development of full-blown eating disorders (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006; Neumark-Sztainer et al., 2006), stress the importance of adequate early detection to prevent the development/transition to full blown eating disorders with devastating physical and psychological impairment as consequence. Hence, it is important to detect eating pathology and their correlates as early as possible in adolescents, even if the subject does not meet a full-blown DSM-5 diagnosis (APA, 2013).

One adequate way to screen for eating pathology and hence to ensure early detection of eating pathology during adolescence is by the use of the Child Eating Disorder Examination-Questionnaire (Decaluwé & Braet, 1999a), which shows good reliability as well as good convergence with the Child Eating Disorder Examination Interview (BryantWaugh, Cooper, Taylor, & Lask, 1996; Decaluwé & Braet, 1999b; Van Durme,

Craeynest, Braet, & Goossens, 2015). Furthermore, the ChEDE-Q adequately addresses the different features conform to the transdiagnostic model of (Fairburn et al., 2003). Consequently, as the ChEDE-Q measures the core symptoms of eating pathology and additionally is very cost and time efficient, this questionnaire might be used as primary screening instrument for eating pathology in adolescents. When clinical scores arise on the questionnaire, the ChEDE might then be used to exclude false negatives, and to enhance start of early treatment (if necessary).

Furthermore, using the ChEDE-Q as a screening tool for the different disordered eating attitudes and behaviours is in line with a combination of both a dimensional and categorical approach Within the dimensional approach, the focus is on the severity of each symptom. Consequently, each individual is placed on a continuum of gradually increasing pathology. Based on cut-off percentiles or on comparisons with means of normative clinical or population-based samples, an individual then falls within the normal, subclinical or clinical range of a certain symptom. In combination, a categorical approach can still be applied as well, since a specific combination of eating pathology symptoms may lead to the diagnosis of a clinical disorder, such as AN, BN and BED. In sum, the abovementioned findings confirm the utility of the ChEDE-Q for the detection of eating pathology in youngsters from the general population (Berg, Peterson, Frazier, & Crow, 2011; Van Durme et al., 2015).

As mentioned above, it is important to detect eating pathology as soon as possible, especially since early intervention and treatment is related to better prognostic outcomes (Steinhausen, 2002, 2009). However, prevention programs might be even more important as these programs might be even more cost-effective for both the individual and society as they may prevent the development of eating pathology in at-risk adolescents. Prevention programs should target the precursors/risk factors

of eating pathology. Based on the results of chapter 2, 3, 5 and 7 of the current dissertation, and if replicated in future studies, the existing prevention programs of eating pathology may need to take into account the role of insecure attachment processes and its differential impact on the acquisition of emotion regulation strategies.

More specifically, prevention programs may need to target the adolescent (emotion regulation), as well as the family as supporting and contributing context to the eating pathology of the youngster (attachment). Based on the results of the current dissertation and the existing evidence of the role of maladaptive emotion regulation in the development of eating pathology (Aldao & Nolen-Hoeksema, 2010; Ball & Lee, 2000; Sim & Zeman, 2005), prevention programs may need to include techniques to improve the emotion regulation skills of the adolescents in order for them to learn to adequately deal with emotional distress (creating emotion resilience). This might make them less vulnerable to develop eating pathology. In addition, mothers could be included in educational programs on the importance of the quality of the parent–child relationship for mental health. There, they could learn responsive and sensitive parenting skills, a necessity to function as a safe haven for their children and to develop a secure parent-child relationship. In this program, additional tools to help their children deal with problems may also be handed to the mothers to further enhance adaptive emotion regulation skills in their child.

Additional implications for female adolescent aesthetic athletes. Even though adolescence is generally considered as a risk period to develop eating pathology due to puberty onset (Klein & Walsh, 2003), stressing the importance of early detection and prevention as mentioned above, female adolescent aesthetic athletes seem to confer an even higher risk. This might be due to the fact that in aesthetic sports low body weight/fat percentage is promoted in order to enable a high strength-to-

weight ratio to enhance athletic performance (Byrne & McLean, 2001; Sundgot-Borgen, 1993, 1994; Sundgot-Borgen & Torstveit, 2004, 2010; Torstveit, Rosenvinge, & Sundgot-Borgen, 2008) and aesthetically costumes, make-up, femininity, and physical attractiveness are also taken into account during the judging process next to performance (Kong & Harris, 2015; Martinsen & Sundgot-Borgen, 2013).

This might explain why elite female adolescent aesthetic athletes report even more disordered eating attitudes and behaviours (chapters 4 and 5) compared to female adolescents from the general population. Moreover, elite female adolescent aesthetic athletes show more disordered eating attitudes (concerns about their weight and body shape) and behaviours (restraint and bulimic symptoms) compared to female adolescents from the general population based on comparisons with means of normative population-based samples of the Child Eating Disorder Examination-Questionnaire (Decaluwé & Braet, 1999b) and the Eating Disorder Inventory-II (Van Strien, 2002) (cfr. de Bruin, Oudejans, & Bakker, 2007; Francisco, Narciso, & Alarcao, 2013).

These results emphasize the importance of early detection and prevention in this specific adolescent group. As insecure attachment and maladaptive emotion regulation also plays a role in the development of eating pathology in female adolescent aesthetic athletes, (chapter 5), the abovementioned implications for detection and the inclusion of attachment and emotion regulation prevention of eating pathology in adolescents from the general population may also hold for this specific risk group. However, in this group, a 'two-pathway' approach, is warranted in such a way that next to general risk factors, sport specific risk factors (for example: the impact of the coach) need to be taken into account and addressed as well during prevention programs (de Bruin et al., 2007; Kong & Harris, 2015; Muscat & Long, 2008). Hence, with regard to the detection and prevention

of eating pathology in the sport context, not only the adolescent athlete and his parents need to be addressed, but also their coaches. The coaches need to be educated about the risk factors, symptoms, and possible impact of their approach on disordered eating attitudes and behaviour in order to enhance early detection, prevention and treatment (Bonci et al., 2008).

Implications for the Treatment of Eating Pathology in Adolescence

Obtaining a clinical diagnosis is often a prerequisite to receive treatment in the present eating disorder units. This has serious implications for the treatment of adolescents, who often present with disordered eating attitudes and behaviours without fully meeting the diagnostic criteria of an eating disorder, even though physical and psychological impairment is clearly present (Hoek & van Hoeken, 2003; Reijonen, Pratt, Patel, & Greydanus, 2003). Cognitive Behavioral Therapy for eating disorders (CBT-E), seems to be the most effective treatment for eating disorders (Fairburn, 2008). Even though CBT-E is considered the most effective treatment, full recovery is often not obtained and high relapse rates can be found throughout previous research (Steinhausen, 2002). Consequently, there is still room for improvement as concerns the treatment of eating pathology and research should investigate how the effectiveness of treatment can be expanded.

The current dissertation, when replicated in future research, may provide guidelines for the expansion of eating pathology treatment. The provided empirical evidence for the interpersonal vulnerability model and the emotion regulation model of attachment for concerns in a clinical sample of adolescents with AN-R (chapter 6) holds clinical implications for the treatment of eating pathology. More specifically, the effect of attachment anxiety on concerns through the hyperactivating strategy of rumination as well as the effect of attachment avoidance on concerns

through the deactivating strategy of emotional control indicates that both insecure attachment and maladaptive emotion regulation may need to be targeted in the treatment of AN-R.

One might suggest that, when an adolescent with eating pathology is admitted for treatment, the individual's attachment configuration and related emotion regulation strategies should be thoroughly assessed in order to provide an individually tailored treatment in combination with the current evidence based treatment of CBT-E (Fairburn, 2008). The assessment of the attachment dimensions and consequent maladaptive emotion regulation strategies (hyperactivating or deactivating) might take place using the ECR-R-C and the FEEL-kj. It needs to be noted that in CBT-E, attention is also paid to other possible maintaining factors, i.e. low self-esteem, interpersonal problems, clinical perfectionism and mood intolerance. Interpersonal problems may entail insecure attachment processes whereas mood intolerance is related to maladaptive emotion regulation. Hence, the proposed techniques of CBT-E for tackling these problems may be applied during treatment. However, sometimes additional techniques may need to supplement CBT-E. For example, when insecure attachment dimensions are present in adolescence, principles of Family-Based Therapy (FBT; Lock & le Grange, 2005) or Attachment-Based Family Therapy (ABFT; Diamond, Siqueland, & Diamond, 2003; Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002) can be used to improve the mother-child relationship and hence the attachment experiences and relationship. Next to ABFT and FBT, Interpersonal Psychotherapy for adolescents (IPT; Tanofsky-Kraff et al., 2007) could also be used. Since people adopt different emotion regulation strategies based on their attachment configuration, i.e. people high on attachment anxiety are prone to use hyperactivating emotion regulation strategies whereas those high on attachment avoidance are prone to use deactivation

strategies, this difference should be reflected in a different approach when working on emotion regulation. In individuals high on attachment anxiety, therapists may focus on teaching them other and more appropriate ways (than hyperactivating) to deal with their overwhelming emotions, whereas in individuals high on avoidance focus may first be on exposure to emotion and interpersonal closeness in order to learn to tolerate and recognize emotions rather than on teaching them emotion regulation strategies immediately (Tasca et al., 2009).

Strengths and Limitations of the Present Research

The strengths and limitations of the different empirical studies were already thoroughly addressed in the discussion section of each specific study. In the following paragraphs, a concise overview of the most important strengths and shortcomings of the present research is provided.

Strengths of the Present Research

It can be considered a strength of the present research that we used well established measures to assess attachment, emotion regulation and eating pathology throughout the different empirical studies. These main variables of the doctoral dissertation were measured using valid, reliable and age-appropriate self-report questionnaires. Moreover, the key variable in this dissertation, eating pathology, was mainly assessed with the use of the 'Child Eating Disorder Examination-Questionnaire' (ChEDE-Q; Decaluwé & Braet, 1999b), which shows good reliability as well as good convergence with the Child Eating Disorder Examination Interview (ChEDE; Bryant-Waugh et al., 1996; Decaluwé & Braet, 1999a) in a recent study of Van Durme et al. (2015). This confirms the utility of the ChEDE-Q for the detection of disordered eating attitudes (weight concern, shape concern and eating concerns) and behaviours (restraint, binge eating

and compensatory behaviour) in youngsters from the general population (Berg et al., 2011).

This first strength brings us neatly to the second strength of the present research, namely the focus on disordered eating attitudes and behaviours as outcome measures (dimensional view), as initial presentations of disordered eating attitudes and behaviours are often subclinical without fulfilling all the criteria of a DSM- diagnosis, especially in adolescence (Bravender et al., 2007; Bravender et al., 2010). Furthermore, focus on disordered eating attitudes and behaviours is important as they have proven to be stable for a 6-month time period (Matton et al., 2013) as well as predictive for the development of full-blown eating disorders (e.g. Neumark-Sztainer et al., 2006) and obesity later in life (e.g. Kotler et al., 2001). This makes research on the development and maintenance of these problems , such as the current dissertation, a necessity in order to enhance early detection as well as to prevent the development/transition to full blown eating disorders.

Thirdly, research in adolescent groups on the role of attachment and maladaptive emotion regulation in the development and maintenance of eating pathology is scarce, especially research taking into account the theoretical assumptions of the emotion regulation model of attachment (Shaver & Mikulincer, 2002). However, research on this topic is important in young age groups since the risk of developing an eating disorder seems to be the greatest in the last years of childhood and the first years of adolescence when physical changes arise and when one is most sensitive to socio-cultural influences (Klein & Walsch, 2003). Furthermore, parental factors (such as attachment) are still important determinants for personal development during adolescence (Fiese, 1997) and research suggests that the parent–child relationship in early adolescence is predictive for cognitive vulnerability for psychopathology toward adolescence (Mezulis,

Hyde, & Abramson, 2006). Research further confirmed that maladaptive emotional regulation might be a transdiagnostic risk factor in the development of psychopathology (Berking & Wupperman, 2012). However, research on this topic was scarce in adolescents with eating pathology. Hence, the current research fills this gap by examining the relationships between attachment, emotion regulation and eating pathology in adolescent samples, which holds both theoretical as well as clinical implications (see infra).

Additionally, we included different adolescent study samples throughout the current dissertation. Moreover, next to research in a community sample (chapter 2 and 3), research was also performed in an at risk group of female aesthetic athletes (chapters 4 and 5) as well as in female eating disordered patients with Anorexia Nervosa of the restricting type (chapter 6). In that way, we were able to weigh the results that were obtained in the at-risk group and the clinical group against those obtained in the general population. This allowed us to investigate whether the relationships found throughout the different studies were similar for the different samples and whether or not sample specific effects could be found.

A final strength of the present research is that we adopted robust methodological designs and different statistical applications throughout our different adolescent study samples. This dissertation consists of two studies with a longitudinal design (more specifically chapters 3 and 5) and one study with a more experimental design (chapter 7). The utilization of a longitudinal and experimental design makes it possible to draw conclusions regarding the direction of relations between variables and is considered a very valuable approach in the developmental psychopathology research domain (Braet & van Aken, 2006).

Limitations of the Present Research and Directions for Future Research

Next to the abovementioned strengths, some limitations need to be discussed as well. The first limitation is related to the design of the studies throughout the dissertation. Even though two studies (chapters 3 and 5) used a longitudinal design and allowed to draw some concise temporal conclusions, future research with at least three times of measurements would be a valuable supplement to the current dissertation to fully investigate the longitudinal relationships between the three concepts. Further research should also include more long-term research starting at young ages and following up people until young adulthood, conducting multiple measurements throughout the years in order to detect which factors determine whether eating pathology develops throughout time.

Secondly, some other methodological concerns may arise throughout the dissertation. Research was solely conducted using self-report measures in adolescents and the measures used throughout the dissertations were mainly questionnaires (ECR-RC, FEEL-KJ, ChEDE-Q, EDI-II). Although it is acknowledged that adolescents are the best informant on their inner thoughts and feelings, the use of self-report data may have posed concerns about biased reporting (i.e. social desirability), shared method variance and limited control on the comprehension of the items, even though the researcher was present during the administration in order to enhance reliable reporting.

Furthermore, the cronbach's alphas for the maladaptive emotion regulation strategies were rather low throughout the different chapters, especially for rumination (about .60 throughout the chapters), as well as the effect sizes of the intervening effects. Further, some of the samples of the current dissertation, i.e. female adolescent ballet dancers and female adolescents suffering from AN of the restricting type, are highly specific

and rather small which may have led to restriction of range on some of the variables of interest making it more difficult to detect effects. Future research should address these issues adequately and should try to include multiple methods next to self-report for all variables (i.e. attachment, emotion regulation and eating pathology), such as the use of clinical interviews (e.g. ChEDE, Child Attachment Interview (Target et al., 2003)) and/or multiple informants in larger samples in order to replicate the findings of the current study. Furthermore, prospective studies in naturalistic settings may be needed to examine the temporal associations between insecure attachment, emotion regulation and disordered eating attitudes and behaviors in adolescents by means of for example Ecological Momentary Assessment.

Thirdly, the current study only tested the theoretical assumptions of the emotion regulation model of attachment (Shaver & Mikulincer, 2002) for eating pathology as outcome measure. However, according to the model, insecurely attached individuals develop maladaptive, hyperactivating or deactivating, emotion regulation strategies based on the unavailability of the attachment figure during childhood. Continued use of these maladaptive ER strategies throughout life appears to be associated with psychological problems in general (Mikulincer, Shaver, & Pereg, 2003). Hence, the model makes no specific assumptions concerning eating pathology. Based on both the theoretical assumptions of the model and the empirical longitudinal evidence for the applicability of the model for negative mood, interpersonal problems, depression and eating pathology in both adolescents and adults (Brenning, Soenens, Braet, & Bosmans, 2012; Tasca et al., 2009; Wei, Vogel, Ku, & Zakalik, 2005), insecure attachment and maladaptive emotion regulation may be transdiagnostic risk factors for psychopathology rather than specific risk factors for eating pathology. Both insecure attachment and maladaptive emotion regulation

have indeed been found to be related to different forms of psychopathology (e.g. Berking & Wupperman, 2012; Bowlby, 1988; Mikulincer & Shaver, 2007b). However, little research has included and compared different psychiatric disorders in order to detect whether disorder specific mechanisms exist. One recent study (Braet et al., 2014) did found evidence for disorder specific emotion regulation deficits depending on the psychological problems adolescents experienced but unfortunately eating problems were not included. Future research should elaborate on the applicability of the emotion regulation model of attachment across different psychological problems, as well as on the entanglement of general vulnerabilities for psychopathology versus possible disorder specific vulnerabilities.

Fourth, only attachment towards mother was included in the current dissertation, because the mother is considered to be the primary caregiver with most responsibility and influence on the eating behaviour of the adolescent (Goossens et al., 2012; Winnicott, 1957). Even though research demonstrates that the relationship with mother is more strongly associated with children's eating pathology and weight status compared to the relationship with the father (Goossens et al., 2012), the father–child relationship might have a differential impact, emphasizing the necessity for future research to investigate whether the same mediation effects can be found when attachment toward father is taken into account.

Finally, the generalizability of our results might be limited on several levels. First, we mainly focused on early adolescents. Further research should investigate whether the results can also be replicated in younger (children) and older (late adolescents) age groups. Furthermore, we only included one at risk group, i.e. elite aesthetic athletes. Further research should investigate whether the same relationships also hold for athletes in other weight and leanness dependent sports, as well as in other

at risk groups, such as models. Additionally, in the clinical study, only female adolescents with AN-R were included. Research should investigate whether the same relationships can be found in adolescents with BN and BED or whether disorder specific problems arise.

Conclusion

The current doctoral dissertation provides preliminary (partial) evidence for both the IPV-model and the emotion regulation model of attachment and thereby confirms the role of insecure attachment and maladaptive emotion regulation in the development of eating pathology in adolescents. Moreover, cross-sectional, longitudinal and experimental designs were used in different adolescent samples, i.e. adolescents from the general population, adolescents from a risk group (aesthetic athletes), and adolescents from a clinical sample (adolescent girls diagnosed with Anorexia Nervosa of the restricting type).

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Nederlandstalige samenvatting

De rol van gehechtheid en emotieregulatie in de ontwikkeling van eetpathologie bij adolescenten

Dit doctoraatsproefschrift is opgebouwd uit acht hoofdstukken. In een eerste hoofdstuk wordt de lezer geïntroduceerd in het domein van eetpathologie bij kinderen en adolescenten en de mogelijke rol die gehechtheid en emotieregulatie mogelijks speelt bij de ontwikkeling en instandhouding van eetpathologie. Vervolgens wordt een overzicht gegeven van de resultaten van zes empirische studies die globaal beogen de rol van gehechtheid en emotieregulatie na te gaan in de ontwikkeling van eetpathologie bij adolescenten, en dit over verschillende steekproeven en designs heen. In een laatste hoofdstuk worden de belangrijkste bevindingen van deze zes studies bediscussieerd en wordt hun waarde weergegeven voor de klinische praktijk.

Hoofdstuk 1: Eetpathologie tijdens de adolescentie: Een inleiding

Eetpathologie: Definiëring en Prevalentie

Eetpathologie verwijst naar een breed spectrum van problemen, en omvat zowel klinische eetstoornissen als subklinisch verstoorde eetattitudes en eetgedragingen. Een *klinische eetstoornis* wordt gedefinieerd als "een persistente verstoring van het eetgedrag of verstoord eetgedrag met als doel gewichtscontrole, wat op termijn een significante negatieve impact heeft op de fysieke gezondheid en/of het psychosociaal functioneren (Walsh & Fairburn, 2002)." In de huidige Diagnostic and Statistical

Manual - 5th edition (DSM-5; APA, 2013), maken eetstoornissen deel uit van de categorie 'voedings-, en eetstoornissen'. Eetstoornissen onderscheiden zich van de voedingsstoornissen (i.e. pica, ruminatiestoornis en vermijdende/restrictieve voedselinname stoornis) door de aanwezigheid van een dysfunctioneel systeem van zelf-evaluatie, iets wat niet aanwezig is bij de voedingsstoornissen (Fairburn, Cooper, & Shafran, 2003). De meest gekende eetstoornissen zijn Anorexia Nervosa (AN), Bulimia Nervosa (BN) en de eetbuistoornis (BED) (APA, 2013). Het hoofdkenmerk van AN is de beperking van de energie-inname relatief ten op zichte van de benodigdheden wat leidt tot een significant laag lichaamsgewicht rekening houdend met leeftijd, geslacht, ontwikkelingsfase en fysieke gezondheid. BN wordt hoofdzakelijk gekenmerkt door herhaaldelijke eetbui-episodes gevolgd door compensatiegedrag om gewichtstoename tegen te gaan. Dit in tegenstelling tot BED waar de herhaaldelijke eetbui-episodes centraal staan maar geen compensatoir gedrag gesteld wordt. De vooropgestelde gedragingen dienen zich minstens eenmaal per week voorgedaan te hebben gedurende de afgelopen drie maanden om de diagnose BN of BED te kunnen stellen (APA, 2013). Naast AN, BN en BED omvat de DSM-5 ook twee 'restgroepen', namelijk de ander gespecifieerde (OSFED) en niet gespecifieerde eetstoornissen (UFED) waarbij niet volledig aan de criteria van bovengenoemde eetstoornissen voldoen is, maar wel duidelijk klinisch significant lijden aanwezig is.

Eetstoornissen komen vaak voor bij adolescente meisjes en jonge vrouwen, met een piek tijdens de adolescentie. Het risico op een eetstoornis blijk het grootst te zijn gedurende de laatste jaren van de kindertijd en de eerste jaren van de adolescentie (Gonzalez, Kohn, & Clarke, 2007; Klein & Walsh, 2003). De prevalentie voor een eetstoornis bedraagt 5.7% voor vrouwelijke adolescenten in vergelijking met 1.2%

voor mannelijke adolescenten (Smink, van Hoeken, Oldehinkel, & Hoek, 2014; Smink, van Hoeken, & Hoek, 2013). De prevalentie lijkt aldus hoger bij meisjes dan bij jongens. Bij AN en BN is de man: vrouw ratio ongeveer 10:1 tot 9:1 terwijl dit bij BED 3:2 tot 3:1 is (APA, 2013). Wanneer we specifiek kijken naar vrouwelijke adolescenten, dan is de life time prevalentie op 20-jarige leeftijd 0.8% voor AN, 2.6% voor BN en 3% voor BED (Stice, Marti, & Rohde, 2013). Studies tonen verder aan dat de meeste adolescenten met een eetstoornis (10%) in de restcategorie terecht komen en aldus de diagnose OSFED of UFED krijgen (Fairweather-Schmidt & Wade, 2014; Wade & O'Shea, 2015).

Ook al vormen adolescente meisjes een belangrijke risicogroep voor eetstoornissen, vrouwelijke adolescente elite-atleten blijken nog een hoger risico te vertonen. Eetpathologie komt namelijk meer voor bij (a) atleten in vergelijking met niet-atleten, vooral bij elite atleten (hoog sportniveau), (b) vrouwelijke atleten in vergelijking met mannelijke atleten en (c) sportcategorieën waarbij een laag lichaamsgewicht of vetpercentage gewenst is in vergelijking met andere sporten. In dergelijke sporten wordt een laag lichaamsgewicht/vetpercentage gepromoot met als doel een zo hoog mogelijke kracht-gewichtsratio te bereiken om de sportprestaties zodoende te bevorderen (Byrne & McLean, 2001; de Bruin, Oudejans, & Bakker, 2007; Sundgot-Borgen, 1994; Sundgot-Borgen & Torstveit, 2010). Kunstschaatsen en ballet zijn voorbeelden van dergelijke sporten (esthetische sporten) waarbij er een heel hoog risico is op het ontwikkelen van eetpathologie (Bachner-Melman, Zohar, Ebstein, Elizur, & Constantini, 2006; Kong & Harris, 2015; Ringham et al., 2006; Sundgot-Borgen & Torstveit, 2004).

Verstoorde eetattitudes en eetgedragingen zijn vaak de voorlopers van een eetstoornis en kunnen als volgt gedefinieerd worden: "gedrag en attitudes met betrekking tot lichaamsperceptie, eetgewoonten,

gewichtsregulatie en zelf-evaluatie die het risico verhogen op het ontwikkelen van een klinische eetstoornis alsook het risico op het ontwikkelen van fysieke gezondheidsproblemen (Waaddegaard, Thoning, & Petersson, 2003, p. 434). Verstoorde eetattitudes zoals zorgen over gewicht, lichaamsvormen en eten maken aldus deel uit van deze definitie; alsook verstoorde eetgedragingen zoals lijngedrag, eetbuien en compensatiegedrag. Waar het gebruik van de DSM-5 een categoriale aanpak omvat, reflecteert een focus op verstoorde eetattitudes en eetgedragingen een meer dimensionele aanpak.

Het transdiagnostisch model van Fairburn et al. (2003) sluit mooi aan bij beide visies. Volgens dit model vormen zorgen over eten, gewicht en lichaam (en de controle daarover) (cf. verstoorde eetattitudes) de kernpathologie van eetpathologie die bijdragen aan het dysfunctioneel systeem van zelf-evaluatie, wat op zijn beurt leidt tot de ontwikkeling van meer extreme eetpathologie-symptomen en gewichtscontrole maatregelen zoals lijngedrag, eetbuien en compensatiegedragingen (cf. verstoorde eetgedragingen). Elke verstoorde eetattitude en verstoorde eetgedraging kan dus afzonderlijk aanwezig zijn zonder daarbij noodzakelijk te voldoen aan een eetstoornisdiagnose. Wanneer echter een specifieke configuratie van kenmerken aanwezig is, kan er mogelijks wel een klinische eetstoornisdiagnose gesteld worden volgens de DSM-5. Tijdens de adolescentie wordt opgemerkt dat initiële presentaties van verstoorde eetattitudes en verstoorde eetgedragingen meestal subklinisch zijn zonder daarbij aan alle criteria van een DSM-diagnose te voldoen (Bravender et al., 2007; Bravender et al., 2010). Dit justifieert het gebruik van zowel een dimensionele als categoriale aanpak binnen huidig proefschrift. Longitudinale studies hebben verder aangetoond dat verstoorde eetattitudes en gedragingen stabiel zijn over een periode van 6 maanden (Matton, Goossens, Braet, & Van Durme, 2013), alsook vaak voorspellend

zijn voor het ontwikkelen van een full-blown klinische eetstoornis (Neumark-Sztainer et al., 2006) of obesitas (Kotler, Cohen, Davies, Pine, & Walsh, 2001).

Verstoorde eetattitudes en gedragingen zijn al op vroege leeftijd zichtbaar en lijken gradueel toe te nemen doorheen de adolescentie (Kaneko, Kiriike, Ikenaga, Miyawaki, & Yamagami, 1999). Geslachtsverschillen zijn tevens minder uitgesproken bij jongere adolescenten (Mleeftijd = 11.6 years) dan bij oudere (Mleeftijd = 15.6 years). In een studie van Ackard, Fulkerson, en Neumark-Sztainer (2007) rapporteerde 34% van de jongens 43.5% van de meisjes tussen 9 en 14 jaar tenminste één verstoorde eetattitude of gedraging, zoals een beperking van de energie-inname, het overslaan van maaltijden, eetbuien, zelfopgewekt braken of het nemen van dieet-pillen; terwijl in een oudere doelgroep (14-15 jaar) 56% van de meisjes en 28% van de jongens tenminste één verstoorde eetattitude of gedraging rapporteert. In een studie van Carter, Stewart, en Fairburn (2001) bij 12- tot 14-jarige meisjes, vertoonde 13% van de meisjes zorgen over gewicht, 20% zorgen over lichaamsvormen en 24% lijngedrag op tenminste de helft van de dagen gedurende de afgelopen maand. Opnieuw vormen vrouwelijke adolescente elite-atleten uit bepaalde sportgroepen een nog groter risico. Bij vrouwelijke balletdansers vertoont 29.2% extreem lijngedrag, 9.6% zelfopgewekt braken, en 4.5% maakt gebruik van laxantia (Thomas, Keel, & Heatherton, 2011).

Etiologie van Eetpathologie: De rol van Gehechtheid en Emotieregulatie?

Theoretische Modellen

Conform met het *multi-causaal model* (e.g.; Jansen, 2001) en het *diathese-stress model* (Ingram & Luxton, 2005) kunnen we stellen dat

eetpathologie het resultaat is van een interactie tussen verschillende biologische, culturele, persoonlijkheids-, en familiale factoren. Deze factoren kunnen zowel slaan op kwetsbaarheidsfactoren, uitlokkende factoren en onderhoudende factoren (Klein & Walsh, 2003; Polivy & Herman, 2002). Dit huidig doctoraatsproefschrift zal vooral focussen op gehechtheid als psychologische factor en wil nagaan of onveilige gehechtheid mogelijks beschouwd kan worden als een psychologische kwetsbaarheidsfactor voor het ontwikkelen van verstoorde eetattitudes en gedragingen.

Gehechtheid wordt beschouwd als een motivationeel gedragssysteem met als doel het installeren van een veilig gevoel en veilige basis waarop men steeds kan terugvallen (Bowlby, 1973, 1982). In tijden van fysieke of psychische dreiging wordt het hechtingssysteem geactiveerd. Het kind zal dan hechtingsgedrag (zoals wenen, aanklampen,…) stellen met als doel nabijheid van een ander op te zoeken om het ongemak te doen dalen en zich veilig te voelen. Wanneer veiligheid geïnstalleerd is wordt het hechtingssysteem gedeactiveerd worden, en is er ruimte om op een veilige manier exploratiegedrag te stellen. Veilige gehechtheid kan zodoende enkel ontstaan wanneer de hechtingsfiguur responsief en sensitief is/was in tijden van nood. Zoniet, dan zal onveilige gehechtheid ontstaan.

Volgens de dimensionele visie op gehechtheid kunnen er twee dimensies onderscheiden worden, met name hechtingsangst en hechtingsvermijding. (Brennan, Clark, & Shaver, 1998; Mikulincer & Shaver, 2007a). Hechtingsangst ontstaat wanneer de hechtingsfiguur inconsistent aanwezig en responsief is in tijden van nood en verwijst naar een angst om in de steek gelaten te worden met een daaraan gerelateerde sterke nood aan nabijheid. Hechtingsvermijding ontstaat wanneer de primaire verzorger consistent niet beschikbaar is in tijdens van nood en

verwijst naar het streven naar onafhankelijkheid en het wantrouwen van anderen. (Brennan et al., 1998). De theorie omtrent gehechtheid (Bowbly, 1982) wordt vaak gehanteerd als model om de ontwikkeling van psychopathologie te verklaren, en dit via een mogelijks mediërende rol van emotieregulatie.

Het emotieregulatie-model van gehechtheid (Mikulincer, Shaver, & Pereg, 2003; Shaver & Mikulincer, 2002) toont aan hoe de hechtingskwaliteit van individuen een invloed heeft op de emotieregulatie strategieën die gehanteerd worden in tijden van stress (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). Veilig gehechte individuen (lage scores op beide dimensies) proberen de nabijheid en steun van de hechtingsfiguur op te zoeken, gezien de effectiviteit van dit gedrag in het verleden. Onveilig gehechte individuen (hoog op één of beide dimensies), zullen minder gebruik maken van deze strategie (Dujardin et al., 2016) daar deze niet effectief was in het verleden. Zij zullen bijgevolg alternatieve (maladaptieve) emotieregulatie-strategieën ontwikkelen (Brumariu, 2015) om met fysiek of psychisch ongemak om te gaan. Individuen die hoog scoren op hechtingsangst blijken vaak gebruik te maken van hyperactiverende strategieën, terwijl individuen die hoog scoren op hechtingsvermijding eerder gebruikmaken van deactiverende strategieën. Hyperactivatie verwijst naar herhaaldelijke pogingen om de afstand tot de hechtingsfiguur zo klein mogelijk te houden en omvat volgende kenmerken: aandacht proberen uitlokken door aanklampend/eisend gedrag te stellen, een verhoogde alertheid/focus op hechtingsfiguren en relaties, een verhoogde activatie van negatieve emoties en gedachten, en moeite om los te komen van psychisch leed. Al deze zaken leiden tot een verhoogde ruminatie over alles met hechtingsfiguren en relaties te maken heeft. Deactivatie verwijst naar herhaaldelijke pogingen om de afstand tot

de hechtingsfiguur zo groot mogelijk te houden en wordt gekenmerkt door: vermijden van afhankelijkheid, streven naar onafhankelijkheid, en suppressie van pijnlijke gedachten en herinneringen. (Mikulincer & Shaver, 2003, 2007a, 2007b; Mikulincer et al., 2003; Shaver & Mikulincer, 2002). Zowel hyperactivatie als deactivatie kunnen op korte termijn adaptief zijn om de negatieve gevoelens ten op zichte van de hechtingsfiguur die niet beschikbaar of responsief was te verminderen. Echter, op lange termijn is het gebruik van deze strategieën maladaptief en geassocieerd met psychische problemen (Mikulincer et al., 2003). Het emotieregulatie-model van gehechtheid benadrukt aldus de interveniërende rol van maladaptieve emotieregulatie (i.e. hyperactiverende of deactiverende emotieregulatie strategieën) in de relatie tussen onveilige gehechtheid en psychopathologie.

Naast het emotieregulatie-model van gehechtheid, duidt ook het *interpersoonlijk kwetsbaarheidsmodel* (IPV-model; Rieger et al., 2010; Wilfley et al., 1997) op de mogelijkheid van maladaptieve emotieregulatie als interveniërende factor in de relatie tussen onveilige gehechtheid en psychopathologie, maar dan meer specifiek voor eetpathologie in het bijzonder. Dit model stelt dat verstoringen in de vroege ouder-kind relatie leiden tot het ontwikkelen van onveilige gehechtheid, wat op zijn beurt leidt tot een laag zelfbeeld. Dit zou dan leiden tot een toename van negatief affect in combinatie met de afwezigheid van adequate emotieregulatie strategieën om hier mee om te gaan wat uiteindelijk resulteert in eetpathologie (of ander dysfunctioneel emotie regulerend gedrag). Dit model veronderstelt aldus eveneens dat onveilige gehechtheid gerelateerd is aan een gebrek aan adaptieve emotieregulatie strategieën, i.e. men zou niet in staat zijn om op een adequate manier met stress of negatieve emoties om te gaan, waardoor andere mechanismes ontstaan om de stress tijdelijk te reduceren zoals extreem diëten, eetbuien,

zelfopgewekt braken. Ook al wijst dit model op maladaptieve emotieregulatie als interveniërende factor in de relatie tussen onveilige gehechtheid en eetpathologie, dit model maakt geen onderscheid tussen gehechtheids-dimensies en emotieregulatie strategieën waardoor assumpties over differentiële relaties moeilijk zijn. Binnen de emotieregulatie theorie van gehechtheid (Shaver & Mikulincer, 2002) wordt echter wel een onderscheid gemaakt waardoor binnen huidig doctoraatsproefschrift beide theoretische achtergronden zullen meegenomen worden doorheen de verschillende studies.

Empirische Evidentie

Vroeger onderzoek vond een hogere prevalentie van onveilige gehechtheid bij klinische groepen van volwassenen met een eetstoornis in vergelijking met niet klinische groepen (Okearney, 1996; Tasca & Balfour, 2014; Ward, Ramsay, & Treasure, 2000; Ward, Ramsay, Turnbull, Benedettini, & Treasure, 2000; Zachrisson & Skarderud, 2010), alsook cross-sectionele associaties tussen onveilige gehechtheid en eetpathologie bij volwassenen uit zowel klinische (Broberg, Hjalmers, & Nevonen, 2001; Troisi et al., 2006) als niet klinische groepen (Kiang & Harter, 2006). Het meeste van bovengenoemd onderzoek focust echter op volwassenen en bijgevolg op romantische gehechtheid (en minder op ouderlijke gehechtheid). Onderzoek naar de link tussen ouderlijke gehechtheid en eetpathologie bij vroeg-adolescenten is beperkt volgens een recente review van Jewell et al. (2016). Dit is vrij verrassend daar vroeg-adolescenten juist een hoog risico vertonen op eetpathologie (Klein & Walsh, 2003) en ouderlijke factoren een grote invloed hebben op de ontwikkeling van vroeg-adolescenten (Fiese, 1997; Soenens et al., 2008).

Het beperkt aantal studies dat al uitgevoerd werd naar de relatie tussen ouderlijke gehechtheid en eetpathologie tijdens de pre- en vroeg-

adolescentie vond een associatie tussen onveilige gehechtheid ten aanzien van moeder en de aanwezigheid van zorgen over gewicht en lichaamsvormen bij pre-adolescente meisjes (9 - 12 jaar) (Sharpe et al., 1998;), en bij jongens en meisjes met overgewicht (10 - 17 jaar). Een recente longitudinale studie van Goossens, Braet, Van Durme, Decaluwé, en Bosmans (2012) vond een prospectieve associatie (over een 1-jarige tijdsperiode) tussen onveilige gehechtheid ten aanzien van moeder en adjusted BMI, lijngedrag, zorgen over eten, zorgen over gewicht en zorgen over lichaam bij kinderen uit de algemene populatie (8-11 jaar). Ook al is het mogelijk dat de vader-kind relatie een differentiële impact heeft op de eetpathologie van een kind, toch toonde onderzoek aan dat de moeder-kind relatie een sterkere impact heeft dan de vader-kind relatie (Goossens et al., 2012). De moeder wordt daarenboven ook vanuit de ontwikkelingspsychologie beschouwd als de primaire verzorger met de meeste verantwoordelijkheid en invloed op de eetgewoontes en gedragingen van een kind (Winnicott, 1957). Vandaar dat gehechtheid ten aanzien van moeder de focus vormt binnen huidig doctoraatsproefschrift.

　　　Ook al vond vorig onderzoek consistent een relatie tussen onveilige gehechtheid en eetpathologie bij kinderen, adolescenten en volwassenen (Jewell et al., 2016), de onderzoeksresultaten zijn moeilijk te vergelijken door de verschillende conceptualisaties en operationalisaties van zowel het concept gehechtheid als het concept eetpathologie. Verder is er weinig convergentie over mogelijke specifieke of differentiële relaties tussen specifieke gehechtheidsstijlen en specifieke verstoorde eetattitudes en gedragingen. Sommige studies vonden dat zowel angstige als vermijdende gehechtheid gerelateerd is aan verschillende vormen van eetpathologie (e.g. Ward et al., 2000), anderen vonden wel een specifieke relatie. Sommige vonden dat angstige gehechtheid (e.g. Eggert, Levendosky, & Klump, 2007), anderen dat vermijdende gehechtheid sterker gerelateerd is

aan eetpathologie (e.g. ColeDetke & Kobak, 1996). Nog anderen vonden dat vermijdende gehechtheid meer geassocieerd is met symptomen van AN van het restrictieve type en angstige gehechtheid meer met symptomen van AN van het purgerende type en BN (Candelori & Ciocca, 1998). Alles samengenomen blijkt de associatie tussen angstige gehechtheid en eetpathologie wel meer consistent en sterker (Cash, Theriault, & Annis, 2004; Eggert et al., 2007; Zachrisson & Skarderud, 2010), terwijl er over de rol van vermijdende gehechtheid meer tegenstrijdige resultaten bestaan (Cash et al., 2004; Kiang & Harter, 2006). Daarenboven werd er binnen onderzoek naar eetpathologie zelden een dimensionele visie op gehechtheid gehanteerd, ook al werd aangetoond dat een twee-dimensionele ruimte een betere representatie van gehechtheid reflecteert (Fraley and Waller, 1998). Op basis van de literatuur blijkt slechts één studie van Shanmugam, Jowett, en Meyer (2012) een dimensionele visie op gehechtheid te hanteren en dit bij volwassen atleten. Deze studie vond dat zowel hechtingsangst als hechtingsvermijding geassocieerd was met eetpathologie.

Het vinden van een relatie tussen onveilige gehechtheid en eetpathologie vertelt ons daarenboven niets over mogelijke onderliggende factoren. Gebaseerd op de theoretische proposities van het IPV- model (Wilfley et al., 1997) en het emotieregulatie model van gehechtheid (Shaver & Mikulincer, 2002), zouden we kunnen verwachten dat maladaptieve emotieregulatie mogelijks als interveniërende factor fungeert. Maladaptieve emotieregulatie is herhaaldelijk geassocieerd gebleken met eetpathologie bij zowel adolescenten en volwassenen (Aldao & Nolen-Hoeksema, 2010; Ball & Lee, 2000; Sim & Zeman, 2005), en daarbij gaat het voornamelijk over het gebruik van maladaptieve strategieën (en minder over het niet gebruiken van adaptieve strategieën) (Aldao & Nolen-Hoeksema, 2010; Czaja, Rief, & Hilbert, 2009). Meer

specifiek vonden Aldao en Nolen-Hoeksema (2010) dat het gebruik van ruminatie en suppressie sterker gerelateerd is aan eetpathologie dan het niet gebruiken van cognitieve herstructurering en probleemoplossende vaardigheden. Ruminatie en suppressie zijn concepten die binnen het emotieregulatie model van gehechtheid gezien kan worden als respectievelijk een typische hyperactiverende en deactiverende emotieregulatie strategie.

Ook al hebben vorige studies aangetoond dat zowel onveilige gehechtheid als maladaptieve emotieregulatie (elk afzonderlijk) samenhangt met eetpathologie, toch zijn er weinig studies die onderzochten of emotieregulatie mogelijks als een interveniërende factor fungeert binnen het verband tussen onveilige gehechtheid en eetpathologie, en zodoende zijn er weinig studies die de theoretische assumpties van het IPV-model en het emotieregulatie model van gehechtheid getoetst hebben met eetpathologie als uitkomstmaat. Dit in tegenstelling tot andere psychische problemen. Het emotieregulatie model van gehechtheid werd namelijk reeds cross-sectioneel en longitudinaal bevestigd voor negatieve stemming, interpersoonlijke problemen en depressie bij adolescenten en volwassenen (e.g. Brenning, Soenens, Braet, & Bosmans, 2012; Wei, Vogel, Ku, & Zakalik, 2005). Binnen het eetstoornissendomein is er slechts één empirische studie die het emotieregulatie model van gehechtheid effectief onderzocht, met name een cross-sectionele studie van Tasca et al. (2009) bij volwassen vrouwen gediagnosticeerd met een eetstoornis. Deze studie vond gedeeltelijke evidentie voor het model: hechtingsangst was indirect geassocieerd met eetpathologie via hyperactiverende emotieregulatie strategieën, terwijl hechtingsvermijding enkel direct gelinkt was met eetpathologie (en niet via deactiverende emotieregulatiestrategieen). De resultaten van deze studie zijn veelbelovend maar vragen om replicatie. Het moet onderzocht

worden of dit model ook stand houdt bij jongere leeftijdsgroepen alsook voor verschillende groepen (i.e., binnen de algemene populatie, risico groepen, en diverse klinische groepen).

Conclusie en Onderzoeksvragen

Gebaseerd op bovengenoemde bevindingen kunnen we besluiten dat empirisch onderzoek naar de bruikbaarheid van het IPV-model en het emotieregulatie model van gehechtheid zeldzaam is binnen het eetstoornissendomein, zeker bij adolescenten. Nochtans is het bestuderen van de verbanden tussen onveilige gehechtheid, maladaptieve emotieregulatie en eetpathologie theoretisch en klinisch bijzonder relevant. Theoretisch kan evidentie voor deze modellen inzicht leveren in de ontwikkeling en instandhouding van eetpathologie en kan het onze etiologische kennis verhogen alsook bijdragen aan de ontwikkeling van meer comprehensieve theoretische etiologische modellen. Klinisch kan evidentie voor de modellen implicaties hebben voor toekomstige preventieprogramma's alsook voor behandelprotocollen voor eetpathologie daar beide mogelijks gehechtheid en emotieregulatie zullen moeten meenemen in hun programma.

Binnen huidig doctoraatsproefschrift worden daarom twee onderzoeksvragen vooropgesteld: 1) Kan de veronderstelde associatie tussen onveilige gehechtheid en verstoorde eetattitudes en eetgedragingen teruggevonden worden bij adolescenten en 2) Functioneert maladaptieve emotieregulatie mogelijks als een interveniërende factor binnen dit verband? Beide onderzoeksvragen werden doorheen de zes empirische studies (hoofdstuk 2 tem 7) onderzocht en dit binnen verschillende steekproeven (adolescenten uit de algemene populatie, vrouwelijke adolescente balletdansers en een klinische groep van adolescenten met een diagnose van AN van het restrictieve type) aan de hand van verschillende

designs (cross-sectioneel, longitudinaal en experimenteel design). Hieronder wordt per hoofdstuk kort een overzicht geboden van de rationale alsook van de resultaten en implicaties.

Hoofdstuk 2: Onveilige Gehechtheid en Eetpathologie Tijdens de Vroege Adolescentie: De Rol van Emotieregulatie.

Ook al werd onveilige gehechtheid reeds geassocieerd met versoorde eetattitudes en gedragingen in vroeger onderzoek (eg. Zachrisson & Skarderud, 2010), toch zijn er jammer genoeg een aantal tekormtkomingen op te merken. Vorig onderzoek werd namelijk meestal uitgevoerd bij volwassen steekproeven en de dimensionele visie op gehechtheid werd zelden gehanteerd. Onderzoek gebruik makend van een dimensionele visie op ouderlijke gehechtheid is dus zeldzaam, alsook onderzoek dat nagaat of maladaptieve emotieregulatie een interveniërende rol speelt in het verband tussen onveilige gehechtheid en eetpathologie. Dit maakt het moeilijk om de theoretische asumpties van het IPV-model empirisch te toetsen (Wilfley et al., 1997).

Hoofdstuk 2 poogde in te spelen op bovengenoemde tekortkomingen door de theoretische assumpties van het IPV-model te onderzoeken in een cross-sectionele studie bij vroeg-adolescenten (10 tot 15 jaar) uit de algemene populatie (n = 952, 54.6% female). Echter, alvorens de theoretische assumpties van het model te toetsen, werd in hoofdstuk 2 eerst de prevalentie van verstoorde eetattitudes (zorgen over eten gewicht, lichaamsvorm en eten) en verstoorde eetgedragingen (lijngedrag, eetbuien en compensatiegedrag) onderzocht. Dit aan de hand van de 'Child Eating Disorder Examination-Questionnaire' (ChEDE-Q; Decaluwé & Braet, 1999a), een betrouwbaar en valide alternatief voor het EDE interview (Van Durme et al., 2015).

De resultaten toonden aan dat 25% van de adolescenten subklinisch (1 tot 5 dagen gedurende de afgelopen maand) lijngedrag rapporteerde, en 1.8% klinisch lijngedrag (meer dan de helft van de dagen gedurende de afgelopen maand). Wat zorgen over eten, lichaamsvorm en gewicht betreft, zagen we dat 43.6% subklinisch scoorde op zorgen (1 tot 5 dagen gedurende de afgelopen maand) en 2.4% klinisch (meer dan de helft van de dagen gedurende de afgelopen maand). Wanneer we naar meer extreme gedragingen keken, zagen we dat 14% subklinisch scoorde op objectieve eetbuien (minstens één eetbui gedurende afgelopen maand), en 4.9% klinisch (minstens één eetbui per week gedurende afgelopen maand). Wat purgeren betreft, scoorde 4.9% subklinisch (minstens één keer gedurende afgelopen maand) en 1.6% klinisch (minstens één keer per week gedurende afgelopen maand). Deze prevalentie cijfers liggen duidelijk hoger dan de prevalentie cijfers die gevonden worden voor klinische eetstoornissen (0.8%-3%) tijdens de adolescentie (Stice, Marti, & Rohde, 2013), wat aantoont dat verstoorde eetattitudes en gedragingen tijdens de adolescentie vaak subklinisch zijn, zonder te voldoen aan alle criteria van een klinische eetstoornis (Bravender et al., 2007; Bravender et al., 2010). Dit pleit voor een dimensionele aanpak. Gezien de lage prevalentie van eetbuien en purgeergedrag in huidige steekproef, werden deze variabelen niet meegenomen als afhankelijke variabelen in de analyses met betrekking tot het IPV-model.

Als tweede beoogde huidig hoofdstuk de theoretische assumpties van het IPV-model te toetsen en na te gaan of er een relatie is tussen de onveilige gehechtheidsdimensies enerzijds en verstoorde eetattitudes (zorgen over gewicht, lichaam en eten als gecombineerde maat) en gedragingen (lijngedrag) anderzijds en of deze relatie mogelijks gemedieerd wordt door maladaptieve emotieregulatie. Een dimensionele visie op ouderlijke gehechtheid werd gehanteerd door gebruik te maken

van the Experiences of Close Relationships-Revised-Child Version (ECR-R-C; Brenning, Soenens, Braet, & Bosmans, 2011).

De resultaten toonden aan dat zowel hechtingsangst als hechtingsvermijding ten aanzien van moeder gerelateerd is aan zowel lijngedrag als zorgen (over eten, lichaam en gewicht). De resultaten toonden verder aan dat elk van deze associaties partieel gemedieerd werd door maladaptieve emotieregulatie na controle voor geslacht, leeftijd, adjusted BMI en puberteitsstadium. Deze resultaten lijken in lijn te zijn met de theoretische assumpties van het IPV-model (Wilfley et al., 1997).

Hoofdstuk 3: De Rol van Gehechtheid en Maladaptieve Emotieregulatie Strategieën bij de ontwikkeling van Boulimiesymptomen bij Adolescenten

Ondanks het feit dat het IPV-model (Rieger et al., 2010; Wilfley et al., 1997) een interveniërende rol toekent aan maladaptieve emotieregulatie binnen de relatie tussen onveilige gehechtheid en eetpathologie, maakt dit model helaas geen onderverdeling op vlak van gehechtheidsdimensies en maladaptieve emotieregulatie strategieën waardoor het vinden van specifieke of differentiële relaties niet mogelijk was. Het onderzoeken en vinden van specifieke of differentiële relaties is echter relevant daar het mogelijks klinische implicaties heeft voor de behandeling van eetpathologie, i.e. verschillende technieken kunnen nodig zijn afhankelijk van de gehechtheidsconfiguratie en de gerelateerde emotieregulatie strategieën van een individu. Om dergelijke specifieke relaties te onderzoeken kan het emotieregulatie model van gehechtheid (Shaver & Mikulincer, 2002) gehanteerd worden dat vooropstelt dat mensen andere emotieregulatie strategieën ontwikkelen op basis van hun gehechtheidsconfiguratie. Veilig gehechte individuen (lage scores op beide dimensies) proberen de nabijheid en steun van de hechtingsfiguur op

te zoeken, gezien de effectiviteit van dit gedrag in het verleden. Onveilig gehechte individuen (hoog op één of beide dimensies), zullen minder gebruik maken van deze strategie (Dujardin et al., 2016) daar deze niet effectief was in het verleden. Zij zullen bijgevolg alternatieve (maladaptieve) emotieregulatie-strategieën ontwikkelen (Brumariu, 2015) om met fysiek of psychisch ongemak om te gaan. Individuen die hoog scoren op hechtingsangst blijken vaak gebruik te maken van hyperactiverende strategieën, terwijl individuen die hoog scoren op hechtingsvermijding eerder gebruikmaken van deactiverende strategieën. Deze maladaptieve emotieregulatie strategieën kunnen op termijn leiden tot de ontwikkeling van psychopathologie zoals bijvoorbeeld eetpathologie.

Aangezien er slechts één cross-sectionele studie bestaat die het model reeds onderzocht bij een klinische groep van volwassen vrouwen met een eetstoornis (Tasca et al., 2009), beoogde hoofdstuk 3 het model te toetsen aan de hand van een longitudinale studie bij adolescenten uit de algemene populatie (N = 397; Mage = 14.02). Hoofdstuk 3 omvat een longitudinale studie, met name een 1-jarige follow-up studie uitgevoerd op de oudste leeftijdscohorte van hoofdstuk 2 waardoor de gemiddelde leeftijd steeg tot 14.19. Verder werd binnen deze studie de Eating Disorder Inventory-II (EDI-II; Garner, 1991; Van Strien, 2002) gebruikt om boulimiesymptomen te meten (eetbuien en/of purgeergedrag) in tegenstelling tot de ChEDE-Q in hoofdstuk 2, waarmee een meer dimensionele aanpak werd beoogd met een focus op de ernst van symptomen eerder dan op de loutere aan- of afwezigheid van een symptoom.

De resultaten van hoofdstuk 3 leverden longitudinale evidentie voor het emotieregulatie-model van gehechtheid bij de huidige steekproef van adolescenten uit de algemene populatie. Hogere niveaus van

hechtingsangst op baseline niveau waren geassocieerd met meer boulimiesymptomen 1 jaar later en dit via een toegenomen gebruik van de hyperactiverende emotieregulatie strategie 'rumineren' (indirect effect). Hogere niveaus van hechtingsvermijding op baseline niveau waren op hun beurt eveneens geassocieerd met meer boulimiesymptomen 1 jaar later en dit via een toegenomen gebruik van de deactiverende emotieregulatie strategie 'emotionele controle' (partiële mediatie). Dit alles na controle voor geslacht, adjusted BMI en boulimiesymptomen op tijdstip 1.

Hoofdstuk 4: Adolescente Esthetische Atleten: Een Risicogroep voor Eetpathologie?

Zoals hierboven reeds vermeld vertonen vrouwelijke atleten uit esthetische sporten, i.e. sporten waarbij een lichaam lichaamsgewicht en vetpercentage van belang zijn voor prestatie en esthetische redenen, een groot risico om eetpathologie te ontwikkelen (eg. Sundgot-Borgen & Torstveit, 2010; De Bruin, 2007; Kong & Harris, 2015). Wanneer we echter studies met betrekking tot eetpathologie bij atleten met elkaar vergelijken zijn er grote discrepanties op te merken op vlak van de gerapporteerde prevalentiecijfers van verstoorde eetattitudes en gedragingen bij atleten. Dit is mogelijks te wijten aan verschillen over de studies heen in assessment instrumenten, kenmerken van de atletenpopulatie en de gehanteerde definitie van eetpathologie waardoor vergelijking moeilijk is (Beals & Meyer, 2007; Sundgot-Borgen, 1999, 2002, 2004; Sundgot-Borgen & Torstveit, 2004). Verder bestond er nog geen informatie over verstoorde eetattitudes en gedragingen bij Vlaamse esthetische atleten en wisten we dus ook niet of zij effectief een hoog risico lopen om eetpathologie te ontwikkelen.

Hoofdstuk 4 beoogde daarom na te gaan of adolescente esthetische elite-atleten, i.e. kunstschaatsers en balletdansers (N = 68; Mage = 14.29),

meer verstoorde eetattitudes en gedragingen vertonen dan adolescenten uit de algemene populatie. De resultaten toonden aan dat vrouwelijke esthetsche atleten meer verstoorde eetattitudes, i.e. zorgen over gewicht en lichaamsvormen; alsook meer verstoorde eetgedragingen, i.e. lijgedrag, eetbuien en compensatiegedrag, vertoonden in vergelijking met een vrouwelijke adolescente normgroep uit de algemene populatie. Wat mannelijke esthetische atleten betreft, werd geen verschil gevonden in vergelijking met een mannelijke adolescente normgroep uit de algemene populatie.

Hoofdstuk 5: Gehechtheid en Boulimiesymptomen in Elite Adolescente Balletdanseressen: Een Interveniërende rol van Maladaptieve Emotieregulatie?

Hoofdstuk 4 toonde aan dat vrouwelijke adolescente esthetische atleten een hoog risico lopen om eetpathologie te ontwikkelen. Hoofdstuk 5 focust daarom specifiek op vrouwelijke adolescente esthetische atleten, meer bepaald op balletdanseressen. Onderzoek onderscheidt een aantal sport-specifieke risicofactoren voor eetpathologie bij atleten, met name sportdiscipline, sportniveau, en de aanpak/stijl van de coach. Nochtans ontwikkelen niet alle atleten die met dergelijke risicofactoren in aanraking komen eetpathologie. Sommige atleten blijken aldus meer kwetsbaar te zijn dan anderen. Meer informatie over de invloed van algemene risicofactoren op de ontwikkeling en instandhouding van eetpathologie bij atleten zou nuttig zijn om een 'dual-pathway' etiologisch model op te kunnen stellen voor eetpathologie bij atleten, waarbij zowel sport-specifieke alsook algemene risicofactoren geïntegreerd worden. Dit zal bijgevolg ook leiden tot de ontwikkeling van meer geschikte preventie en behandelprogramma's voor specifieke atletengroepen.

Hoofdstuk 5 beoogde longitudinaal de rol van gehechtheid en emotieregulatie na te gaan op de toename van boulimiesymptomen bij vrouwelijke adolescente balletdansers (N = 78; Mage = 14.19) over een 1-jarige periode. Met andere woorden, deze studie vormde een toets van de theoretische assumpties van het emotieregulatie-model van gehechtheid bij vrouwelijke balletdansers en had als doel na te gaan of het model gerepliceerd kan worden in deze risicogroep en wou dus specifiek nagaan of de twee hechtingsdimensies (hechtingsangst en hechtingsvermijding) een differentiële impact hebben op de toename van boulimiesymptomen via specifieke onderliggende maladaptieve emotieregulatie strategieën (hyperactivatie en deactivatie) bij adolescente balletdanseressen. De resultaten van hoofdstuk 5 leverden gedeeltelijke evidentie voor het emotieregulatie-model van gehechtheid. Hogere niveaus van hechtingsangst op baseline niveau waren geassocieerd met meer boulimiesymptomen 1 jaar later en dit via een toegenomen gebruik van de hyperactiverende emotieregulatie strategie 'rumineren' (mediation). Hogere niveaus van hechtingsvermijding op baseline niveau waren echter niet geassocieerd met boulimiesymptomen 1 jaar later en er was ook geen interveniërende rol van de deactiverende emotieregulatie strategie 'emotionele controle' terug te vinden. Bij deze analyses werd gecontroleerd voor boulimiesymptomen op tijdstip 1. Deze resultaten wijken ietwat of van de resultaten uit de algemene populatie uit hoofdstuk 3.

Hoofdstuk 6: De Relatie tussen Gehechtheid, Emotieregulatie en Eetstoornissymptomen bij Adolescenten met Anorexia Nervosa

De vorige hoofdstukken gaven inzicht in de rol van onveilige gehechtheid en maladaptieve emotieregulatie bij de toename van

verstoorde eetattitudes (zorgen over gewicht, lichaamsvormen en eten) en eetgedragingen (lijngedrag en boulimiesymptomen) zonder dat hierbij aan de diagnose van een klinische eetstoornis voldaan was. Dit leverde bijgevolg informatie op omtrent de ontwikkeling van subklinische eetpathologie. De vraag blijft echter of de theoretisch assumpties van het emotieregulatie-model van gehechtheid ook standhouden voor een klinische groep van adolescente eetstoornispatiënten en of dezelfde associaties gevonden kunnen worden en of die mogelijks sterker zijn binnen een klinische groep. Dit is van belang daar dit klinische implicaties kan hebben voor de behandeling. Hoofdstuk 6 onderzocht een groep van vrouwelijke adolescenten met Anorexia Nervosa van het restrictieve type (AN-R). De focus op vrouwelijke adolescenten met AN-R had verscheidene redenen. Ten eerste is AN-R de meest voorkomende eetstoornis binnen de gespecialiseerde eetstoornissencentra in België (39.5%), waarbij de meeste patiënten jonger zijn dan 20 jaar (62.5%) (Janssens, 2014). Ten tweede is de vrouw: man ratio voor AN-R 10:1 waardoor de meeste patiënten vrouwelijk zijn (APA, 2013) en ten derde leidt AN-R tot ernstige medische complicatie door de extreme beperking van de energie-inname. Bovendien zijn de medische gevolgen van AN-R vaak ernstiger en moeilijker omkeerbaar tijdens de adolescentie dan op latere leeftijd (Bravender et al., 2007). Deze bevindingen, in combinatie met de lage herstelcijfers voor AN-R, tonen het belang aan van een betere etiologische kennis over AN-R tijdens de adolescentie daar dit kan bijdragen tot het ontwikkelen van meer adequate behandelprogramma's wat op zijn beurt de prognose mogelijks kan verbeteren.

Hoofdstuk 6 onderzocht meer specifiek de associaties tussen onveilige gehechtheid, maladaptieve emotieregulatie, en de kernsymptomen van AN-R (zorgen en lijngedrag) bij vrouwelijke adolescenten gediagnosticeerd met AN-R (N = 52; Mage = 14.38). Dit is

vernieuwend daar er slechts één studie bestaat die de theoretische assumpties van het emotieregulatie-model reeds naging in een klinische groep van eetstoornispatiënten, en dit bij volwassen vrouwen (Tasca et al., 2009). Deze studie vond gedeeltelijke evidentie voor het model: hechtingsangst was indirect geassocieerd met eetpathologie via hyperactiverende emotieregulatie strategieën, terwijl hechtingsvermijding enkel direct gelinkt was met eetpathologie (en niet via deactiverende emotieregulatie strategieën). Verdere studies hieromtrent ontbreken, zeker bij adolescenten, ook al kan dit mogelijks duidelijke richtlijnen opleveren voor de behandeling van AN-R daar dit kan aantonen dat er andere technieken dienen gehanteerd te worden afhankelijk van hoe iemand scoort op de hechtingsdimensies en de daaraan gerelateerde maladaptieve emotieregulatie strategieën. De resultaten van hoofdstuk 6 leverden gedeeltelijke evidentie voor het model: hechtingsangst was gerelateerd aan zorgen over gewicht, lichaamsvormen en eten via ruminatie (partiële mediatie) terwijl hechtingsvermijding gerelateerd was aan dergelijke zorgen via emotionele controle (indirect effect). In tegenstelling tot de verwachting hing lijngedrag niet significant samen met de onveilige hechtingsdimensies en de maladaptieve emotieregulatie strategieën. Dit is onverwacht daar 'zorgen' en lijngedrag de kernsymptomen zijn van AN-R en sterk gecorreleerd waren binnen de huidige studie.

Hoofdstuk 7: Wordt de Associatie tussen Hechtingsangst en Lichaamsontevredenheid Gemodereerd door Affect. Een Experimentele Studie met de Trier Social Stress Test.

Alle voorgaande hoofdstukken zijn gebaseerd op zelf gerapporteerde data betreffende emotieregulatie. De gehanteerde designs waren daarenboven cross-sectioneel of longitudinaal. Tot op heden bestaan er geen experimentele studies die onderzoeken of de relatie tussen

onveilige gehechtheid en verstoorde eetattitudes bij kinderen en vroeg-adolescenten mogelijks gemodereerd wordt door veranderingen in affect. Vroeger onderzoek naar emotieregulatie bij eetpathologie focust daarenboven hoofdzakelijk op hoe veranderingen in negatief affect geassocieerd zijn met eetpathologie (waaronder lichaamsontevredenheid). Meer onderzoek is dus nodig om na te gaan of veranderingen in positief affect mogelijks ook een effect hebben op eetpathologie (Haedt-Matt & Keel, 2011).

Om die reden onderzocht hoofdstuk 7 of veranderingen in state affect (negatief en/of positief) de associatie tussen hechtingsangst en lichaamsontevredenheid mogelijks modereerden. De studie ging meer bepaald na of hechtingsangst de lichaamsontevredenheid van kinderen en vroeg-adolescenten verhoogt onder stresserende omstandigheden (N = 81; Mage = 11.74). De veranderingen in state affect werden geïnduceerd door blootstelling aan een interpersoonlijke stressor. Hiervoor werd gebruik gemaakt van het gestandaardiseerd protocol van de Trier Social Stress Test voor kinderen (TSST-C; Kirschbaum, Pirke, & Hellhammer, 1993). De resultaten van hoofdstuk 7 toonden aan dat een daling in positief affect na blootstelling aan de TSST-C (interpersoonlijke stressor) leidt tot een daling van de lichaamstevredenheid bij kinderen en vroeg adolescenten, maar enkel bij deze kinderen die hoog scoorden op hechtingsangst, en dus niet bij dezen die laag scoorden op hechtingsangst. Deze bevinding bouwt voort op de resultaten van vorige studies en hoofdstukken waarbij eveneens een positieve associatie tussen onveilige gehechtheid en verstoorde eetattitudes en eetgedragingen gevonden werd bij kinderen en adolescenten (Jewell et al., 2016). De resultaten van dit hoofdstuk kunnen mogelijks opnieuw verklaard worden door het emotieregulatie-model van gehechtheid.

Hoofdstuk 8: Algemene Discussie

In het afsluitende hoofdstuk worden de voornaamste resultaten die voortvloeien uit de zes studies samengevat en geïntegreerd. Daarnaast wordt ingegaan op de implicaties die resulteren uit huidig doctoraatsproefschrift en worden de sterktes, beperkingen en suggesties voor verder onderzoek bediscussieerd. Hieronder wordt ingegaan op de belangrijkste resultaten over de hoofdstukken heen, alsook op de voornaamste klinische implicaties.

Ten eerste werd over de hoofdstukken heen *een verband gevonden tussen onveilige gehechtheid en verstoorde eetattitudes en eetgedragingen.* Nochtans zijn er ook een aantal discrepanties op te merken doorheen huidig doctoraatsproefschrift. Bij vroeg-adolescenten uit de algemene populatie (hoofdstuk 2), waren zowel hechtingsangst als hechtingsvermijding cross-sectioneel gassocieerd met zorgen (over gewicht, lichaamsvormen en eten) en lijngedrag. In de longitudinale studie bij de oudste leeftijdscohorte van de adolescenten uit hoofdstuk 2 (hoofdstuk 3) was er enkel een direct effect van hechtingsvermijding op boulimiesymptomen 1 jaar later, terwijl er in de risicogroep van vrouwelijke adolescente balletdansers (hoofdstuk 5) enkel een direct effect was van hechtingsangst op boulimiesymptomen 1 jaar later, beide na controle voor boulimiesymptomen op tijdstip 1. In een klinische groep van vrouwelijke adolescenten met een diagnose van AN-R (hoofdstuk 6) bleek enkel hechtingsangst gerelateerd aan 'zorgen', de kernpathologie van AN-R (maar niet aan lijngedrag).

De associaties tussen de gehechtheidsdimensies en eetpathologie bleken aldus verschillend naargelang de steekproef die men onderzocht. Binnen de algemene populatie bleken beide gehechtheidsdimensies, en bij boulimiesymptomen voornamelijk hechtingsvermijding, een rol te spelen bij de ontwikkeling/toename van symptomen terwijl bij de risico- en

klinische groep hechtingsangst een meer prominente rol bleek te spelen. Deze laatste bevinding is consistent met vorig onderzoek (e.g. Cash et al., 2004; Eggert et al., 2007; Zachrisson & Skarderud, 2010) en kan mogelijks verklaard worden door de kenmerken van de gehechtheidsdimensies. Hoge niveaus van hechtingsangst hangen samen met een sterke nood aan bevestiging als een gevolg van de aanwezige angst om in te steek gelaten/verworpen te worden. Dit kan ervoor zorgen dat adolescenten heel gevoelig zijn voor socioculturele invloeden met betrekking tot het fysieke uiterlijk (een gekende risicofactor voor eetpathologie). Dit in contrast tot personen met hoge scores op hechtingsvermijding die mogelijks minder gevoelig zijn voor externe invloeden daar zij zoveel mogelijk afstand proberen nemen van anderen Collins & Read, 1990). Het verschil in bevindingen (i.e. het enkel vinden van een verband voor hechtingsangst bij de hoofdstuk 5 en 6) kan echter ook een artefact zijn van de kenmerken van de studie en de steekproef. Bij atleten is hechtingsangst mogelijks meer predictief voor psychologische problemen dan hechtingsvermijding, daar hechtingsvermijding blijkt samen te gaan met persoonlijkheidskenmerken die gerelateerd zijn of gewenst zijn voor een goede sportprestatie zoals zelfstandigheid en onderdrukken van negatieve emoties en pijn. Bij patiënten is het mogelijk dat adolescenten die hoog scoren op hechtingsvermijding initieel minder geneigd zijn om hulp te zoeken of deel te nemen aan huidig onderzoek, waardoor ze mogelijks ondergerepreseerd waren. Wanneer de symptomen doorheen de jaren echter toenemen en het functioneren serieus ondermijnd wordt, belanden ze uiteindelijk mogelijks wel in een eetstoornissenutit (vrijwillig of onvrijwillig). Ditt kan verklaren waarom vorig onderzoek wel een verband vond tussen hechtingsvermijding en AN-R in een oudere sample. Bij de algemene populatie is dergelijk artefact afwezig daar

volledige klassengroepen deelnamen aan de studies en de scores op de gehechtheidsdimensies aldus mogelijks meer divers waren.

Ten tweede vertelt huidig doctoraatsproefschrift ook iets meer over *de rol van emotieregulatie binnen het verband tussen onveilige gehechtheid en eetpathologie*. Huidig doctoraat levert namelijk cross-sectionele evidentie voor het IPV-model en het emotieregulatie-model van gehechtheid bij het verklaren van zorgen (over gewicht, lichaamsvormen en eten) en dit bij zowel adolescenten uit de algemene populatie (hoofdstuk 2) als bij een klinische groep van vrouwelijke adolescenten met een diagnose van AN-R (hoofdstuk 6). Binnen de algemene populatie werd het IPV-model eveneens cross-sectioneel bevestigd voor lijngedrag, wat niet het geval was bij de klinische studie. In lijn met de cross-sectionele resultaten van hoofdstuk 2 en 6, levert hoofdstuk 7 tevens experimentele evidentie voor de onderliggende rol van emotieregulatie. Deze studie toont namelijk aan de veranderingen in positief (state) affect na exposure aan een interpersoonlijke stressor (TSST-C) de associatie tussen hechtingsangst en lichaamsontevredenheid bij kinderen en vroeg-adolescenten modereren. Verder werd er longitudinale evidentie gevonden voor ruminatie (hyperactiverende emotieregulatie strategie) als interveniërende variabele in het verband tussen hechtingsangst en boulimiesymptomen en dit zowel bij adolescenten uit de algemene populatie (hoofstuk 3) als bij vrouwelijke adolescente balletdansers (hoofdstuk 5). Met betrekking tot de interveniërende rol van emotionele controle (deactiverende emotieregulatie strategie) in het verband tussen hechtingsvermijding en boulimiesymptomen werden verschillende resultaten bekomen. Binnen de algemene populatie werd het veronderstelde verband gevonden, terwijl dit bij de risico-groep niet het geval was.

Over de verschillende hoofdstukken van huidig doctoraatsproefschrift heen blijkt het effect van hechtingsangst op eetpathologie (via hyperactivatie 'ruminatie') het sterkst te zijn over de verschillende adolescentengroepen heen. Dit kan mogelijks opnieuw verklaard worden door de kenmerken die eigen zijn aan de gehechtheidsdimensies (zie bovengenoemde verklaring). Wat hechtingsvermijding betreft, vonden slechts enkele hoofdstukken een effect van hechtingsvermijding via emotionele controle. Dit zou, net zoals hierboven vermeld, kunnen verklaard worden door kenmerken eigen aan de studie of steekproeven (hoofdstuk 5 en 6). Een andere mogelijkheid is uiteraard dat er, conform met de veronderstellingen van het multi-causaal model en diathese-stress model, mogelijks andere mediatoren of moderateren een rol spelen bij het bepalen of hechtingsvermijding al dan niet een impact heeft op eetpathologie zoals bepaalde genetische, biologische (e.g. temperament), sociale (e.g. social comparison), en/of andere psychologische variabelen (e.g. personality, perfectionism) (e.g. Jansen, 2001; Ingram & Luxton, 2005).

Doorheen de hoofdstukken werd duidelijk dat zowel onveilige gehechtheid als maladaptieve emotieregulatie als psychologische risicofactoren (kwetsbaarheden) kunnen beschouwd worden. Dit heeft naast theoretische implicaties omtrent etiologische kennis met betrekking tot eetpathologie, eveneens *klinische implicaties*. Deze klinische implicaties hebben betrekking op zowel detectie, preventie als behandeling van eetpathologie. In hoofdstuk 2, 3, 4 en 5 werd duidelijk dat verstoorde eetattitudes en eetgedragingen vaak voorkomen bij vroeg-adolescenten, en nog vaker bij bepaalde risicogroepen. Dergelijke problemen blijken daarenboven relatief stabiel en vaak predictief voor de ontwikkeling van full-blown eetstoornissen (Goossens et al., 2012; Kotler, Cohen, Davies, Pine, & Walsh, 2001; Matton et al., 2013; Neumark-Sztainer, Paxton,

Hannan, Haines, & Story, 2006; Neumark-Sztainer et al., 2006). Dit alles benadrukt duidelijk het belang van vroeg-detectie. Screening voor eetpathologie kan gebeuren op basis van de Child Eating Disorder Examination-Questionnaire (Decaluwé & Braet, 1999b), een betrouwbaar en valide instrument dat daarenboven een waardig alternatief vormt voor de Child Eating Disorder Examination Interview (BryantWaugh, Cooper, Taylor, & Lask, 1996; Decaluwé & Braet, 1999b; Van Durme, Craeynest, Braet, & Goossens, 2015). De ChEDE-Q kan gebruikt worden als primair screeningsinstrument bij adolescenten. Wanneer klinische scores opgemerkt worden op de vragenlijnst, kan het ChEDE interview afgenomen worden om vals negatieven uit te sluiten en een vroege start van de behandeling te garanderen (indien nodig). Vroeg-detectie van eetpathologie is aldus belangrijk, zeker omdat dit leidt tot vroege interventie en behandeling wat gerelateerd is aan een betere prognose. (Steinhausen, 2002, 2009).

Daarnaast zijn preventieprogramma's mogelijks nog belangrijker en meer kosteneffectief voor zowel het individu en de maatschappij daar zij de ontwikkeling van eetpathologie mogelijks zelfs kunnen tegengaan in adolescenten die een hoog risico lopen op eetpathologie. Preventieprogramma's moeten zich richten op de voorlopers/risicofactoren van eetpathologie. Gebaseerd op de resultaten van hoofdstuk 2, 3, 5 en 7, en indien gerepliceerd in toekomstig onderzoek, dan zullen de huidige preventieprogramma's in de toekomst ook rekening moeten houden met de gehechtheidsconfiguratie van een persoon en de differentiële impact die dit mogelijks heeft op de emotieregulatie strategieën die gehanteerd worden. Gebaseerd op de resultaten van huidig doctoraat en de bestaande evidentie omtrent de rol van maladapatieve emotieregulatie bij de ontwikkeling van eetpathologie (Aldao & Nolen-Hoeksema, 2010; Ball & Lee, 2000; Sim & Zeman, 2005), zullen preventieprogramma's

adolescenten adequate emotieregulatie vaardigheden moeten aanleren zodat ze leren om adequaat om te gaan met stress en negatieve emoties. Dit maakt hen mogelijks minder kwetsbaar om psychische problemen te ontwikkelen. Daarnaast zal het mogelijks nodig zijn om de moeders eveneens te betrekken bij de preventieprogramma's. Zij kunnen baat hebben bij psycho-educatie omtrent het belang van een kwalitatieve ouder-kind relatie voor de mentale gezondheid van hun kind. Verder kunnen ze opvoedingvaardigheden aangeleerd krijgen waarbij ze leren reponsief en sensitief ouderlijk gedrag te stellen. Dit is een noodzakelijke basis om als een veilige basis voor het kind te fungeren en een veilige gehechtheid te installeren.

Naast de implicaties voor vroeg-detectie en preventie van eetpathologie, levert huidig doctoraatsproefschrift mogelijks ook implicaties voor de behandeling van eetpathologie bij adolescenten. Gebaseerd op de resultaten van hoofdstuk 6 bij een klinische groep van adolescenten met AN van het restrictieve type, kan gesteld worden dat wanneer iemand zich aanmeldt met een eetprobleem, dat de gehechtheidsconfiguratie alsook de gehanteerde emotieregulatie strategieën allereerst betrouwbaar in kaart dienen gebracht te worden (bijvoorbeeld aan de hand van de ECR-RC en de FEEL-KJ). Op basis van die resultaten kan CBT-E (Enhanced Cognitive Behavioral Therapy for Eating Disorders), de meest evidence-based behandeling voor eetstoornissen (Fairburn, 2008), mogelijks aangevuld worden met een individuele aanpak met betrekking tot gehechtheid en emotieregulatie. Binnen de CBT-E behandeling wordt reeds aandacht besteed aan factoren die mogelijks een instandhoudende rol spelen, zoals interpersoonlijke problemen en 'mood' intolerantie. Interpersoonlijke problemen kunnen mogelijks slaan op onveilige gehechtheid en 'mood' intolerantie is gerelateerd aan emotieregulatie. De technieken die voorgesteld worden

binnen de CBT-E behandeling met betrekking tot het aanpakken van deze probelemen, kunnen aldus aangewend worden tijdens de behandeling. Dit zal echter niet altijd volstaan, waardoor andere technieken eveneens dienen aangewend te worden. Wanneer onveilige gehechtheid aanwezig is tijdens de adolescentie, kan men gebruik maken van Family-Based Therapy (FBT; Lock & le Grange, 2005) of Attachment-Based Family Therapy (ABFT; Diamond, Siqueland, & Diamond, 2003; Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002) om de moeder-kind relatie te verbeteren en aldus de gehechtheid te versterken. Naast ABFT and FBT, kan men ook gebruiken maken van Interpersonal Psychotherapy voor adolescenten (IPT; Tanofsky-Kraff et al., 2007). Dat mensen andere emotieregulatie strategieën hanteren op basis van hun gehechtsheidsconfiguratie dient eveneens gereflecteerd en opgenomen te worden binnen de behandeling. Bij individuen die hoog scoren op hechtingsangst, zal de focus dienen te liggen op het aanleren van meer adequate manieren om om te gaan met negatieve emoties (anders dan hun hyperactiverende strategieën), waar bij individuen die hoog scoren op hechtingsvermijding de focus dient te liggen op blootstelling aan emoties en interpersoonlijke nabijheid om zo emoties te leren toleren en benoemen eerder dan direct emotieregulatie strategieën aan te leren (Tasca et al., 2009).

Conclusie

Huidig proefschrift verschaft voorlopige (gedeeltelijke) evidentie voor het IPV-model en het emotieregulatie model van gehechtheid, en aldus voor de rol van onveilige gehechtheid en gerelateerde maladaptieve emotieregulatie strategieën, bij het ontstaan/instandhouding van eetpathologie bij adolescenten. Dit werd zowel cross-sectioneel, longitudinaal en experimenteel bekeken binnen diverse samples van

adolescenten, met name adolescenten uit de algemene populatie, adolescenten uit een risicogroep (esthetische atletes), en adolescenten uit een klinische groep (adolescente meisjes met AN van het restrictieve type).

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Data Storage Fact Sheets

Data Storage Fact Sheet

Name/identifier study: Chapter 1 PhD Kim Van Durme: Assessment ChEDE-Q
Author: Kim Van Durme
Date: 26/07/2016

1. Contact details

===

1a. Main researcher

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1b. Responsible Staff Member (ZAP)

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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

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3. Information about the files that have been stored

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3a. Raw data

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- [ ] all members of the research group

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- [x] other (specify): IT worker Steven Vandenhole

3b. Other files

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Data Storage Fact Sheet

Name/identifier study: Chapter 2 PhD Kim Van Durme
Author: Kim Van Durme
Date: 26/07/2016

1. Contact details
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1a. Main researcher

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Data Storage Fact Sheet

Name/identifier study: Chapter 3 PhD Kim Van Durme
Author: Kim Van Durme
Date: 26/07/2016

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2. Information about the datasets to which this sheet applies

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* Reference of the publication in which the datasets are reported: Van Durme, K., Goossens, L., Bosmans, G., & Braet, C. (submitted). The role of attachment and maladaptive emotion regulation strategies in the development of bulimic symptoms in adolescents. Manuscript submitted for publication.

* 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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3b. Other files

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Data Storage Fact Sheet

Name/identifier study: Chapter 4 PhD Kim Van Durme
Author: Kim Van Durme
Date: 26/07/2016

1. Contact details
===
1a. Main researcher

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2. Information about the datasets to which this sheet applies

==

* Reference of the publication in which the datasets are reported: Van Durme, K., Goossens, L., & Braet, C. (2012). Adolescent aesthetic athletes: a group at risk for eating pathology? Eating Behaviors, 13, 119-122, doi: 10.1016/j.eatbeh.2011.11.002.

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Data Storage Fact Sheet

Name/identifier study: Chapter 5 PhD Kim Van Durme

Author: Kim Van Durme

Date: 26/07/2016

1. Contact details

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1b. Responsible Staff Member (ZAP)

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Data Storage Fact Sheet

Name/identifier study: Chapter 6 PhD Kim Van Durme
Author: Kim Van Durme
Date: 26/07/2016

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1a. Main researcher

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1b. Responsible Staff Member (ZAP)

- name: Prof. Dr. Lien Goossens and Prof Dr. Caroline Braet
- address: Henri Dunantlaan 2, 9000 Gent
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2. Information about the datasets to which this sheet applies

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* Reference of the publication in which the datasets are reported: Van Durme, K., Braet, C., Van den Eede, U., Böhler, S., Lampo, A., Van Hooren, F., Simons, A., & Goossens, L. (submitted) The relationship between attachment, emotion regulation and eating disorder symptoms in adolescents with restrictive Anorexia Nervosa? Manuscript submitted for publication.

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Data Storage Fact Sheet

Name/identifier study: Chapter 7 PhD Kim Van Durme
Author: Kim Van Durme
Date: 26/07/2016

1. Contact details

==
1a. Main researcher

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