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Childhood emotional maltreatment and disordered eating in a general adolescent population. Does emotion regulation play a mediating role?

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Abstract

Objectives: To determine if emotion regulation mediates the link between emotional maltreatment and disordered eating behaviour in a community sample of adolescents.

Design and method: Participants were 222 secondary school pupils (aged 14-18 years) from a state high school in a rural area in Scotland. Standardised questionnaire measures were used to gather data on history of emotional abuse and neglect using the Childhood Trauma Questionnaire (CTQ), emotion regulation strategies using the Regulation of Emotions Questionnaire (REQ) and subclinical disordered eating behaviour using the Eating Attitudes Test (EAT-26) and the Dutch Eating Behaviour Questionnaire (DEBQ). Pearson correlation and multiple mediation analyses were conducted to determine significant relationships and to identify whether dysfunctional emotion regulation was a mediator of the relationship between emotional maltreatment and disordered eating behaviour.

Results: Multiple mediation analyses found both emotional abuse and emotional neglect to have a significant direct relationship with EAT-26 total score and DEBQ restraint scores - mediated by internal dysfunctional emotion regulation (with external dysfunctional emotion regulation also being a significant mediator in the analysis with emotional neglect and EAT-26 total). The direct relationship between emotional abuse/neglect and DEBQ emotional eating scores was non-significant, although a specific indirect effect through internal dysfunctional emotion regulation was observed.

Conclusions: To the best of the author's knowledge, this is the first study which has looked at history of emotional maltreatment and disordered eating behaviour focussing on the influence of emotion regulation in particular. Results were indicative of significant indirect effects between emotional abuse and neglect and all measures of disordered eating through internal dysfunctional emotion regulation. Findings suggest the role of emotion regulation warrants further study in the research on childhood maltreatment and disordered eating behaviour.

Chapter 1: Introduction

Over the last 30 years, eating disorders have received much research interest, with some researchers claiming that significant progress has been made (e.g. Caparrotta & Ghaffari, 2006). Others argue, however, that, partly due to eating disorders only emerging as a serious problem from around the 1970's, the research base is still some way from disentangling the different risk factors in understanding the complex aetiology (Polivy & Herman, 2002). While some risk factors, such as body dissatisfaction are quite clearly established (Killen *et al.*, 1996; Stice & Whitenden, 2002), there is still a great deal more to be learned. Achieving greater understanding of aetiological influences on children and young people seems especially important, given that the age of onset for eating disorders is typically during adolescence and early adulthood (Lewinsohn *et al.*, 2000).

Behaviours observed in those with clinical eating disorders –dieting, body dissatisfaction, binge eating and vomiting – have also been found in the general population (Williamson *et al.*, 1995) and those displaying subclinical disordered eating behaviour also experience high levels of distress and low mood (Dancyger & Garfinkel, 1995). As well as dieting and body image concerns, disordered eating behaviour such as emotional eating is also widespread in the general population (Nguyen-Rodriguez *et al.*, 2009). Subclinical disordered eating behaviour is described as alarmingly common and has been observed even at pre-adolescent stages (Lindberg *et al.*, 2006) with many children and young people having been found to show high rates of weight and body image concerns (Jones *et al.*, 2001; McVey *et al.*, 2004). The prevalence of those displaying subclinical or partial eating disorder syndromes are actually much higher than those meeting full clinical criteria (Mazzeo & Espelage, 2002) with authors therefore arguing both extremes of the continuum warrant clinical and research attention (e.g. Cotrufo *et al.*, 1998).

The following chapter shall review the research base for subclinical disordered eating behaviour, with some reference where relevant to the literature on clinical eating disorders. Under the umbrella term of disordered eating behaviour, the author is

referring to eating behaviour such as restraint –strictly limiting food intake (for example, perhaps due to body image dissatisfaction or a desire to stay slim) or emotional eating behaviour (for example, ‘comfort eating’, binge eating with/without purging). The current study is interested particularly on the research with children and adolescents; however, given the limited number of studies with young people, findings of interest with adult populations will also be discussed.

Chapter one begins with a general introduction to subclinical disordered eating in young people, the disordered eating continuum and theories of disordered eating behaviour. It then discusses the research on emotional constructs and disordered eating and puts forward a rationale to explore this association further, with a particular focus on emotion regulation. It then explores aetiological factors from early childhood. Finally, the chapter integrates the three research areas of early emotional maltreatment, eating behaviour and emotion regulation before presenting the aims of the current study.

1.1 Introduction to subclinical disordered eating in young people

In general population studies, 29.3 per cent of 10-14 year olds, and 23 per cent of 12-18 year olds have reported currently trying to lose weight (Jones *et al.*, 2001; McVey *et al.*, 2004). What is especially worrying is that these concerns appear to be internalised at a very young age, with children as young as six or seven years old being found to display dieting, weight concerns and disordered eating behaviour (Flannery-Schroeder & Chrisler, 1996), most likely from thinness being promoted as the sociocultural ideal (e.g. Ricciardelli & McCabe, 2001; Tiggemann & Pickering, 1996). In a female adolescent sample in Naples, Italy, Cotrufo *et al.* found 3.8 per cent of their sample to meet criteria for partial diagnosis and 10.7 per cent to fulfil criteria for subclinical disordered eating. This was higher than those meeting clinical criteria for bulimia nervosa (2.3 per cent), anorexia nervosa (0.2 per cent), and binge eating disorder (BED) (0.2 per cent) (Cotrufo *et al.*, 1998).

1.1.1 Distinct groups, or a continuum?

Research has historically debated whether eating disorders exist on a continuum or whether those with a clinical eating disorder should be regarded as a distinct group (Hund & Espelage, 2006). Body dissatisfaction in young females is so prevalent it has even been described as a 'normative discontent' (Striegel-Moore *et al.*, 1986). With such high monitoring of weight and dieting in the population in general, disordered eating is perhaps most usefully viewed on a continuum, with most of society being able to be placed at some point on this, with some research supporting this (e.g. Tylka & Subich, 1999). Some authors have proposed, however, that those with clinical eating disorders are a qualitatively different group (e.g. Gleaves *et al.*, 2000; Williamson *et al.*, 2002), with binge eating in BED and bulimia nervosa for example, being qualitatively different from subclinical levels of bingeing in the general population, on measures such as severity of bingeing (Williamson *et al.*, 2002).

It is considered that perhaps what is more important than looking at differences or commonalities, is determining who may be at risk of which levels of distress and why. In using the analogy of a continuum, what is concerning is that research with young people has identified cases where those with subclinical levels of disordered eating have been found to be at risk of later developing a clinical eating disorder. Longitudinal studies with adolescents have found high dieting at time one to be predictive of later disordered eating behaviour, including obesity and clinical eating disorders at time two (Neumark-Sztainer *et al.*, 2006; Patton *et al.*, 1999). In the majority of cases dieting in general does not proceed to a clinical eating disorder (Polivy & Herman, 2002), however, where there are significant weight concerns and disordered eating behaviour, this has been found to be more likely. Patton *et al.* (1999) found female adolescents reporting dieting at a severe level at time one to be 18 times more likely to progress to meeting criteria for a clinical eating disorder at time two, while moderate female dieters were five times more likely over a three year period. Given that the research highlights the widespread nature of subclinical disordered eating behaviour and the potential risk of this developing into a clinical eating disorder, greater understanding of aetiological influences on younger age groups is crucial.

1.2 Theories of disordered eating behaviour

Theories into the aetiology and motivations for disordered eating behaviour have only existed over the past 80 years or so, as, prior to around the 1930's, researchers assumed anorexia had a medical cause (Caparrotta & Ghaffari, 2006). The following provides a brief overview of the theoretical standpoints for various disordered eating behaviours to set the scene. Although stemming from attempts to understand obesity, the following theories have been very much applied to the wider population, hence the development of scales to measure subclinical disordered eating such as the Dutch Eating Behaviour Questionnaire (DEBQ). The concepts of disordered eating discussed in the literature have arisen from these theories, and they are considered of relevance to the current study, given the emotional constructs discussed.

1.2.1 Restraint theory

Herman and Polivy's Restraint Theory, attributes overeating to dieting itself (as cited in van Strien & Ouwens, 2003). Restraint refers to a deliberate attempt to limit food intake. While some research is suggestive of restraint meaning people do not eat as much, and indeed allows them to maintain a healthy weight (e.g. Williamson *et al.*, 1995) many other studies have suggested that restraint leads to overeating (Ogden, 2003). It could be thought that this could be dependent on the extent of food restriction, with authors proposing that strict dieting, or dietary restraint, cannot be maintained over time, therefore leading to overeating (Arnou *et al.*, 1992; Braet *et al.*, 2008). This central hypothesis of being unable to maintain, termed the 'disinhibition hypothesis' posits that at times certain emotions or alcohol for example, disinhibit the individual, leading them to eat when they would normally restrain (Williamson *et al.*, 1995). Studies have also indicated that being cognitively active can increase the likelihood of restraint being broken. Ward and Mann (2000) studied restrained and unrestrained eaters in two tasks, one involving 'high cognitive load' (being instructed to concentrate well on two tasks) and the other not as cognitively taxing. Participants were provided with tasty food, high in calories in both groups. The researchers found that restrained eaters consumed more in the

condition requiring high concentration than in the low concentration condition. Furthermore, the study found that the comparison group of unrestrained eaters ate less in the high cognitive load condition. This therefore appears to provide convincing support for engagement in cognitive tasks leading to disinhibition and breakdown of efforts to restrain (Ward & Mann, 2000). Restraint theory proposes that both restraint and negative affect are part of the aetiology of binge eating (Arnold *et al.*, 1992) and indeed studies into binge eating have found binge eaters to score more highly on restraint measures than non-binge eaters (Williams *et al.*, 1987) and that they often binge following periods of hunger (Stein *et al.*, 2007). Studies therefore appear to show some support for restraint theory, that in some cases restraint cannot be maintained, which leads to overeating.

1.2.2 Affect regulation theory

Research has pointed towards eating having a mood regulatory role. Affect regulation theory, put forward by various theorists (e.g. Arnold *et al.*, 1992), proposes that an unpleasant emotional state, such as anxiety or depression can often precede an episode of eating to the point of bingeing. Arnold *et al.* (1992) conducted a qualitative study with obese female participants, and found that 100 per cent of the sample reported negative emotion of some sort before and after bingeing. In addition to this, 63 per cent reported that a binge was triggered by a change in mood, namely: frustration/anger (42 per cent); anxiety/agitation (37 per cent); depression/sadness (16 per cent), and regret (5 per cent) (Arnold *et al.*, 1992). Interestingly the authors found that negative affect alone was sufficient to trigger a binge, whether restraint was present or not (Arnold *et al.*, 1992). This directly links to the concept of emotional eating. The interesting point here is that affect regulation theory posits that eating is an effort to regulate the emotion being experienced; however, the Arnold study found evidence that negative mood lasts long after the binge, and indeed other studies have found negative mood to *worsen* after a binge (Stein *et al.*, 2007; Wegner *et al.*, 2002), therefore appearing not to be a particularly effective strategy for regulating mood. Those with bulimia, however, who then purge after a binge report more positive feelings such as calmness and relief (Cooper *et al.*, 1988) therefore suggesting that binge and purge behaviour may be an 'effective' mood

regulator in these populations. Support has also been found for affect regulation theory at the subclinical level of emotional eating in general populations. In an experimental context in which participants believed their emotional state was open to being changed, they were more likely to eat tasty, fattening foods in attempt to alter their mood and make themselves feel better (Tice *et al.*, 2001).

1.2.3 Psychosomatic theory of obesity

A further theory regarding emotional eating is Bruch's Psychosomatic Theory of Obesity (as cited in Ogden, 2003). This theory stemmed from clinical observations of obese individuals, with researchers observing many of them would overeat in response to emotion (van Strien & Ouwens, 2003). The theory posits that emotions are experienced as feeling physiologically empty, similar to hunger, which leads to eating (Ogden, 2003). To deal with negative affective states, food is used as 'an emotions defense' which, in time, can lead to obesity (e.g. Nguyen-Rodriguez *et al.*, 2009). Related to this is Schachter's Externality Theory, which posits that while those of normal weight are usually responsive to internal cues such as hunger or satiety, overweight individuals have been found to have a lack of interoceptive awareness and be highly responsive to food related cues in the environment (van Strien & Ouwens, 2003). Schachter and colleagues appeared to then integrate the two theories into the Emotionality Theory of Obesity, stating that not only are the obese more susceptible to external food cues, they are also more likely to eat in response to experiencing negative emotions (Ogden, 2003). Although it is now over thirty years since these theories were first described, recent research has been suggestive that they still hold true. Conducting a study with obese females, van Strien and Ouwens (2003) compared two experimental conditions, one in which participants were given a milkshake to drink first and one in which they were not. Both participant groups were then asked to taste cookies and rate them on a form. Participants completed the Dutch Eating Behaviour Questionnaire (DEBQ), measuring emotional, restrained and external eating behaviour. Authors found a significant positive relationship between emotional eating scores and cookie consumption in the milkshake group, i.e. instead of eating less, following just having consumed a milkshake, emotional eaters ate more, providing support for the idea of

them having a lack of interoceptive awareness. Indeed, those scoring highly on emotional eating in both groups (whether they had had a milkshake or not) were found to consume more, therefore providing convincing support for psychosomatic theory.

1.2.4 Psychoanalytic theory

Psychoanalysts have provided insight into the potential unconscious and symbolic representations of eating disorder symptoms (Caparrotta & Ghaffari, 2006). One author conceptualised strict restraint in particular, as displaying an unconscious need to re-enact and resolve earlier dysfunctional interpersonal relationships (Clinton, 2006); although he acknowledges this can only be speculative. Authors propose, for example, that eating disorder symptoms reflect difficulties and reluctance to separate from a controlling mother (Caparrotta & Ghaffari, 2006), although recent findings are suggestive of fathers playing a more significant role than mothers, with paternal authoritarian parenting style being linked to eating disorder symptomatology (Enten & Golan, 2009). Zerbe (2001) describes the psychodynamic treatment of patients with eating disorders as involving helping them to understand the meaning of their symptoms, by ‘making the unconscious conscious’. The author proposes that through learning to name feelings, patients will be less likely to adopt maladaptive means of coping (their eating disorder), instead using their new ability to use their minds constructively (Zerbe, 2001), however, the evidence base for this is not well established due to psychodynamic principles not being studied systematically (Gowers & Waugh, 2004) and indeed perhaps there is difficulty quantifying psychodynamic therapeutic change in an easily measurable way.

In summary, there are therefore various theoretical standpoints put forward from the study of obesity and eating disorder presentations in clinical practice. Of particular interest to the current study are restraint theory, affect regulation theory and psychosomatic theory, as shall be explored in the discussion chapter.

1.3 Disordered eating behaviour and emotion

Links between various emotional constructs and both clinical and subclinical disordered eating behaviour are well established in the literature. In clinical eating disorders, emotional difficulties are considered to be at the core (e.g. Harrison *et al.*, 2009), with research finding difficulty identifying and responding appropriately to emotional states to be a significant problem for eating disorder patients (e.g. Bruch, 1962). Supporting researchers' descriptions of their clinical experience, studies have found those with clinical eating disorders to have poorer recognition of emotion from facial expression and vocal tone (Kucharska-Pietura *et al.*, 2004). Research has further suggested that those with clinical eating disorders have 'mood intolerance' and are unable to cope with various emotional states (Fairburn *et al.*, 2003), with anger in particular being proposed as very difficult for eating disorder patients to experience (Ioannou & Fox, 2009). Indeed longitudinal observation over ten years found those with eating disorders to have an altered perception of their bodily states (Bruch, 1962). Research also describes biases in emotional processing in those with clinical eating disorders, which could be playing a role in them being maintained (Pringle *et al.*, 2011).

One interesting discussion point in the established emotional difficulties and disordered eating relationship is the concept of which difficulty comes first - is it a difficulty with emotional processing which contributes to the development of disordered eating behaviour, or are cognitive difficulties caused by attention being focussed on extreme restraint (e.g. Ward & Mann, 2000) or starvation leading to difficulties with emotional processing? –a question asked by other researchers (e.g. Fox & Power, 2009; Sim & Zeman, 2006). Reviewing the literature on emotional constructs with subclinical disordered eating behaviour should arguably help to clarify this, as at the lower level of the disordered eating continuum, cognitive abilities would not be considered to have been affected significantly by low caloric intake.

1.3.1 Alexithymia and emotion recognition

One emotional concept which has received substantial research attention in disordered eating is alexithymia. Alexithymia is defined as, "(1) Difficulty

identifying and describing feelings, (2) difficulty distinguishing between feelings and the bodily sensations of emotional arousal, (3) constricted imaginal processes, as evidenced by a paucity of fantasies and (4) an externally oriented cognitive style” (Parker *et al.*, 1998, pp.91). In clinical eating disorders, research has reported alexithymia to be found in between 23 per cent and 77 per cent of anorexia nervosa patients and between 51 per cent and 83 per cent of bulimia nervosa patients (Quinton & Wagner, 2005), although it is also considered to be found throughout the general population (Quinton & Wagner, 2005), with one study finding 10.2 per cent of college women to score as alexithymic (De Berardis *et al.*, 2007). Alexithymia, often measured using the Toronto Alexithymia Scale (TAS; Bagby *et al.*, 1994) has been found to be related to clinical eating disorders and some studies have explored the construct with subclinical disordered eating behaviour.

Individuals with subclinical disordered eating patterns have also been found to display difficulties with emotion recognition (Ridout *et al.*, 2010). Taking into consideration the cognitive abilities query, Ridout *et al.* explored the concept that disturbed eating behaviour could be affecting the cognitive abilities of participants (for example, through malnourishment or preoccupation with thoughts of eating or restraint) and therefore also their abilities to concentrate and perform on cognitive tasks. Comparing high scores on the Eating Disorder Inventory (EDI-II; Garner, 1991) with low scores, the authors found that those scoring more highly were poorer at correctly identifying emotional expression than low EDI scorers, although their performance on attention-control tasks (Stroop colour naming task and delayed matching to sample task) did not differ. Alexithymia scores were also significantly higher for those scoring in the higher range on the EDI. This study therefore provides some evidence of cognitive difficulties not being a problem at subclinical levels, while demonstrating evidence of emotional recognition difficulties existing at a subclinical level (albeit at a level of scoring which could be at risk of a clinical eating disorder). This study was only conducted, however, with very small numbers (22 participants in each group) and so further research with higher numbers of participants would be required for more reliable conclusions to be drawn.

Emotional intelligence has also been studied in a general population of undergraduate females and was found to significantly predict bulimic symptoms (Markey & Vander Wal, 2007). It is worth bearing in mind, however, that emotional intelligence accounted for just 9 per cent of the variance in bulimic symptoms, while an analysis containing alexithymia, emotional intelligence and coping along with negative affect combined accounted for 12 per cent of the variance. In a general population study with undergraduate females in Italy, De Berardis *et al.* (2007) found statistically significant differences between the number of people scoring above cut-off on the Eating Attitudes Test (EAT-26; Garner *et al.*, 1982) (cut-off being indicative of being at risk of a clinical eating disorder) in the alexithymia group, in comparison to those not scoring as 'alexithymic'. A similar general population study with undergraduates in the UK, however, found no such links, with alexithymia not being found to be related to total EAT-26 score or to scores on the Eating Disorder Inventory (EDI-II), although higher bulimia scores were linked to difficulty identifying emotions (Quinton & Wagner, 2005). The differences in findings between the two studies are interesting, with both studies adopting similar methodologies and analyses; it may be that a smaller sample size in the Quinton and Wagner contributed to the difference in findings, or potentially cultural differences. Despite the non-significant results of Quinton and Wagner, it seems that on the whole, studies have found significant links between emotional constructs such as alexithymia and higher levels of subclinical disordered eating behaviours.

Although the majority of studies reviewed here are with adults, studies with young people have also found support for alexithymia in disordered eating. In a study with a female adolescent population, Sim and Zeman (2006) found that experiencing difficulty in recognising emotional states predicted the presence of disordered eating. The authors propose that those displaying disordered eating behaviour struggle in identifying basic emotional states, in turn leading them to disordered eating behaviours as an attempt to manage negative emotional states (Sim & Zeman, 2006).

In summary, therefore, the majority of studies have found links between disordered eating behaviour and alexithymia in the general population. Given that emotional awareness is described as one of the most basic skills required for emotional

competency (Saarni, 1999) experiencing difficulty in this area is likely to have significant consequences. Regarding the question of which difficulty comes first, evidence from those with subclinical disordered eating behaviour is suggestive of emotional difficulties coming first, later leading to disordered eating patterns; though longitudinal studies would be required to test this further. In essence, this means that individuals with emotional difficulties are possibly using disordered eating behaviours to cope with emotional states or as a way of regulating their emotions.

1.3.2 Disordered eating to cope with emotions

A study involving patients with Binge Eating Disorder, reported that bingeing, certainly at the level qualifying for a binge eating disorder diagnosis, may be the result of an inability to manage emotion effectively (Clyne & Blampied, 2004). Cooper *et al.* (2004) state that there is now strong evidence that in bulimia nervosa, binge eating is preceded by emotional or cognitive stress. The research suggests that both restricting food intake and binge eating appear to provide an escape from negative self awareness and emotional distress (e.g. Heatherton & Baumeister, 1991). In open-ended qualitative studies, Serpell and colleagues found both anorexic and bulimic patients to cite avoidance or escape from emotions as a ‘pro’ in their illness (Serpell *et al.*, 1999; Serpell & Treasure, 2002). Eating behaviour is described as serving the function of managing strong emotional states by “blocking off” (e.g. Corstorphine, 2006), dissociating from cognitions that are painful or from negative mood (Cooper *et al.*, 2004). This could either be by using impulsive behaviour (such as binge eating or vomiting) or by using compulsive behaviours (compulsive exercise or food restriction) (Waller *et al.*, 2007). In summary therefore, research with clinical eating disorders describes disordered eating serving a function – namely it appears in helping individuals to regulate their emotions.

1.3.3 Emotion regulation

Emotion regulation is defined as a “set of processes by which emotions are themselves regulated...[which] may be automatic or controlled, conscious or unconscious...Emotion regulation may dampen, intensify, or simply maintain emotion, depending on an individual’s goals” (Gross, 2007, p.8), or “the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying

emotional reactions” (Thompson, 1991, p.269). There are various emotion regulation strategies that can be used, “potentially limitless” - some bringing more positive benefit than others (Gross, 2002, p.282), with women being reported to utilise emotion regulation strategies more than men (Larsen *et al.*, 2006).

Emotion regulation is a relatively new construct to be studied, only emerging as a popular area of psychological study from around the 1990’s, scarcely mentioned in developmental psychology textbooks prior to this time (Eisenberg, 2004). In a review on the study of emotion regulation in psychology, Eisenberg points out that previous theorists alluded to the concept, with Freud (1961) discussing the ego regulating human drives and Lazarus and Folkman’s (1984) theory on coping and how people respond to stress was also a related concept (as cited in Eisenberg, 2004). Eisenberg proposes that the research base on emotion regulation has increased both in quantity and quality over the last ten years or so. This appears to be reflected in the emergence of its inclusion in some disordered eating research, which shall be discussed.

Emotion regulation develops both through positive early parent-child interaction with a responsive caregiver (Field, 1994) and through interaction with peers in childhood (Ford, 2005). A responsive caregiver teaches the child to label his emotions and guides him towards learning to regulate them in such a way to achieve his goals (Ehring & Quack, 2010). Individual differences in emotion regulation abilities are thought to stem from various factors. Regarding the role of parenting, difficulties in emotion regulation development can occur when a caregiver is either physically unavailable or emotionally unavailable (e.g. if they were suffering from a mental health problem; Field, 1994), although it is suggested that the beliefs parents hold about emotions alone can affect emotion regulation development (Morris *et al.*, 2007). Growing up in an ‘invalidating environment’, an individual learns that certain emotional expression is bad or not acceptable and so believes it should not be expressed (Corstorphine, 2006). Reviewing the literature on emotion regulation to date, Morris *et al.* (2007) propose that there are various ways that emotion regulation development is shaped, (1) through social learning –observing and modelling those

around us, (2) parental practices around emotion and managing emotional reactions in their young, and (3) parenting style and the attachment relationship.

Stemming from the work of John Bowlby (e.g. 1958; 1960a; 1960b), Attachment Theory states that human beings use attachment behaviour in infancy (e.g. vocalising, smiling) in attempt to get the caregiver's attention and bring them closer in proximity to the child (as cited in Cassidy, 2008). A secure attachment style occurs when a child feels that the caregiver, or attachment figure, is available and responsive to their needs, and an insecure attachment style results when this is not the case (Cassidy, 2008). Authors have commented that a lot can be learned about the development of emotion regulation from attachment theory, and that they are intrinsically linked. A secure attachment appears crucial in the development of constructive emotion regulation, such as in learning to problem solve or to reappraise situations (Shaver & Mikulincer, 2007). Research in this area has indeed found some evidence in support of attachment style predicting emotion regulation abilities. Contreras *et al.* (2000) for example, measured children's attachment style and parent report of children's emotionality and coping abilities, and found a secure attachment style was associated with greater endorsement of constructive coping strategies. Attachment is therefore considered to be a key factor in the development of effective emotion regulation abilities.

Research with eating disorder patients frequently reports an insecure, often ambivalent attachment relationship between mothers and daughters (Ward *et al.*, 2000). Troisi and colleagues in Italy, for example, have studied women with eating disorders along with controls, and have confirmed not only a link between eating disorders and an insecure attachment style but also that reports of childhood separation anxiety were more severe in eating disorder patients in comparison with controls (Troisi *et al.*, 2005), with a further study also finding insecure attachment and childhood separation anxiety to be associated with body dissatisfaction (Troisi *et al.*, 2006). In essence then, attachment seems to shape emotion regulation development and it is known to be frequently reported in those with clinical eating disorders. Has research consequently then identified emotion regulation as playing a role in disordered eating?

Difficulties with emotion regulation are described as being involved in both the origin and maintenance of eating disordered behaviours (e.g. Markey & Vander Wal, 2007), with researchers commenting that this is clear from their clinical experience (e.g. Corstorphine, 2006). Researchers have begun linking the emotional invalidation seen by parents of eating disorder patients, with the fact that this would directly have affected their emotion regulation development (Waller *et al.*, 2007). Fairburn and colleagues for example, explain that the “mood intolerance” which some eating disorder patients have can lead to “dysfunctional mood modulatory behaviour” (e.g. bingeing, vomiting, excessive exercising; Fairburn, 2003, pp.517). Eating, or not eating (as would be the case with restraint), would therefore be one method of serving to regulate mood. Emotion regulation is however a relatively new area of emotion to be mentioned in disordered eating research, with the majority of previous research looking at alexithymia. One difficulty in interpreting previous research into emotion regulation in disordered eating coherently, is that there is great variation in the way authors have defined emotion regulation (McEwen & Flouri, 2009; Sim & Zeman, 2006). Indeed, the Markey and Vander Wal (2007) study which looked at emotional intelligence, alexithymia and adaptive coping (using the Brief COPE inventory; Carver, 1997) referred to all of these constructs as ‘emotion regulation’. In some respects this is understandable, due to the fact that emotional constructs are complex and interrelated. For example, Parker and colleagues referred to emotional intelligence and alexithymia as related, but different, constructs from emotion regulation (Parker *et al.*, 2001). Others describe alexithymia as a form of emotion regulation deficit (e.g. Connelly & Denny, 2007) or as a deficit which would consequently result in poor emotion regulation (Mikolajczak & Luminet, 2006). The present study considers emotion regulation to be a different construct from other emotional concepts, including alexithymia, as it involves a step beyond the initial ability to identify emotions and is focussing more on behaviour or action in how an individual manages emotions. Studies which have explored the relationship between disordered eating behaviour and emotion regulation in keeping with this definition shall now be discussed.

Bingeing and purging have been proposed as methods of helping individuals to regulate negative emotions (Gilboa-Schechtman *et al.*, 2006). Clyne and Blampied

(2004) appeared to find promising preliminary data in support of a relationship between emotion regulation and bingeing behaviour. Using an intervention which taught skills in emotional recognition and management, relaxation and problem-solving techniques to those with binge eating disorder, all patients no longer met the criteria for BED and depression levels were significantly reduced at the end of treatment (Clyne & Blampied, 2004). Measures specifically monitoring bingeing, anxiety, stress, alexithymia and emotional intelligence did not show significant changes, although there appeared to be positive changes, with perhaps a small sample size influencing results. Clyne and Blampied therefore provide interesting and promising findings regarding the relationship between emotion regulation and binge eating behaviour, although their study was open to bias, through participants self-reporting bingeing behaviour.

While the role of food in regulating emotions may seem more intuitive in bulimic or bingeing behaviours, the strict food restriction in anorexia has also been proposed as an effort to regulate unpleasant or anxious mood (Gilboa-Schechtman *et al.*, 2006). Women with anorexia nervosa have been found to have significantly more difficulties with emotion regulation than controls (Harrison *et al.*, 2009), and women with bulimia nervosa have been found to be more likely to have difficulty regulating negative mood in particular (e.g. Cooper *et al.*, 1988). There is therefore a strong suggestion that emotion regulation difficulties may be quite prevalent in clinical eating disorders.

Recent research has focussed on emotion regulation and disordered eating behaviours in the general population. Recognising a gender bias towards females in disordered eating research, Lavender and Anderson (2010) used a male college population as their sample and found that difficulties with emotion regulation accounted for the variance in disordered eating scores and body dissatisfaction. Using hierarchical regression analyses, controlling for one effect at a time, they found emotion regulation difficulties to account for unique variance in disordered eating, after controlling for body mass index (BMI) and negative affect. It is worth bearing in mind, however, that despite significant findings, emotion regulation only accounted for 1.3 per cent of the variance in disordered eating. There are therefore

likely to be many other factors contributing to the eating behaviours. The measure of disordered eating used in this study is also a measure the researcher did not come across in any other research in this area, which is worth noting. Nevertheless, this seems to be a finding worthy of further exploration.

A recent study with a general college population looked at emotion regulation (using the Difficulties in Emotion Regulation Scale -DERS; Gratz & Roemer, 2004), disordered eating behaviour (using the Bulimia Test Revised -BULIT-R; Thelin *et al.*, 1991) and retrospective report of parental response to emotion in the early years (using the Emotion Socialisation subscale of the Emotions as a Child Scales, EAC; O'Neal & Magai, 2005). The study found both direct and indirect effects of parental magnification of emotion (expressing the same emotion, if not at a greater intensity) on disordered eating behaviour, partially mediated by emotion dysregulation (Buckholdt, *et al.*, 2010). One caution in interpreting these findings, however, is that there were only 118 participants in the sample and for the statistical analysis used – Structural Equation Modelling (SEM) – typical sample sizes are around 200 (Kline, 2011). The study was also specific to bulimic disordered eating behaviours in particular. Nevertheless, it adds to the existing research, helping towards gaining a greater understanding of the mechanism by which emotion difficulties in the eating disorders originate. It therefore appears that further research in this area, looking at prior care-giving experience and more general disordered eating behaviour could be of interest.

In a general population study with undergraduates, Whiteside *et al.* (2007) measured restraint, over-evaluation of shape and weight and emotion regulation (using the DERS) and their relationship with binge eating. They found that all factors were associated with binge eating independently, with emotion regulation difficulties accounting for a unique part of the variance over the other factors. In addition to this, they examined particular emotion regulation difficulties associated with binge eating and found these participants reported persistent negative moods that were difficult to change and that they endorsed more dysfunctional emotion regulation strategies (Whiteside *et al.*, 2007). This study therefore appeared to provide further support for Clyne and Blampied (2004)'s findings, supporting a link between

emotion regulation difficulties and binge eating behaviour in particular. In an attempt to explore if these associations also hold for younger children, Czaja *et al.* (2009) compared children who had indicated having a loss of control over their eating (i.e. emotional eating or bingeing in the past three months) with a control sample. They found that the loss of control group used significantly more maladaptive emotion regulation strategies for regulating anxiety than controls. This therefore provides support for emotion regulation difficulties playing a role in loss of control disordered eating behaviour in young people. Further research into other types of disordered eating in the general population would be helpful, therefore, to determine if they are also linked with dysfunctional emotion regulation in young people.

A further study with a general population of adolescents investigated whether differences in emotional identification or regulation difficulties could discriminate between disordered eating behaviour and body dissatisfaction (Sim & Zeman, 2006). The authors measured emotional awareness (using the Emotion Expression Scale for Children (EESC; Penza-Clyve & Seman, 2002) methods of coping with emotions, using the Children's Emotion Management Scale- Coping Factor (CEMS; Zeman *et al.*, 2001), disordered eating (using the EAT-26), body dissatisfaction (subscale of the EDI) and negative affect. While Sim and Zeman refer to all emotional constructs in their study as 'emotion regulation', the researcher considers the coping element to be a more accurate reflection of how an individual regulates a particular emotional state. Sim and Zeman themselves indeed note that emotion regulation terminology is inconsistent in the research. Using hierarchical multiple regression, this study found that the coping measure did not predict disordered eating behaviour. In an adolescent population therefore, a measure of coping with emotions was not found to be a significant predictor of disordered eating, at least using the CEMS. It is notable, however, that they had modified the EAT-26, by using only two of the usual three subscales, yet reported an overall total score (minus one of the subscales). It is considered that this could be questionable, given that the measure is not standardised in being used in this way.

Although not using emotion regulation measures, studies into emotional eating with young people are relevant for discussion, as they could be hypothesised as serving an

emotion regulation function. Stemming from the Affect Regulation Model, emotional eating is viewed as an attempt to regulate and reduce negative emotion (Goossens *et al.*, 2009). Studies of emotional eating, prompted by a desire to understand obesity (Nguyen-Rodriguez *et al.*, 2009), have found 10.5 per cent of overweight young people to display emotional eating (Braet *et al.*, 2008). Some studies have proposed females score more highly on emotional eating than males (Goossens *et al.*, 2009; Larsen *et al.*, 2006; Wardle *et al.*, 1992), however, others have found no gender difference (Nguyen-Rodriguez *et al.*, 2009). In looking at what might be leading to the emotional eating, a study with an obese population found alexithymia to be linked to emotional eating, although this was interestingly to a greater extent in obese men than for obese women (Larsen *et al.*, 2006).

Emotional eating has also been studied with adolescents in the general population. Studying emotional eating with various emotions, a study found perceived worry or stress to be associated with emotional eating in girls and confused mood to be related to emotional eating in boys (Nguyen-Rodriguez *et al.*, 2009). A further study looking at emotional eating in overweight young people found emotional eating to be associated with higher anxiety and loss of control over eating (Goossens *et al.*, 2009) and found 11 per cent of the sample to score above the clinical cut-off for emotional eating. More recently, Norwood *et al.* (2011) studied both emotional eating and restraint in a general population of adolescent females. Looking at how participants regulated anger in particular, Norwood and colleagues found that both those scoring high on restrained eating and emotional eating reported higher use of expressing anger and suppressing it, in comparison with controls. While not using an emotion regulation measure *per se*, authors describe this finding as providing support for anger regulation being related to eating behaviours in adolescents. This therefore appears to provide further support for an emotion regulation and disordered eating link in young people.

In summary, therefore, the majority of the research base provides support for the existence of greater emotion regulation difficulties in those displaying disordered eating behaviour – both clinical and in the general population. Significant findings appear to exist for both adults and young people alike, albeit that there is a smaller

research base with young people. There therefore seems to be a rationale for further study of emotion regulation and possible relationships with other aetiological factors within eating disorders. A large majority of eating disorder research has focussed on early life experience –partly due to family factors (such as the attachment difficulties discussed) being thought to be important and partly due to histories of abuse being reported in some eating disorder patients (e.g. Kent *et al.*, 1999; Kong & Bernstein, 2009).

1.4 Aetiology of disordered eating –familial factors

A negative or controlling family environment is proposed as having frequently been described by eating disorder patients (e.g. Polivy & Herman, 2002). For example, women with bulimia nervosa have been found to report higher levels of intrusive parenting in adolescence compared with controls (Rorty *et al.*, 2000). Eating disorders are described as a subtype of internalising behaviour, which has been found to be linked to high levels of parental control, for example, when parents are overprotective or intrusive (McEwen & Flouri, 2009). Mountford *et al.* looked at the degree to which emotional needs being met in childhood contributed to later disordered eating. Using a new measure, The Invalidating Childhood Environments Scale (ICES), the authors compared women with a clinical eating disorder to controls, and found that participants who perceived their childhood environment to be invalidating (e.g. ignoring their thoughts or emotions) were more likely to have an eating disorder (Mountford *et al.*, 2007). The authors propose that their findings highlight a research need to focus on the role of ‘passive abuse’ and its link to disordered eating (Mountford *et al.*, 2007).

Although relationships with mothers are frequently mentioned, research has begun to identify father’s roles in eating disorder development, with one study finding that paternal maladaptive behaviour was more influential on disordered eating behaviour than maternal behaviour (Johnson *et al.*, 2002). Tying in with the emotion regulation component, McEwen and Flouri (2009) looked at a UK sample of 11-18 year olds, and their self-reported measures of emotion regulation strategies, disordered eating, emotional symptoms and scores of father’s parenting (levels of

warmth, psychological control and behavioural control). They found that emotion regulation mediated the relationship between fathers' psychological control and emotional symptoms. The study also found a direct link between fathers' parenting and eating disorder symptoms in the sample, as measured by the Eating Attitudes Test, although emotion regulation was not found to mediate this link. The authors appeared to follow the Baron and Kenny (1986) approach to the mediation analysis, however, which is criticised for being the most likely mediation approach to miss a significant effect (e.g. through being the lowest in power; Hayes, 2009). Nevertheless, McEwen and Flouri demonstrated interesting findings, tying in various parts of the research base – the early parenting experience, emotion regulation and disordered eating components. Research has therefore identified a familial or caregiver influence, contributing to disordered eating development.

1.5 Aetiology of disordered eating -history of childhood maltreatment

A link between a history of childhood abuse and later development of an eating disorder is well established in the literature (e.g. Kent *et al.*, 1999). Indeed, the National Institute for Clinical Excellence guidelines state that professionals working with adolescents with eating disorders should be aware of a potential history of abuse (NICE, 2004). Much of the research base looks at varying types and combinations of abuse and neglect, making it difficult to draw meaningful conclusions. Nevertheless, the general message is that a significant relationship between disordered eating and early maltreatment does appear to exist (e.g. Kent *et al.*, 1999; Kong & Bernstein, 2009).

A significant proportion of research, especially preliminary research in this area, highlighted significant associations between disordered eating and sexual abuse in particular. In a sample of 10-15 year olds receiving treatment for sexual abuse and a same age comparison, Wonderlich *et al.* (2001) found that the children reporting a history of sexual abuse reported the highest level of eating disorder behaviours, as measured by the Kids Eating Disorder Survey (KEDS; Childress *et al.*, 1993). They found that impulsivity had the strongest mediational effect between the two, followed by drug use. Interestingly, the authors did not find the further constructs

usually associated with disordered eating - mood, perfectionism or body image to be significant mediators, while other studies have (e.g. Kong & Bernstein, 2009). They propose that this may be due to there being two or more pathways to disordered eating, which previous authors have suggested (e.g. Steinberg *et al.*, 1990).

Wonderlich *et al.* argue that those who have been sexually abused who then proceed to display more impulsive behaviour are more likely to develop disordered eating behaviours such as purging or restricting, where as other eating disordered individuals may arrive at their pathology via another route. A more recent study looking at history of sexual abuse and subclinical disordered eating behaviour (along with alexithymia and general distress) in a general adult population found that although there was a weak relationship between reported childhood sexual abuse and disordered eating, this relationship was mediated by general distress and alexithymia (Hund & Espelage, 2005).

A general population study with adolescents studied a broader range of early family factors (parental caring, communication and monitoring), a history of sexual and physical abuse and disordered eating. Neumark-Sztainer *et al.* (2000) found that reported history of sexual and physical abuse was strongly associated with disordered eating. The authors report, however, that this link was weakened (although remained significant) when the other family constructs were controlled for. The authors propose this could be suggestive of a positive family relationship being a protective factor against the development of disordered eating, i.e. a secure attachment could act as a buffer. The authors also point out that there was a higher rating of disordered eating in males who had reported sexual abuse compared with females, which they acknowledge is in contrast to usual gender findings. They therefore put forward that perhaps eating disorder aetiology is different for males and females (Neumark-Sztainer *et al.*, 2000). It is worth noting, however, that while these represent promising findings, the authors of this paper used their own measures – at times only single statements- to measure the constructs they report on. This would not be considered as robust as using standardised measures. Replication with standardised measures would be able to be considered more reliable and indeed would lend itself more to the possibility of comparison with other studies.

Not all studies looking at history of sexual abuse and disordered eating have found significant links however (e.g. Schaaf and McCanne, 1994) and research over the last decade or so has begun to include the study of other types of childhood maltreatment. Conducting a study with a general population of undergraduate men, Mitchell and Mazzeo (2005) looked at various forms of childhood maltreatment (using the Childhood Trauma Questionnaire-CTQ; Bernstein & Fink, 1998), along with alexithymia, social support, mood and their relationship with disordered eating (as measured by the Bulimia Test Revised). The authors found that only physical neglect and physical abuse were significantly correlated with disordered eating, mediated by depression (Mitchell & Mazzeo, 2005). The authors acknowledge that this differs from previous studies, in that no significant relationship was found with alexithymia for example, and the type of abuse found to correlate with the disordered eating measure was different (i.e. sexual abuse not being found to have a significant relationship with disordered eating in this study). It should be noted, however, that this again was a bulimia specific measure and so perhaps is not useful in direct comparison to other studies. Their decision to adhere to Baron and Kenny (1986) and Sobel's Test approaches to mediation analysis seem credible, as they acknowledge their sample size is not sufficient for structural equation modelling. They acknowledge that this could be another reason why their results produced different findings, for example, in comparison to those using structural equation analysis (Mitchell & Mazzeo, 2005).

Kong and Bernstein (2009) looked at a sample of adult patients with clinical eating disorders and measured history of various forms of childhood maltreatment (using the CTQ), obsessive-compulsive traits and depression. The study found that the presence of sexual abuse, physical abuse and emotional abuse each significantly predicted an eating disorder and found 90 per cent of the sample to report at least one type of childhood trauma. This seems exceptionally high, and yet the study appeared to adhere to the cut-off point recommended by the CTQ. Interestingly, they also found that the presence of depression appeared to be a more effective predictor of disordered eating than the abuse itself (Kong & Bernstein, 2009).

1.5.1 Emotional maltreatment in particular

The majority of research in this area has focussed on studying history of sexual and physical abuse and neglected to focus on emotional abuse (e.g. Hund & Espelage, 2006; Waller *et al.*, 2007), with emotional abuse only beginning to be studied from the end of the 1980's (Kent & Waller, 2000). To define what is meant by emotional abuse, it is referred to as “verbal assaults on a child’s sense of worth or well-being, or any humiliating, demeaning, or threatening behaviour directed toward a child by an older person” (Bernstein & Fink, 1998, p.2), while emotional neglect refers to, “the failure of caretakers to provide a child’s basic psychological and emotional needs, such as love, encouragement, belonging and support” (Bernstein & Fink, 1998, p.2). One of the reasons for the lack of studies focussing on emotional abuse is that it is a difficult construct to define and measure (Waller *et al.*, 2007).

Nevertheless, effective research in this area is required in understanding the impact it can have on children and their subsequent development. Waller *et al.* (2007) describe their clinical experience of the effect of emotional abuse on a child. They explain that it often results in two main beliefs about the self: negative core beliefs and that the expression of emotion may be unacceptable (i.e. it has consequences; Waller *et al.*, 2007), i.e. emotional abuse has a significant impact on the development of emotion regulation, as discussed earlier. Waller *et al.* propose that emotional abuse permeates very deeply in children, due to their inflexible, concrete thinking styles in early development, leading to the effects of emotional abuse being quite entrenched.

In a study with an undergraduate female population, Kent *et al.* (1999) studied various types of childhood maltreatment (using the Child Abuse and Trauma Scale [CATS; Sanders & Becker-Lausen, 1995]) and found in fact that it was emotional abuse which was the most predictive of later eating disturbance (on the Eating Disorder Inventory -EDI-II). They found that this relationship was further mediated by anxiety and dissociation. Dissociation in particular seems of interest, as considering it is usually referred to as a coping response to early trauma (e.g. Kent *et al.*, 1999), perhaps it could be considered a form of regulating negative emotions? While presenting interesting findings, it is worth noting that the authors created this subscale for their study, albeit using items from the original CATS measure. It is

assumed therefore, that this was not the usual standardised method for the measure to be used. Nevertheless, the study provided interesting preliminary results into emotional abuse having a significant relationship with disordered eating behaviour; findings which were supported in a similar study the following year. Also studying female undergraduates, Witkiewitz and Dodge-Reyome (2000) similarly found that emotional abuse (measured by the CTQ) was the most predictive form of disordered eating behaviour (as measured by the Eating Disorder Inventory) (Witkiewitz & Dodge-Reyome, 2000).

Studies looking at binge eating disorder (BED) have also found links to earlier emotional abuse. Allison *et al.* (2007) compared people with BED, night eating syndrome (NES) and an overweight/obese comparison group. They found higher rates of emotional abuse and neglect for those with BED and NES than in the comparison group who did not display disordered eating (Allison *et al.*, 2007), although all three groups reported high prevalence of at least one type of childhood maltreatment; between 71 per cent and 82 per cent depending on type.

Reflecting on the research on early maltreatment type and disordered eating as a whole, there are clearly varied results. In their review on emotional abuse and disordered eating, Kent and Waller (2000) propose that different types of trauma may be linked to different disordered eating behaviours, depending on the type of abuse. A literature review of emotional maltreatment and disordered eating concluded that overall research does provide evidence of a relationship between the two, with the mechanism by which they are linked remaining unclear (Kent & Waller, 2000). This could help to explain why some studies find significant relationships and others do not. However, given the lack of consistency in measures and constructs studied, it would be difficult to say. Kent *et al.* (1999) propose that their findings indicate that it is when other forms of abuse have an emotionally abusive component that they will be associated with eating psychopathology. Indeed it is recognised that all forms of abuse have a psychological impact, evoking a strong emotional reaction and in this sense, can also be classed as emotional abuse to some degree (e.g. Kent & Waller, 2000; Taylor, 2009). Nevertheless, emotional abuse and emotional neglect – both also referred to as psychological abuse (Baker & Maiorino, 2010) – are

therefore proposed as being worthy of further research in the study of disordered eating.

1.6 Putting the reviewed literature together - childhood emotional maltreatment and emotion regulation

While significant relationships have been found therefore between early maltreatment and eating and between emotion regulation difficulties and eating, research is also indicative of maltreatment being linked to emotion regulation difficulties. Authors have described that the emotional invalidation which emotional abuse encompasses, leads to problems with an individual identifying, expressing and managing emotions which appears to be an adaptive coping strategy for dealing with an emotionally dysfunctional environment (Waller *et al.*, 2007). Studies have found support for childhood maltreatment leading to difficulties in self-regulation and in the central nervous system developing properly (Ford, 2005). Indeed survivors of trauma in general, experiencing post-traumatic stress disorder (PTSD) symptoms have been found to show significant correlations between their PTSD symptoms and measures of emotion regulation (Ehring & Quack, 2010). Studies have found children who have been physically abused to be vigilant in response to potential threats (e.g. angry faces) in comparison to controls (Ford, 2005). In a longitudinal study looking at maltreated children and non-maltreated children aged 6-12 years, neglect and physical/sexual abuse, earlier onset of maltreatment and multiple maltreatment were found to be related to emotion dysregulation (Kim & Cicchetti, 2010). Using the maltreatment classification system from the department of social services records, the authors did not find those with histories of emotional maltreatment to show significant differences in emotion regulation in comparison with controls. Considering emotional maltreatment was measured purely by social services records, however, it is of course possible that the comparison 'controls' may also have experienced a degree of emotional abuse or neglect in their childhoods. This could be likely, with rates of severe to extreme abuse or neglect being reported in as high as 15 per cent (emotional abuse) and 13 per cent (emotional neglect) of cases in general population studies (Baker & Maiorino, 2010).

Maltreated children have been found to display less adaptive emotion regulation and greater emotion dysregulation than controls (Shipman *et al.*, 2007). Shipman *et al.* found mothers who were maltreating showed less validation when their children displayed negative emotion, and indeed found that mothers' responses to emotions mediated the relationship between maltreatment and emotion regulation (Shipman *et al.*, 2007). It appears that maltreatment in childhood is particularly damaging to emotion regulation, with early interpersonal trauma being found to be related to higher emotion regulation difficulties, in comparison to both controls and survivors of late-onset traumas (Ehring & Quack, 2010) thus providing further evidence of emotion regulation developing in early childhood.

1.6.1 Impact on attachment

Caregivers who are abusive or unresponsive are at risk of promoting hyperarousal in the child that can have lasting effects on his or her ability to manage strong emotions (van der Kolk & Fislser, 1994). For children growing up in environments where they are being maltreated, it is likely to be frightening and unpredictable (Kim & Cicchetti, 2010). "In maltreating families, parents are less likely to be available to provide support and scaffolding when their children are upset, from which children can learn constructive strategies to regulate their emotional states" (Kim & Cicchetti, 2010, pp.707). Those experiencing early trauma may not have experienced the full range of feelings during early parent-child interaction through attunement with a caregiver, which is crucial for emotion regulation development (Field, 1994) and thus may not realise that very different ways of feeling and of relating to others exist (Ford, 2005). Research has found children who have experienced physical abuse to be likely to have an avoidant attachment style and those who have experienced neglect to display an anxious ambivalent attachment style (Finzi *et al.*, 2000). Consequently, therefore, maltreatment in early childhood can lead to both insecure attachment and stress reactivity but also to self-regulatory processes failing to work properly (Ford, 2005).

1.6.2 Trauma theory

Those who have experienced childhood maltreatment are at greater risk of developing mental health problems, including internalising and externalising

problems (e.g. Kim & Cicchetti, 2010; Trickett *et al.*, 2011). Rorty and Yager's (1996) trauma theory pertains that a decreasing sense of self results from abuse, in turn leading to difficulty managing strong emotion and the use of maladaptive coping strategies (as cited in Hund & Espelage, 2006). This theory therefore seems a central component in the study of emotion difficulties resulting from early emotionally abusive experiences.

1.7 Early childhood maltreatment, emotion regulation and disordered eating

It is described in the literature that if abuse leads to unbearable emotions, turning attention towards weight, the body, and food consumed, an individual can gain a sense of emotional control (Polivy & Herman, 2002). Research in recent years has begun looking at the established significant relationships between childhood emotional abuse, disordered eating and the mechanism which underlies this relationship. Despite researchers in the field alluding to the concept of all three being related (e.g. Fox & Power, 2009), only a limited number of studies could be identified looking at history of emotional abuse, emotions and disordered eating, with the ones that could be identified involving the study of alexithymia (as opposed to emotion regulation).

1.7.1 Alexithymia as a mediator

The first study which could be identified, linking all three factors of early emotional maltreatment, alexithymia and disordered eating behaviour was Mazzeo and Espelage (2002). Studying physical and emotional abuse/neglect, family conflict and cohesion, alexithymia, depression and disordered eating, they found no direct association between early maltreatment and disordered eating behaviour. Using structural equation modelling to study mediation, however, the authors found that early maltreatment was linked to disordered eating *indirectly*, via alexithymia and depression (Mazzeo & Espelage, 2002). The authors therefore propose that it may be those who struggle to identify and describe their feelings who are more prone to disordered eating behaviours. Following on from this study, Hund and Espelage

(2006) studied presence of early emotional maltreatment, alexithymia, disordered eating behaviours and measures of depression and anxiety in a general college population of women. Again, using structural equation modelling, they measured the mediating effects of all independent variables and found that childhood emotional abuse and disordered eating were associated by a weak but significant mediating relation of alexithymia and general distress. Hund and Espelage propose therefore that difficulties in managing emotions could be the reason for the disordered eating. As Mazzeo and Espelage (2002) and Hund and Espelage (2006) note, there is need for replication, as these are the only two papers identified which explored emotional abuse and disordered eating behaviour, investigating the mediating influence of an emotional construct. Nevertheless, the findings seem reliable, through descriptions of methodology and very large sample sizes (with 820, and 588 participants, respectively). A very recent study has indeed pointed towards a link between all three constructs, studying emotional maltreatment and disordered eating, finding emotion regulation difficulties to be a potential mediator. Comparing women with a bulimia diagnosis with controls, Groleau *et al.* (2011) found emotional maltreatment to predict severity of disordered eating behaviour (as measured on the EAT-26) and that 'ineffectiveness' (a subscale of the EDI-II considered to reflect self esteem) was a significant mediator of this relationship. When the effect of emotional abuse on oral control (subscale of the EAT-26) in particular was studied, emotional instability (as measured by the Dimensional Assessment of Personality Pathology –Basic Questionnaire (DAPP-BQ; Livesley *et al.*, 1993)) was found to mediate this relationship. The prevalence of emotional abuse reported in those with bulimic disorders seems extremely high, with 80.7 per cent of them reporting an emotionally abusive history. Despite not directly studying emotion regulation in particular, this study proposes that its findings are suggestive of it playing a role in the relationship between emotional abuse and disordered eating behaviour, certainly in a population of women with bulimic symptoms.

In summary, while some studies have not found significant links between emotional abuse and eating (e.g. Mitchell & Mazzeo, 2005) the majority of recent studies have (Groleau *et al.*, 2011; Hund & Espelage, 2006; Kent *et al.*, 1999; Kong & Bernstein, 2009; Witkiewitz & Dodge-Reyome, 2000), particularly when the influence of

emotional constructs (hypothesised to be a product of the emotional maltreatment) are studied too. Indeed, there are two potential explanations for the lack of a significant link between emotional maltreatment and disordered eating for the Mitchell and Mazzeo study –it used only a bulimia specific measure to capture disordered eating behaviour in a general population and it was a study specifically with males; in contrast the studies finding significant links were with female participants using more comprehensive measures of various disordered eating behaviours, on the EDI-II (with the exception of Kong and Bernstein, which was with eating disordered individuals of both sexes). Emotional maltreatment and disordered eating therefore appears to be an area worthy of extended study. As the above significant findings have been found either with those with a clinical eating disorder or by measuring disordered eating using measures designed to capture symptomatology at the higher end of the disordered eating continuum (i.e. the EDI-II), it is considered that it could be helpful for research to include measures to capture the lower subclinical end of the disordered eating continuum, to discover whether this end of the continuum (e.g. emotional eaters/restrained eaters) are influenced by early emotional maltreatment and emotion regulation difficulties. Given that these studies have involved mostly alexithymia measures, it was also considered of interest to study emotion regulation in particular, in attempt to determine support for the hypothesis that all three areas of research may be linked, via the mechanism of emotion regulation.

1.8 Rationale for the current study

As outlined throughout this chapter, research has found some support for early emotional maltreatment and eating behaviour, between emotional maltreatment and emotion regulation and between emotion regulation difficulties and eating behaviour. No previous research could be identified which has studied all three variables together, out-with the alexithymia construct alone. In attempt to build on the findings by Kent *et al.* (1999) and Hund and Espelage (2006) with female populations, the current study focussed on emotional abuse and emotional neglect,

with neglect scarcely being mentioned in previous research. The present research was therefore an attempt to expand the knowledge base, by studying all three combined, as illustrated in Figure 1.1. As described in the hypotheses to follow, of particular interest was whether there would be a mediation effect, i.e. would early emotional maltreatment be linked to disordered eating behaviour *indirectly* via dysfunctional emotion regulation strategies. For mediation to occur, the relationship between early emotional maltreatment and disordered eating behaviour would be able to be explained either in part or in full by a mediator variable (in the current study –internal or external dysfunctional emotion regulation).

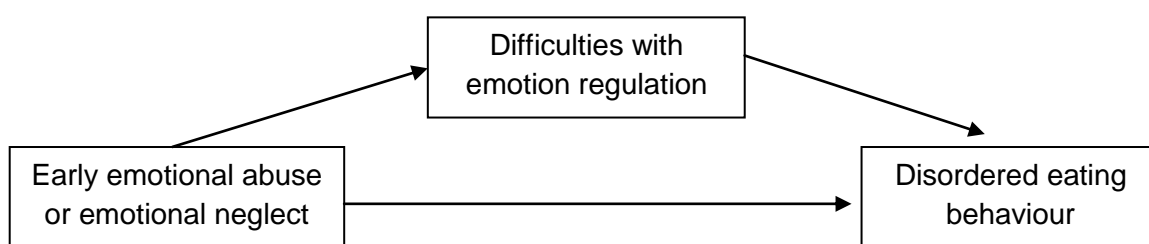


Figure 1.1. Model of direct and mediating hypotheses for proposed research (Based on other mediation models, e.g. Baron & Kenny, 1986)

Given the recognised emotional component in eating disordered behaviour, it is surprising that emotion regulation in particular has not received much attention in the research, as noted by Harrison *et al.* (2009), and indeed other authors have noted a need to move beyond the study of alexithymia in order to achieve a deeper understanding of emotional processing in eating disorders (Gilboa-Schechtman *et al.*, 2000). The current study is therefore focussed on how individuals manage their emotions behaviourally, i.e. an extension of the alexithymia construct of difficulties identifying emotions, for example.

Given that the research in this area is particularly scarce with young people and that adolescence is a crucial age for eating disturbance and body image concerns developing, a general high school population was chosen as the sample. It was considered of interest to include both male and female adolescents in the study, as,

despite clinical eating disorders being more widely diagnosed in females, studies have also shown males to be affected by eating disturbance, for example, following childhood maltreatment (e.g. Mitchell & Mazzeo, 2005). Studies with adolescents in particular have found males to experience emotional eating just as much as females (Nguyen-Rodriguez *et al.*, 2009) and so it seems important to include both when studying disordered eating behaviours in this age group.

The principal research question was:

- Do problems with emotion regulation mediate the link between emotional abuse or neglect and disordered eating behaviour in a general population of adolescents?

In line with what previous research has found, the research hypotheses were as follows:

1. Level of early emotional maltreatment will be positively correlated with disordered eating behaviour.
2. Level of early emotional maltreatment will be positively correlated with dysfunctional emotion regulation strategies.
3. Dysfunctional emotion regulation strategies will be positively correlated with disordered eating behaviour.

The mediation hypotheses for emotional abuse were:

1. Dysfunctional emotion regulation will mediate the relationship between emotional abuse and disordered eating as measured by the EAT-26.
2. Dysfunctional emotion regulation will mediate the relationship between emotional abuse and disordered eating as measured by the restraint scale of the DEBQ.
3. Dysfunctional emotion regulation will mediate the relationship between emotional abuse and disordered eating as measured by the emotional eating scale of the DEBQ.

The mediation hypotheses for emotional neglect were:

4. Dysfunctional emotion regulation will mediate the relationship between emotional neglect and disordered eating as measured by the EAT-26.
5. Dysfunctional emotion regulation will mediate the relationship between emotional neglect and disordered eating as measured by the restraint scale of the DEBQ.
6. Dysfunctional emotion regulation will mediate the relationship between emotional neglect and disordered eating as measured by the emotional eating scale of the DEBQ.

Chapter 2: Method

2.1 Design

This was a cross-sectional survey study of community-based adolescents (14-18 years) using standardised questionnaire measures.

2.2 Participants

Participants were 230 secondary school pupils in a state high school within a largely rural local authority area. Four consent forms were not completed fully and so data from these participants were not used in the analyses, taking the sample size to 226¹.

Pupils were in third to sixth year (age 14-18; mean age 15.38 years; SD=1.054²). 125 participants were male (55.6 %), 100 were female (44.4 %). One participant did not indicate their gender. Participants were not excluded for any reason, other than if their parents or they themselves opted-out of taking part in the study. Potential participants were also asked not to take part if they had been absent for the research briefing session which took place in school the week prior to data collection.

268 pupils were invited to take part. 21 opted out through personal choice; 5 opted out via parent choice; 11 were asked not to take part due to absence on the day of the research briefing and 1 was asked not to take part as they made the researcher aware that they had forgotten to inform their parents. 230 pupils completed questionnaires (85.83% participation rate).

¹ Due to missing data, data from 4 of the participants were excluded from analysis –hence the final participant number of 222.

²One participant did not provide their age

2.3 Measures

Participants were asked to indicate their gender, age and their height and weight if known. The questionnaire pack was an A4 sized booklet, seven pages in length, comprising of four questionnaires (see Appendix 1).

2.3.1 *The Regulation of Emotions Questionnaire (REQ, Phillips & Power, 2007)*

The Regulation of Emotions Questionnaire is a 21-item questionnaire designed to measure the emotion regulation strategies of adolescents. It measures the tendency to use both functional and dysfunctional emotion regulation strategies and asks respondents to rate how often they use each strategy on a 5-point Likert scale (i.e. Never, Seldom, Often, Very Often, Always). Examples of questionnaire items representing functional responding to emotions include: “I talk to someone about how I feel” (External functional) and “I review (rethink) my goals or plans” (Internal functional). Items related to dysfunctional emotion regulation responses include: “I harm or punish myself in some way” (Internal dysfunctional) and “I try to make others feel bad (e.g. being rude, ignoring them)” (External dysfunctional). It provides a total mean score on four subscales: External functional (6 items), internal functional (5 items), external dysfunctional (5 items) and internal dysfunctional (5 items) emotion regulation strategies, by calculating the mean score for all the items on each subscale. A higher mean score indicates greater utilisation of emotion regulation strategies on that subscale. It is reported to have good psychometric properties (e.g. reporting Cronbach’s alpha coefficients for the subscales of .66 (EF), .72 (ID), .76 (IF and ED) and is a valid measure of both functional and dysfunctional emotion regulation with adolescents (Phillips & Power, 2007).

While the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a frequently cited measure of emotion regulation used in this area of research, it is used mostly with adults. Following a small pilot study, first with the DERS, then with the REQ, it was decided that the Regulation of Emotion Questionnaire, designed specifically for adolescents, was more user-friendly and more appropriate for this sample group. Cronbach’s alpha coefficients for the current study were .68 and .61 (for internal functional and external functional respectively) and .70 and .81 (for internal dysfunctional and external dysfunctional respectively).

2.3.2 *The Childhood Trauma Questionnaire (CTQ, Bernstein & Fink, 1997) – Emotional Abuse and Emotional Neglect Sub-Scales*

The CTQ is a 28-item self-report measure that screens for a history of childhood abuse and neglect. It is suitable for use with adolescents aged 12 and above and its brevity and ease of use promotes it as a research tool, as well as for clinical use (Bernstein *et al.*, 2003). The measure in its entirety covers five types of maltreatment: physical, sexual and emotional abuse, and physical and emotional neglect (Bernstein & Fink, 1998). For the purposes of the present study, only the emotional abuse and emotional neglect components of the questionnaire were included, with five items in each. Responses are indicated on a 5-point Likert scale, ranging from Never True, Rarely True, Sometimes True, Often True and Very Often True. Example items are, “People in my family said hurtful or insulting things to me” (Emotional Abuse Scale) and “I felt loved” (Emotional Neglect Scale, scored in reverse). A total score for each subscale was then obtained, and the cut-off scores recommended by Bernstein and Fink to quantify extent of maltreatment were applied. Participants were considered to display a significant history of emotional abuse if they scored within either of the top two categories of the childhood trauma scale (within the moderate-severe or severe-extreme range). This therefore applied to participants scoring 13 or above (13-15 Moderate [to Severe]; ≥ 16 Severe [to Extreme]). Likewise, participants were considered to display a significant history of emotional neglect when they scored at least 15 on the emotional neglect subscale, again within either of the two top categories (15-17 Moderate [to Severe]; ≥ 18 Severe [to Extreme]). Continuous scores were used in all analyses.

The CTQ is a valid and reliable measure appropriate for use with a community sample (Paivio & Cramer, 2004; Scher *et al.*, 2001). Despite it being more widely used as the full 28-item measure, research has found usefulness of both the measure as a whole and individual subscale scores for community sample use (Scher *et al.*, 2001). Cronbach’s alpha coefficients in the original validation sample for community use were .89 and .92 for emotional abuse and emotional neglect

respectively. Cronbach's alpha coefficients in the current study were .86 (emotional abuse) and .72 (emotional neglect).

2.3.3 *The Eating Attitudes Test (EAT-26; Garner et al., 1982)*

The EAT-26 is the most widely cited standardised measure of screening for symptoms indicative of eating disorders (McEwen & Flouri, 2009). Participants indicate their answer on a 6-point Likert scale (i.e. Always, Usually, Often, Sometimes, Rarely, Never). This 26-item section provides a total test score, as well as subscale scores on a Dieting Scale (13 items); Bulimia and Food Preoccupation Scale (6 items); and an Oral Control Scale (7 items). Example items include, "Avoid eating when I am hungry" (Oral Control Scale), "Feel uncomfortable after eating sweets" (Dieting Scale) and "Find myself preoccupied with food" (Bulimia and Food Preoccupation Scale). A total test score of 20 or above is indicative of an individual being at risk of an eating disorder. It was decided to omit some introductory questions and the behavioural section of the questionnaire, as the questions were considered intrusive for the age group (e.g. use of laxatives & vomiting) and of no added relevance for the purposes of the study. This was observed to have been done in previous studies (e.g. McEwen & Flouri, 2009). Continuous scores of both the total score and subscale scores were used for the analysis, as has been done in other studies (e.g. Hund & Espelage, 2006). The EAT-26 is reported to have high internal consistency and test-retest reliability (Garner *et al.*, 1982). This measure is free to use, and is available online (<http://www.eat-26.com/>). Cronbach's alpha coefficients in the current study were .91 (EAT-26 total score), .90, .79, and .72 for the dieting, bulimia and oral control subscales respectively.

2.3.4 *The Dutch Eating Behavior Questionnaire (DEBQ; van Strien et al., 1986)* *–Restraint Scale and Emotional Eating Scale*

As well as the EAT-26, it was considered useful to the research hypotheses to include two further subscales, focussing more on subclinical eating behaviours. The

DEBQ is a 33-item self-report measure for use with the general population, which includes scales on three types of eating style, each linked to a prominent theory on overeating (Braet *et al.*, 2008): emotional eating, external eating and restraint. It also enquires specifically about eating behaviour in response to different emotions. It was hoped that this could help identify eating styles which could potentially provide further insight into the influence of emotion regulation on eating at a subclinical level. Participants indicate their response to each item on a 5-point Likert scale (i.e. Never, Seldom, Sometimes, Often, Very Often). The present study adhered to the wording of the DEBQ as published in Wardle (1987), which was a validation study of its use with a general population in the UK. The DEBQ demonstrates good reliability and validity (e.g. van Strien *et al.*, 1986; Wardle, 1987). Cronbach's alpha coefficients in the validation sample were .95 and .94 for restraint and emotional eating respectively.

The present study chose to include only the items on the emotional eating scale (13 items) and the restraint scale (10 items), as these scales were linked to the hypotheses of the study. Eating in response to external cues was not considered as relevant to the research hypotheses, and indeed this scale has been criticised for not being related to actual external eating behaviour (Jansen, 2011). Item examples include, "When you have eaten too much, do you eat less than usual on the following days?" (Restraint) and "Do you have a desire to eat when you are bored or restless?" (Emotional Eating). Total mean scores for the emotional eating and restraint subscales were calculated and used for later analysis. Cronbach's alpha coefficients in the current study were .94 and .93 for restraint and emotional eating respectively.

2.4 Procedure

2.4.1 Pilot study

A small pilot study was conducted, asking participants first to complete a questionnaire pack including the DERS and then to complete a questionnaire pack using the REQ, to inform usability and approximate questionnaire completion time. Feedback from this showed the REQ to be more user-friendly leading to its inclusion

in the final questionnaire pack. The pilot study indicated that 20 minutes would be sufficient for the questionnaire packs to be completed.

2.4.2 Permission for measure use

The REQ and CTQ were obtainable from the University of Edinburgh and an author of the REQ was contacted to make them aware of the research taking place. As the EAT-26 is protected under copyright, permission for use of the EAT-26 was granted by contacting the author via the EAT-26 website (see Appendix 2).

2.4.3 Power calculation

A medium effect size was considered likely to be obtained, with medium effects being found in previous studies in this line of research (e.g. Kong & Bernstein, 2009). Using guidance by Fritz and MacKinnon (2007) estimating sample sizes to detect mediation effects, a minimum sample size of 90 was required in order to achieve power of .80 as recommended for mediation analysis (Fritz & MacKinnon, 2007).

2.4.4 Ethical approval

The study was approved by Edinburgh University D.Clin.Psychol Research Ethics Committee with no ethical concerns identified. The researcher contacted Clinical Governance in the local health board and it was confirmed that the study was not required to go through the full NHS IRAS ethics process (see Appendix 3). Consent from the Local Education Authority (LEA) was then sought and the researcher was given formal permission for the research to take place within the local authority area (Appendix 4). The LEA advised the researcher to liaise with the head teacher in the local school, who would give assistance regarding permission to contact any further schools. When proof of Local Education Authority was provided to Clinical Governance in the NHS, the study was approved by those on the ethics committee and a letter was issued indicating permission had been granted for the study to begin (Appendix 5).

The researcher contacted the school in the local area which she was directed to by the LEA and met with a senior member of staff to explain the research aims and invite the school to take part. Permission was granted to invite all 3rd to 6th year pupils to

take part in the research. The researcher liaised with the pastoral teachers and two sessions in consecutive weeks were agreed for the researcher to be present in 3rd to 6th year pupils' PSE (Personal & Social Education) classes - the first week to inform pupils about the research and the second week for data collection.

Prior to commencing data collection, the UK Research Integrity Office Code of Practice for Research (UKRIO, 2009) was consulted, to ensure the researcher was adhering to important ethical considerations during data collection. Publications by the British Psychological Society were also then consulted (e.g. *Guidelines for Minimum standards of Ethical Approval in Psychological Research*, BPS, 2004), to ensure procedure was in keeping with the standards of the profession. The points mentioned in the research brief, debrief and participant information sheet were all based on these guidelines.

2.4.5 The research brief – Inviting pupils to take part

During the first session, the researcher met with the pupils to explain the research study, distribute participant information sheets and opt-out consent forms for parents/guardians and was present to answer any questions about the study (see Appendices 6 & 7 respectively). The researcher asked the pupils to read the sheet further over the following week, to show the consent form to their parents/guardians and decide whether they would like to take part or not. The researcher followed a prompt sheet of all areas to cover during the brief, to ensure continuity across classes as much as possible and to ensure no important points were missed.

2.4.6 Data collection

2.4.6.1 Consent form and questionnaire distribution

At the time of data collection, the researcher reiterated the points on the participant information sheet, especially regarding what participants would be required to do and emphasised the voluntary nature of the research. The researcher once again followed a prompt sheet, to ensure all points were covered. Teaching staff made the researcher aware of any pupils whose parents did not consent for them to take part. Tacit consent was assumed for parents who did not respond. Any pupils who had been absent the week before, missing the research brief or who made it known to the

researcher that they had forgotten to inform their parents were informed that they would be unable to take part. This was in order to adhere to the BPS guidelines that parents/guardians of school children under 18 years must be informed of research and given the opportunity to opt-out if they wish (BPS, 2004).

Prior to distributing questionnaire packs, the researcher reiterated that participation was completely voluntary, that they were free to cease completion at any point and urged pupils to feel free to do something else instead. This was an attempt to reduce any feelings of obligation to take part as much as possible. Pupils were asked to have alternative materials on their desks, so as not to draw attention if they were choosing not to take part. Matched numbering was used, to link consent forms and questionnaires, in order to be able to later trace a corresponding questionnaire, should the consent form not be adequately completed. This was in order to evidence consent for each questionnaire contributing to the data collection, given that recorded consent is a legal obligation of researchers (*Guidelines for Minimum Standards of Ethical Approval in Psychological Research, BPS, 2004*). In order to ease any participant anxiety regarding confidentiality (e.g. regarding providing their name and signature on the consent form), consent forms were collected at the beginning of questionnaire completion and placed in a separate box. Participants were informed that these would be kept in a locked drawer and stored separately from their questionnaire responses. Following questionnaire completion, the questionnaires were placed in a separate box.

2.4.6.2 De-brief

Participants were de-briefed at the end of questionnaire completion and thanked for their participation. A slip of paper was distributed to all participants (Appendix 8), listing suggestions of sources of support in the event that the content of the research had caused them any upset. The researcher's contact details were also provided (as recommended by the BPS, 2009), for them to contact her in the weeks that ensued if they had any queries about the research. The researcher informed pupils that it was hoped that the research would be published and disseminated in other ways, for example, through presentations, to make them aware of likely use of the data (as

recommended by the UK Research Integrity Office). Pupils were given the opportunity to ask questions.

2.4.7 Collation of the data

The questionnaires were scored and the data entered into Predictive Analytics Software -PASW Statistics v.18. A total of 32 participants had missing data, meaning 14.2% of the sample had at least one item missing. Four participants had missing data at the variable level, and so were excluded from any further analysis. The remaining 28 cases had missing data at the item level. Missing value analysis was run on PASW to examine the pattern of missing data. The EAT-26 measure had the most missing values, although this was in a relatively few number of cases (5.4%). Little's MCAR test was not significant and so was indicative of the data being missing completely at random (MCAR). Due to the data appearing to be MCAR and the small number of cases with missing items, the selected method of treating the missing values was not considered too crucial (Kline, 2011). Case mean substitution was used to replace the missing values, as it was considered that this could be the most accurate estimation of how a participant would have responded – and indeed is reported to be especially useful in research using self-report measures, where items on a measure are expected to be highly correlated (Fox-Wasylyshyn & El-Masri, 2005). The case means were then rounded up to the nearest whole number, as other authors have reported doing (Mazzeo & Espelage, 2002).

In all reports of subsequent analysis, therefore, the sample size is 222.

2.4.8 Data analysis

Data were found to be significantly positively skewed across all measures and their subscales, (except for the REQ internal-functional subscale). Square root transformation, reciprocal transformation and log transformation were each carried out on the scores, to examine the effect on distribution. The log transformation in particular brought the distributions more closely towards normal. Pearson

correlations were carried out with the log transformed scores and compared with the results of Pearson correlations with the original data. The correlation results were very similar (i.e. the same significant results found regardless of approach) and so it was concluded that despite the skewness, results of the correlations with the original data appear to be reliable and would provide greater ease of interpretation.

Independent t-tests were then carried out with the original data to examine gender differences in scoring across the measures.

The data was then further analysed to test the meditational hypotheses, that internal or external dysfunctional emotion regulation would mediate the link between emotional maltreatment and disordered eating behaviour. Mediation refers to cases where the significant total relationship between an independent variable (emotional abuse or neglect in the current study) and a dependent variable (disordered eating in the current study) can be accounted for in part or completely by a mediator variable (Mathieu & Taylor, 2006). Multiple mediation analyses were carried out for each of the mediation hypotheses, using 'Indirect' a PASW macro for multiple mediation (Preacher & Hayes, 2008). This program can be downloaded from the authors' website and is then run through PASW. It uses the product of coefficients approach and bootstrap confidence intervals to examine the total and specific effects of X (independent variable) on Y (dependent variable) through one or more mediators (Preacher & Hayes, 2008).

Chapter 3: Results

3.1 Descriptive statistics

3.1.1 Demographic information

Of the 222 participants whose data is presented in the following analyses, 123 were male (55.4% of the sample) and 99 were female (44.6%). The age range was 14-18 years (mean age 15.38 years; SD= 1.05). As data were gathered from one high school in a small rural area, there was little variation in socioeconomic status.

Although not a main focus of the study, as part of the EAT-26 measure, data were gathered allowing BMI to be calculated for those reporting height and weight. 120 participants (54.1%) of the sample provided data on this and of these, the majority of participants (78.3%) fell in the normal range, 12.5% in the overweight range, 6.7% in the obese range and 2.5% in the underweight range.

3.1.2 Descriptives

The mean, median, standard deviations and range of scores across the measures are presented in Table 3.1.

Table 3.1. Mean, median, standard deviation and range of scores on all measures

Measure	Sample as a whole				
	Mean (SD) Males	Mean (SD) Females	Mean (SD)	Median	Range
REQ (mean total scores)					
Internal functional	2.71 (0.67)	2.68 (0.52)	2.70 (0.61)	2.80	1.00-4.40
External functional	2.71 (0.69)	2.90 (0.66)	2.80 (0.68)	2.67	1.50-6.17
Internal dysfunctional	2.08 (0.64)	2.31 (0.71)	2.19 (0.68)	2.00	1.20-5.00
External dysfunctional	1.96 (0.71)	1.81 (0.62)	1.89 (0.67)	1.80	1.00-5.00
CTQ					
Emotional abuse	8.16 (4.02)	8.55 (3.74)	8.33 (3.90)	7.00	5-25
Emotional neglect	10.67 (4.26)	10.52 (4.22)	10.60 (4.23)	10.00	5-25
EAT-26					
Dieting	2.75 (5.54)	6.15 (7.47)	4.27 (6.67)	2.00	0-39
Bulimia	0.98 (2.55)	0.93 (2.00)	0.96 (2.32)	0.00	0-15
Oral control	1.83 (3.12)	2.55 (3.34)	2.15 (3.23)	1.00	0-21
Total EAT-26	5.56 (9.66)	9.63 (11.44)	7.37 (10.66)	4.00	0-73
DEBQ (mean total scores)					
Restraint	1.70 (0.79)	2.55 (0.90)	2.08 (0.94)	1.95	1.00-5.00
Emotional eating	1.77 (0.73)	2.31 (0.78)	2.01 (0.80)	1.92	1.00-4.85

3.1.3 Prevalence of emotional maltreatment and disordered eating

3.1.3.1 Early emotional maltreatment

Participants were considered to display a history of emotional maltreatment if they scored within either of the top two categories of the childhood trauma scale subscales (within the moderate-severe or severe-extreme range). For emotional abuse, 24 participants (10.8% of the sample), 13 male and 11 female, fell within these ranges. For emotional neglect, 45 participants (20.3% of the sample), 25 male and 20 female scored within these ranges. This appears to be in line with findings of other studies in the general population (Baker & Maiorino, 2010).

3.1.3.2 *Disordered eating behaviour*

Using the recommended score of ≥ 20 on the EAT-26 as a cut-off mark, the scores of 17 participants (11 female, 6 male; 7.7% of the sample) were indicative of them being at risk of a clinical eating disorder. This is similar to prevalence reported in other studies (e.g. De Berardis *et al.*, 2007).

3.1.4 *Gender differences in scores across measures*

Independent samples t-tests were conducted to determine if there were any gender differences in scoring across the measures. Childhood emotional maltreatment scores did not differ significantly between males and females (Emotional abuse $t(220)=.726$, $p=.468$; Emotional neglect $t(220)=-.265$, $p=.792$). Scores were not found to differ significantly between males and females on the use of internal functional emotion regulation strategies ($t(220)=-.363$, $p=.717$) or external dysfunctional regulation strategies ($t(220)=-1.618$, $p=.107$). Differences between males and females were found to be significant, however, for external functional emotion regulation ($t(220)=2.034$, $p<.05$) and internal dysfunctional emotion regulation ($t(220)=2.528$, $p<.05$), where females scored more highly for both. Gender differences were found across many of the eating measures. The EAT-26 total score differed significantly between males and females ($t(220)=2.869$, $p<.01$), as did scores on the dieting subscale for males and females ($t(176)=3.776$, $p<.001$), where females had higher scores. There were no gender differences in scores on the EAT subscales bulimia and food preoccupation ($t(220)=-.173$, $p=.862$) or oral control ($t(220)=1.649$, $p=.101$). Scores on the DEBQ, were found to differ significantly between males and females on restraint ($t(220)=7.448$, $p<.001$) and

emotional eating ($t(220)=5.275, p<.001$), with females having higher scores than males.

3.2 Statistical analysis

3.2.1 Bivariate correlations

Pearson correlation coefficients and significance levels are reported in Table 3.2. Two of the outcome measures were highly correlated –the EAT-26 total score and the DEBQ restraint score ($r=.60$), with this being even higher for the dieting subscale of the EAT and the restraint scale ($r=.71$) as would be expected. The effect size of the correlation was considered using guidelines by Cohen (1992) of .10 (small effect), .30 (medium effect) and .50 (large effect).

Emotional maltreatment and disordered eating behaviour

Emotional abuse was significantly positively correlated with EAT-26 total scores, $r=.62$ (and all of the EAT-26 subscales), as well as with the DEBQ restraint, $r=.43$ and emotional eating subscales, although with a weaker $r=.18$ (all significant at $p<.01$ level, 1 tailed).

Emotional neglect was significantly positively correlated with the EAT-26 total score, $r=.34$ (and all subscales) and with the DEBQ restraint scale, $r=.21$ (all significant at the $p<.01$ level, 1 tailed). Emotional neglect was not significantly correlated with the DEBQ emotional eating scale.

Table 3.2. Pearson correlation coefficients between all variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. CTQ EA	-											
2. CTQ EN	.52**	-										
3. REQ IF	-.22**	-.41**	-									
4. REQ EF	-.18**	-.38**	.38**	-								
5. REQ ID	.55**	.21**	.10	-.12*	-							
6. REQ ED	.65**	.38**	-.29**	-.19**	.48**	-						
7. EAT-26 Total	.62**	.34**	-.11*	-.03	.49**	.51**	-					
8. EAT -Dieting	.58**	.31**	-.06	-.01	.48**	.45**	.95**	-				
9. EAT- Bulimia	.51**	.28**	-.18**	-.03	.36**	.56**	.73**	.57**	-			
10. EAT- oral control	.49**	.29**	-.12*	-.05	.37**	.36**	.82**	.65**	.52**	-		
11. DEBQ - restraint	.43**	.21**	.03	.03	.40**	.24**	.60**	.71**	.20**	.37**	-	
12. DEBQ - emotional eating	.18**	-.00	.03	.16**	.25**	.11	.15*	.18**	.20**	-.02	.30**	-

* p < .05 **p < .01 level (1-tailed). The CTQ shorthand represents the Childhood Trauma Questionnaire emotional abuse and emotional neglect subscales respectively. The REQ labelling refers to the Regulation of Emotions Questionnaire - internal functional emotion regulation scale, the external functional scale, the internal dysfunctional scale and the external dysfunctional scale. The EAT-26 refers to the Eating Attitudes Test total score, and subscales: dieting, bulimia and food preoccupation scale and oral control scale respectively. Finally, the DEBQ shorthand refers to the Dutch Eating Behaviour Questionnaire subscales -Restraint and Emotional Eating.

Support was therefore found for Hypothesis 1, through significant positive correlations for both emotional abuse and neglect with disordered eating, as measured by the EAT-26 and DEBQ restraint. The hypothesis was only partly upheld for the DEBQ emotional eating measure, however, with a weaker significant positive correlation being found for emotional abuse and non-significant results with emotional neglect.

Emotional maltreatment and dysfunctional emotion regulation strategies

Emotional abuse was significantly positively correlated with both internal dysfunctional ($r=.55$) and external dysfunctional emotion regulation ($r=.65$) at $p<.01$ level (1 tailed). Emotional neglect was also significantly correlated with internal dysfunctional ($r=.21$) and with external dysfunctional emotion regulation ($r=.38$). Interestingly, emotional abuse and neglect were also significantly negatively correlated with internal functional emotion regulation strategies ($r= -.22$ and $-.41$) and external functional emotion regulation ($r= -.18$ and $-.38$ respectively). Support for Hypothesis 2 was therefore found, i.e. both emotional abuse and emotional neglect were significantly positively associated with dysfunctional emotion regulation.

Dysfunctional emotion regulation strategies and disordered eating behaviour

Internal dysfunctional emotion regulation was significantly positively correlated with the EAT-26 total score ($r=.49$) (and all of its subscales) and with the DEBQ restraint ($r=.40$) and emotional eating ($r=.25$) scales at the $p<.01$ level (1 tailed). External dysfunctional emotion regulation was significantly positively correlated with the EAT-26 total score ($r=.51$) (and all subscales) and with the DEBQ restraint ($r=.24$), $p<.01$ (1 tailed). There was no significant correlation found between external dysfunctional and DEBQ emotional eating. Support was therefore found for Hypothesis 3 for internal dysfunctional emotion regulation strategies and all measures of disordered eating and for external dysfunctional emotion regulation strategies for all disordered eating measures except DEBQ emotional eating.

Interestingly, for functional emotion regulation strategies with the EAT-26 total, internal functional was significantly negatively correlated, although weakly, with EAT total score ($r=-.11$, $p<.05$). EAT total score was negatively although not significantly, correlated with external functional. Internal functional was not significantly correlated with restraint or emotional eating ($r=.03$ for each) and external functional was not significantly correlated with restraint but was significantly correlated with emotional eating ($r=.16$, $p<.01$).

In summary therefore, significant positive correlations were found in the relationships between all dysfunctional emotion regulation strategies and disordered eating, except for external dysfunctional emotion regulation and the DEBQ emotional eating scale.

3.3 Multiple mediation analysis –Indirect effects

In order to understand the relationships between emotional maltreatment, emotion regulation and disordered eating variables in more detail, multiple mediation analyses were carried out, using *Indirect*, a macro add-on which can be downloaded to work alongside PASW Statistics (Preacher and Hayes, 2008). Preacher and Hayes explain that mediation goes beyond correlation, by facilitating the study of underlying processes and possible causal relations. The mediation analyses in the current study were based on the model shown in Figure 3.1. It was hypothesised that dysfunctional emotion regulation (both internal and external) would mediate the link between emotional maltreatment and disordered eating. The order of the variables in the model are therefore based on the research hypotheses, as advised in the mediation literature (Preacher & Hayes, 2008). As the mediation literature explains, methods of studying multiple mediation are not well documented (Preacher & Hayes, 2008), and so detail regarding interpretation of the approach used is given below.

Six analyses were carried out, three for emotional abuse (with each of the three eating measures as outcome variables) and three for emotional neglect (with each of the three eating measures as outcome variables). All mediation analyses were testing

for indirect and total effects of emotional maltreatment on disordered eating, using internal and external dysfunctional emotion regulation scores as mediator variables.

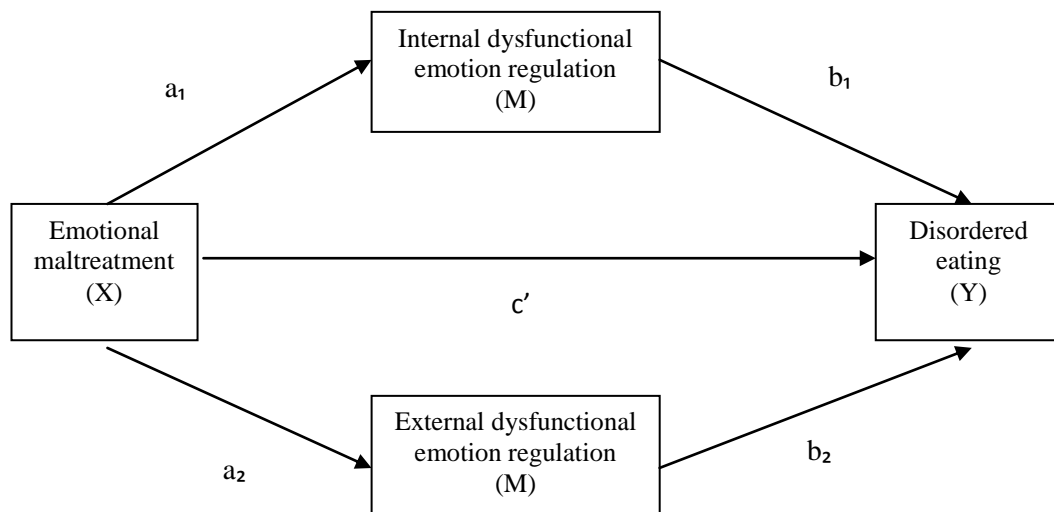


Figure 3.1. Model for multiple mediation analyses for each of the 6 models (Based on graphical representation of other multiple mediation models, e.g. Preacher and Hayes, 2008).

Explanation of the model

The direct effect of emotional maltreatment on disordered eating is represented by c' . The two proposed mediators, internal dysfunctional emotion regulation and external dysfunctional emotion regulation, can each be referred to as 'M'. The specific indirect effect of internal dysfunctional emotion regulation is a_1b_1 and of external dysfunctional emotion regulation is a_2b_2 . The total indirect effect is $a_1b_1+a_2b_2$. The total effect (c) = $c'+a_1b_1+a_2b_2$. All of the individual paths (e.g. a_1 , or b_1) are quantified with unstandardised regression coefficients (Preacher & Hayes, 2008). Although with all research, cause is not able to be determined for certain, the direction of the arrows in Figure 3.1 demonstrate that in a mediation model, “the independent variable *causes* the mediator which then *causes* the dependent variable” [Emphasis added] (MacKinnon, 2008, p.8). Product of coefficients (also known as the Sobel test) and bootstrapping approaches were used. Authors of the ‘Indirect’ programme recommend using these approaches in combination, firstly for bootstrapping to confirm findings of the product of coefficients approach, and secondly as bootstrapping does not rely on assumptions of a normal distribution in

the sample (Preacher & Hayes, 2008). Bootstrapping is a procedure which estimates the indirect effect by repeatedly sampling from the data set. Through repeating this process thousands of times, confidence intervals are derived for the indirect effect (Preacher & Hayes, 2008). The bootstrap estimates were based on 2000 bootstrap samples.

Difference between mediation and indirect effects

In multiple mediation models, the researcher should study both the total indirect effect of X on Y, but also the specific indirect effects (e.g. a_1b_1 or a_2b_2) (Preacher & Hayes, 2008). Authors argue that even in the absence of a significant direct relation between the IV (X) and the DV (Y), mediation is still possible (e.g. MacKinnon, 2008; Preacher & Hayes, 2008) and indirect effects should be studied, as “X can still exert an indirect effect on Y *through M*” (Hayes, 2009, pp.414). In cases such as this, when the c’ path is non-significant but the indirect effect (e.g. a_1b_1) is statistically significant, authors in the mediation field (e.g. Holmbeck, 1997) conclude there is an *indirect* effect although it cannot be termed mediation as such (as cited in MacKinnon, 2008) (the explanation for this being that a mediator cannot account for a relationship which was not significant in the first place; MacKinnon, 2008). To clarify the difference between mediation and indirect effect: an indirect effect is described as occurring in cases where X and Y are not directly related (e.g. correlations between them are likely non-significant) but they are *indirectly* related through significant relationships with the linking variable (Mathieu & Taylor, 2006) (i.e. IV and mediator are likely significantly correlated and mediator and DV are likely significantly correlated). It is possible for the total effect and the total indirect effect to be non-significant and for an indirect effect still to exist, for example if one mediator’s overall effect (a_1b_1) was positive and the other (a_2b_2) was negative, they can cancel each other out (Hayes, 2009). Hayes therefore recommends studying individual paths (with unstandardised regression coefficients being presented for each path), in order that interesting effects underlying relationships are not missed by researchers.

Interpreting the output

The output for this mediation analysis presents coefficients and significance values for each of the individual paths in the model, data on the total indirect effect and p values. Preacher and Hayes explain that the direct effects of X on Y and total effects (i.e. including the mediators) are examined to see if there is a difference between the two, which would therefore suggest an indirect effect. Bootstrapping produces confidence intervals (CI) for the indirect effects. If zero is not between the lower and upper CI, then it can be concluded that the indirect effect is not zero, and therefore one can be confident in an effect (as explained by Preacher and Hayes, 2008).

In some of the following analyses showing non-significant total, direct and indirect effects, *single* mediation analysis was carried out on only one mediator (internal dysfunctional as explained below), to allow effects to be examined without the presence of external dysfunctional emotion regulation in the model.

3.3.1 Emotional abuse

Mediation analysis 1: Emotional abuse, dysfunctional emotion regulation and EAT-26 total score

Results of a multiple mediation model testing Mediation Hypothesis 1 - that dysfunctional emotion regulation would mediate the link between emotional abuse and disordered eating, as measured by the EAT-26 - are shown in Table 3.3.

Table 3.3. Mediation of the effect of emotional abuse on disordered eating, as measured by the EAT-26, through internal dysfunctional and external dysfunctional emotion regulation

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping BC 95% CI		BCa 95% CI	
		SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect effects									
Internal dysfunctional emotion regulation	0.2886	0.0971	2.9708	0.0352	0.5455	0.0770	0.5919	0.0853	0.6139
External dysfunctional emotion regulation	0.2616	0.1226	2.1331	-0.0436	0.5999	-0.0332	0.6257	-0.0220	0.6373
TOTAL	0.5502	0.1433	3.8405	0.1294	1.0182	0.1617	1.0760	0.1943	1.1657
Contrasts									
Internal vs. external	0.0270	0.1688	0.1598	-0.3615	0.3997	-0.3458	0.4133	-0.3350	0.4221

Product of coefficients analysis

The product of coefficients analysis found a specific indirect effect for internal dysfunctional which was significant, $a_1b_1=.2886$, ($Z=2.97$, $p=.0030$) and for external dysfunctional emotion regulation which was also significant, $a_2b_2=.2616$, ($Z=2.13$, $p=.0329$) in the relationship between emotional abuse and total score on the EAT-26. The paths from emotional abuse to internal dysfunctional, $a=.0951$, ($t=9.70$, $p<.0001$) and from internal dysfunctional to EAT-total score, $b=3.0333$, ($t=3.10$, $p<.005$) were both significant. Similarly there were significant paths from emotional abuse to external dysfunctional, $a_2=.1118$, ($t=12.68$, $p<.0001$) and from external dysfunctional to EAT-total score, $b_2=2.3406$, ($t=2.15$, $p<.05$). Emotional abuse was therefore related to greater use of dysfunctional emotion regulation strategies, which was associated with increased disordered eating.

Bootstrapping

In agreement with the results of the product of coefficients analysis, bootstrapping found the total effect (c path) of emotional abuse on EAT-total score to have a coefficient of 1.6954, ($t=11.72$, $p<.001$) and the direct effect (c' path) of emotional abuse on EAT-total score to have a coefficient of 1.1452, ($t=5.81$, $p<.001$). The difference between the total and the direct effect of emotional abuse on EAT-total

score was therefore different from zero, confirming that there was an indirect effect of the entered mediator variables. The total indirect effect was a point estimate of .5502 and 95% BCa bootstrap confidence intervals of .1943 to 1.1657 which was significant ($Z=3.84$, $p=.0001$). An examination of the specific indirect effects indicated that internal dysfunctional emotion regulation was a significant mediator, since its 95% confidence intervals did not contain zero.

Mediation analysis 2: Emotional abuse, dysfunctional emotion regulation and DEBQ restraint scale

Results of a multiple mediation model testing Hypothesis 2 – that dysfunctional emotion regulation would mediate the link between emotional abuse and disordered eating, as measured by the DEBQ restraint scale - are shown in Table 3.4.

Table 3.4. Mediation of the effect of emotional abuse on disordered eating, as measured by the DEBQ restraint scale, through internal dysfunctional and external dysfunctional emotion regulation

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping BC 95% CI		BCa 95% CI	
		SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect effects									
Internal dysfunctional emotion regulation	0.0324	0.0100	3.2332	0.0105	0.0574	0.0116	0.0591	0.0113	0.0589
External dysfunctional emotion regulation	-0.0187	0.0124	-1.5058	-0.0423	0.0070	-0.0443	0.0040	-0.0448	0.0033
TOTAL	0.0137	0.0145	0.9437	-0.0166	0.0480	-0.0184	0.0462	-0.0206	0.0455
Contrasts									
Internal vs. external	0.0511	0.0174	2.9458	0.0169	0.0852	0.0192	0.0889	0.0188	0.0887

Product of coefficients analysis

From the product of coefficients analysis, the specific indirect effect of emotional abuse on restraint score, through internal dysfunctional was significant ($a_1b_1=0.0324$,

$p=.0012$), while the indirect effect through external dysfunctional emotion regulation was non-significant ($a_2b_2=-0.0187$, $p=.1321$). The paths from emotional abuse to internal dysfunctional, $a_1=.0951$ ($t=9.70$, $p<.0001$) and from internal dysfunctional to restraint score, $b_1=.3404$ ($t=3.41$, $p=.0008$) were significant. It seems likely that internal dysfunctional is an important mediator ($Z=3.23$, $p=.0012$). There was a significant path from emotional abuse to external dysfunctional, $a_2=.1118$ ($t=12.68$, $p<.0001$) but not from external dysfunctional emotion regulation to restraint, $b_2=-.1676$ ($t=-1.51$, $p=.1335$). Emotional abuse was therefore related to greater use of internal dysfunctional emotion regulation strategies, which was associated with greater restraint.

Bootstrapping

In agreement with the results of the product of coefficients analysis, bootstrapping found the total effect (c path) of emotional abuse on restraint to have a coefficient of 0.1042, ($t=7.13$, $p<.0001$) and the direct effect (c' path) of emotional abuse on restraint score to have a coefficient of 0.0906 ($t=4.50$, $p<.0001$). The difference between the total and the direct effect of emotional abuse on restraint was therefore different from zero. The total indirect effect through the two mediators was a point estimate of 0.0137 and 95% BCa bootstrap CI of -0.0206 to 0.0455, which was not significant ($Z=.9437$, $p=.3453$). This appeared to be due to the overall positive effect of a_1b_1 , and overall negative effect of a_2b_2 in the same model, cancelling each other out (which is possible, as reported by Hayes, 2009). Bootstrapping showed the specific indirect effect of internal dysfunctional emotion regulation to have 95% BCa bootstrap CI's of .0113 to .0589. As these intervals do not include zero, it can be concluded that there was a specific effect of internal dysfunctional emotion regulation on the relationship between emotional abuse and restraint. This was further confirmed by using a single mediation analysis, with only internal dysfunctional as a potential mediator. This analysis found a significant total indirect effect of .0297 ($Z=3.03$, $p=.0025$), with 95% BCa bootstrap CI's of .0095 to .0570, therefore providing further evidence of emotional abuse exerting an influence of restraint indirectly via internal dysfunctional emotion regulation.

Mediation analysis 3: Emotional abuse, dysfunctional emotion regulation and DEBQ emotional eating scale

Results of a multiple mediation model testing Mediation Hypothesis 3 - that dysfunctional emotion regulation would mediate the link between emotional abuse and disordered eating, as measured by the DEBQ emotional eating scale - are shown in Table 3.5.

Table 3.5. Mediation of the effect of emotional abuse on disordered eating, as measured by the DEBQ emotional eating scale, through internal dysfunctional and external dysfunctional emotion regulation

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping BC 95% CI		BCa 95% CI	
		SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect effects									
Internal dysfunctional emotion regulation	0.0255	0.0092	2.7593	0.0056	0.0479	0.0066	0.0492	0.0063	0.0483
External dysfunctional emotion regulation	-0.0074	0.0116	-0.6411	-0.0298	0.0202	-0.0311	0.0180	-0.0311	0.0175
TOTAL	0.0181	0.0134	1.3428	-0.0093	0.0524	-0.0102	0.0510	-0.0108	0.0503
Contrasts									
Internal vs. external	0.0329	0.0161	2.0448	-0.0026	0.0659	-0.0007	0.0682	-0.0007	0.0682

Product of coefficients

The product of coefficients analysis found specific indirect effects for internal dysfunctional which were significant, $a_1b_1=0.0255$ ($Z=2.76$, $p=.0058$) and indirect effects for external dysfunctional emotion regulation which were non-significant, $a_2b_2=-0.0074$, ($Z=-.6411$, $p=.5215$) in the relationship between emotional abuse and emotional eating. Once again, the paths from emotional abuse to internal dysfunctional, $a_1=.0951$ ($t=9.70$, $p<.0001$) and from internal dysfunctional to emotional eating, $b_1=0.2679$ ($t=2.85$, $p=.0047$) were both significant. The path from emotional abuse to external dysfunctional emotion regulation was significant ($a_2=.1118$, $t=12.68$, $p<.0001$) but the path from external dysfunctional to emotional eating was not significant ($b_2=-.0665$, $t=-0.64$, $p=.5244$). Emotional abuse was

therefore related to greater use of internal dysfunctional emotion regulation strategies which was related to increased emotional eating.

Bootstrapping

Bootstrapping found the total effect (c path) of emotional abuse on emotional eating to have a coefficient of 0.0361, ($t=2.66$, $p=.0084$) and the direct effect (c' path) of emotional abuse on emotional eating to have a coefficient of 0.0181 ($t=.96$, $p=.3394$). The direct effect was therefore non-significant. Hayes (2009) recommends exploring indirect effects, however, as they may link the independent and dependent variables where the direct relationship is not significant. The total indirect effect through the two mediators with a point estimate of 0.0181 ($t=1.34$, $p=.1793$) was not significant. Once again, this may have been due to the overall positive effect of a_1b_1 , and overall negative effect of a_2b_2 in the same model, cancelling each other out. Bootstrapping showed the specific indirect effect of internal dysfunctional emotion regulation to have 95% BCa bootstrap CI's of .0063 to .0483. As this does not include zero, it was considered that this was likely a significant effect. Single mediation analysis once again confirmed this, finding a total indirect effect point estimate of .0244, with 95% BCa CI's of .0046 to .0457 which was significant ($Z=2.69$, $p=.0070$) therefore providing evidence of emotional abuse being linked to emotional eating indirectly, via internal dysfunctional emotion regulation.

3.3.2 Emotional neglect

Mediation analysis 4: Emotional neglect, dysfunctional emotion regulation and the EAT-26 total score

Results of a multiple mediation model testing the above relationship are shown in Table 3.6.

Table 3.6. Mediation of the effect of emotional neglect on disordered eating, as measured by the EAT-26 total score, through internal dysfunctional and external dysfunctional emotion regulation

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping BC 95% CI		BCa 95% CI	
		SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect effects									
Internal dysfunctional emotion regulation	0.1687	0.0616	2.7382	0.0193	0.3908	0.0280	0.4315	0.0350	0.4665
External dysfunctional emotion regulation	0.2879	0.0776	3.7078	0.0608	0.6228	0.0687	0.6548	0.0792	0.6960
TOTAL	0.4566	0.1011	4.5162	0.1215	0.9404	0.1293	0.9852	0.1578	1.0508
Contrasts									
Internal vs. external	-0.1193	0.0972	-1.2267	-0.3937	0.1270	-0.4101	0.1129	-0.4101	0.1129

Product of coefficients

The product of coefficients analysis found specific indirect effects for internal dysfunctional, $a_1b_1=0.1687$ ($Z=2.7382$, $p=.0062$) and for external dysfunctional emotion regulation, $a_2b_2=0.2879$ ($Z=3.7078$, $p=.0002$) which were both significant in the relationship between emotional neglect and total score on the EAT-26. There were significant paths from emotional neglect to internal dysfunctional emotion regulation ($a_1=.0340$, $t=3.22$, $p=.0015$) and from internal dysfunctional emotion regulation to EAT-26 total score ($b_1=4.9612$, $t=5.13$, $p<.0001$). There were also significant paths from emotional neglect to external dysfunctional emotion regulation ($a_2=.0601$, $t=6.08$, $p<.0001$) and from external dysfunctional emotion regulation to EAT-26 total score ($b_2=4.7917$, $t=4.64$, $p<.0001$). Emotional neglect was therefore related to greater use of both internal and external dysfunctional emotion regulation strategies, which in turn were positively associated with disordered eating.

Bootstrapping

In agreement with the results of the product of coefficients analysis, bootstrapping found the total effect (c path) of emotional neglect on EAT-26 total score to have a coefficient of 0.8535, ($t=5.34$, $p<.0001$) and the direct effect (c' path) of emotional neglect on EAT-26 total score to have a coefficient of 0.3969, ($t=2.69$, $p=.0076$). The difference between the total and the direct effect of emotional neglect on EAT-

total score was therefore different from zero, indicating that there was an indirect effect of the entered mediator variables. An examination of the specific indirect effects indicated that both internal dysfunctional and external dysfunctional emotion regulation were mediators, since for both effects the 95% CI's did not contain zero. The indirect effect of internal dysfunctional emotion regulation was significant at $p < .01$ level, while the indirect effect of external dysfunctional emotion regulation was significant at $p < .0005$ level. The total indirect effect was a point estimate of .4566 with 95% BCa CI's of .1578 to 1.0508, which was significant ($Z=4.52$, $p < .0001$).

Mediation analysis 5: Emotional neglect, dysfunctional emotion regulation and the DEBQ restraint scale

Results of a multiple mediation model testing the above relationship are shown in Table 3.7.

Table 3.7. Mediation of the effect of emotional neglect on disordered eating, as measured by the DEBQ restraint scale, through internal dysfunctional and external dysfunctional emotion regulation

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping BC 95% CI		BCa 95% CI	
		SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect effects									
Internal dysfunctional emotion regulation	0.0168	0.0061	2.7332	0.0024	0.0374	0.0036	0.0406	0.0039	0.0422
External dysfunctional emotion regulation	0.0022	0.0062	0.3582	-0.0096	0.0172	-0.0089	0.0181	-0.0090	0.0179
TOTAL	0.0190	0.0078	2.4531	0.0001	0.0419	0.0013	0.0447	0.0019	0.0463
Contrasts									
Internal vs. external	0.0146	0.0096	1.5179	-0.0053	0.0396	-0.0038	0.0428	-0.0038	0.0428

Product of coefficients

The product of coefficients analysis found specific indirect effects for internal dysfunctional which were significant, $a_1b_1=0.0168$, ($Z=2.7332$, $p=.0063$), with

indirect effects for external dysfunctional which were non-significant, $a_2b_2=0.0022$ ($Z=.3582$, $p=.7202$) in the relationship between emotional neglect and restraint. The paths from emotional neglect to internal dysfunctional emotion regulation ($a_1=.0340$, $t=3.22$, $p=.0015$) and from internal dysfunctional to restraint ($b_1=0.4941$, $t=5.10$, $p<.0001$) were both significant. The path from emotional neglect to external dysfunctional emotion regulation was significant ($a_2=.0601$, $t=6.08$, $p<.0001$) but not from external dysfunctional emotion regulation to restraint ($b_2=0.0369$, $t=0.36$, $p=.7219$). Emotional neglect was therefore related to greater use of dysfunctional emotion regulation strategies, which in turn were related to more restrained eating behaviour –with internal dysfunctional in particular appearing to be a significant indirect effect.

Bootstrapping

In agreement with the result of the product of coefficients analysis, bootstrapping found the total effect (c path) of emotional neglect on restraint to have a coefficient of 0.0457, ($t=3.13$, $p=.0020$) and the direct effect (c' path) of emotional neglect on restraint score to have a coefficient of 0.0267 ($t=1.81$, $p=.0719$). The difference between the total and the direct effect of emotional neglect on restraint is therefore different from zero, indicating that there is an indirect effect of the entered mediator variables. The total indirect effect, with a point estimate of .0190, and a 95% BCa bootstrap CI of .0019 to .0463 was marginally significant ($p=.0142$). Examination of the specific indirect effects indicated that internal dysfunctional emotion regulation was likely to have a significant indirect effect, since its 95% BCa CI's did not contain zero. Single mediation analysis, with only internal dysfunctional emotion regulation as a mediator confirmed this, with a stronger total indirect effect, with a point estimate of .0173 ($p=.0047$). In this analysis the direct effect of emotional neglect on restraint became significant (although weakly, $p=.0428$). Single mediation analysis therefore found internal dysfunctional emotion regulation to mediate the link between emotional neglect and DEBQ restraint.

Mediation analysis 6: Emotional neglect, dysfunctional emotion regulation and DEBQ emotional eating scale

Results of a multiple mediation model testing the relationship between emotional neglect and emotional eating with dysfunctional emotion regulation strategies as mediators are shown in Table 3.8.

Table 3.8. Mediation of the effect of emotional neglect on disordered eating, as measured by the DEBQ emotional eating scale, through internal dysfunctional and external dysfunctional emotion regulation

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping BC 95% CI		BCa 95% CI	
		SE	Z	Lower	Upper	Lower	Upper	Lower	Upper
Indirect effects									
Internal dysfunctional emotion regulation	0.0103	0.0044	2.3676	0.0019	0.0213	0.0028	0.0237	0.0030	0.0239
External dysfunctional emotion regulation	0.0008	0.0056	0.1424	-0.0119	0.0141	-0.0119	0.0141	-0.0122	0.0140
TOTAL	0.0111	0.0060	1.8475	-0.0002	0.0244	-0.0005	0.0253	-0.0005	0.0253
Contrasts									
Internal vs. external	0.0095	0.0080	1.1851	-0.0083	0.0302	-0.0068	0.0329	-0.0068	0.0336

Product of coefficients

From the product of coefficients analysis, the specific indirect effect for internal dysfunctional was significant, $a_1b_1=0.0103$, ($Z=2.3676$, $p=.0179$) and for external dysfunctional was not significant, $a_2b_2=0.0008$, ($Z=.1424$, $p=.8867$). The paths from emotional neglect to internal dysfunctional emotion regulation ($a_1=.0340$, $t=3.22$, $p=.0015$) and from internal dysfunctional emotion regulation to emotional eating ($b_1=0.3031$, $t=3.46$, $p=.0007$) were both significant. The path from emotional neglect to external dysfunctional was significant ($a_2=.0601$, $t=6.08$, $p<.0001$) but not from external dysfunctional to emotional eating ($b_2=0.0132$, $t=0.14$, $p=.8876$). Emotional neglect was therefore related to greater use of dysfunctional emotion regulation

strategies, with internal dysfunctional emotion regulation in particular being linked to greater emotional eating.

Bootstrapping

Bootstrapping found the total effect (c path) of emotional neglect on emotional eating to have a coefficient of -0.0007 ($t=-0.06$, $p=.9533$), and the direct effect (c' path) of emotional neglect on emotional eating to have a coefficient of -0.0118 ($t=-0.89$, $p=.3761$). The difference between the total and the direct effect of emotional neglect on emotional eating is therefore different from zero, indicating that there is an indirect effect of the entered mediator variables (despite the total and direct effects being non-significant). The total indirect effect was a point estimate of .0111 and 95% BCa CI's of .0005 to .0253, which was not significant ($Z=1.85$, $p=.0647$). Despite a non-significant total indirect effect, examination of the specific indirect effects indicated that internal dysfunctional emotion regulation could be having an indirect effect. Single mediation analysis, looking at only internal dysfunctional as a mediator confirmed that there was a weak significant indirect effect of emotional neglect on emotional eating, through internal dysfunctional emotion regulation, with a point estimate of .0105 and 95% BCa CI's of .0032 to .0230 which was significant ($Z=2.50$, $p=.0125$).

3.4 Summary of mediation analyses

Emotional abuse

Emotional abuse had a significant direct effect on EAT-26 total score, which was strengthened through a mediation influence of internal dysfunctional emotion regulation. Support was therefore found for Mediation Hypothesis 1, with internal dysfunctional emotion regulation mediating the relationship between emotional abuse and total EAT-26 score. Emotional abuse had a significant direct effect on DEBQ restraint score, while the total indirect effect was non-significant in the analysis involving the two mediators. In the single mediation analysis, the total indirect effect was found to be significant. Support was therefore found for Mediation Hypothesis 2, with internal dysfunctional emotion regulation being found

to mediate the relationship between emotional abuse and restraint. Emotional abuse did not have a significant direct effect on DEBQ emotional eating scores, and the total indirect effect, in the multiple mediation analysis was non-significant. In studying internal dysfunctional emotion regulation in a single mediation analysis however, emotional abuse was found to have an indirect effect on emotional eating, through internal dysfunctional emotion regulation. While support was therefore not found for Hypothesis 3, in terms of mediation, an indirect effect through internal dysfunctional emotion regulation was once again found, which is interesting. It appears therefore, that while emotional abuse and emotional eating were not found to be linked *directly*, they have been found to be related *indirectly*, due to emotional abuse being linked with internal dysfunctional emotion regulation strategies, and to internal dysfunctional emotion regulation being linked to emotional eating.

Emotional neglect

Emotional neglect had a significant direct effect on EAT-26 total score, which was mediated by both internal and external dysfunctional emotion regulation. Support was therefore found for Mediation Hypothesis 4, with both internal and external dysfunctional emotion regulation being found to mediate the link between emotional neglect and EAT-26 total score. Emotional neglect did not have a significant direct effect on DEBQ restraint scores in the multiple mediation analysis. In the single mediation analysis, however, the direct effect was significant, therefore allowing the conclusion to be drawn that internal dysfunctional emotion regulation mediated the link between emotional neglect and DEBQ restraint. Mediation Hypothesis 5 was therefore supported. Emotional neglect did not have a significant direct effect on DEBQ emotional eating scores and indeed, its total effect was non-significant. Single mediation analysis with internal dysfunctional emotion regulation did, however, find a weak significant indirect effect of emotional neglect on emotional eating through internal dysfunctional emotion regulation. Hypothesis 6 was therefore partly supported, with emotional neglect being linked to DEBQ emotional eating through a weak but significant indirect effect of internal dysfunctional emotion regulation. Once again, the indirect effect appears to be due to significant

correlations between emotional neglect and internal dysfunctional emotion regulation and between internal dysfunctional emotion regulation and emotional eating.

Chapter 4: Discussion

4.1 Summary of findings

The main aim of the current study was to investigate the association between reports of early emotional maltreatment and disordered eating behaviour in a general population of adolescents. It was of particular interest in the study to determine whether dysfunctional emotion regulation mediated this relationship.

The results found promising preliminary data in support of a significant relationship between emotional abuse/neglect and disordered eating, mediated by internal dysfunctional emotion regulation, as discussed in further detail below. Results on the whole, therefore, were suggestive of internal dysfunctional emotion regulation in particular playing a vital role. To the best of the author's knowledge, this was the first study to look at the relationship between early emotional maltreatment and disordered eating behaviour with an emotion regulation mediator as its focus.

4.1.1 Findings in relation to the research hypotheses

Hypothesis 1: Emotional maltreatment and disordered eating

Hypothesis 1 stated that level of early emotional maltreatment would be positively correlated with disordered eating behaviour. This hypothesis was supported, with significant positive correlations being found for both emotional abuse and emotional neglect with disordered eating behaviour, as measured by the EAT-26 and the DEBQ restraint scale. The DEBQ emotional eating scale was weakly (although still significantly) correlated with emotional abuse, while its relationship with emotional neglect was non-significant.

Hypothesis 2: Emotional maltreatment and dysfunctional emotion regulation strategies

Hypothesis 2 stated that level of early emotional maltreatment would be positively correlated with dysfunctional emotion regulation strategies. Support was found for Hypothesis 2, with both emotional abuse and emotional neglect being found to be positively correlated with use of internal dysfunctional and external dysfunctional

emotion regulation strategies. It was of interest that functional emotion regulation strategies were significantly negatively correlated with emotional abuse and emotional neglect, therefore providing further support of maltreatment influencing the development of emotion regulation abilities.

Hypothesis 3: Dysfunctional emotion regulation strategies and disordered eating behaviour

Hypothesis 3 stated that dysfunctional emotion regulation strategies would be positively correlated with disordered eating behaviour. Hypothesis 3 was supported for two out of three of the outcome measures, with no significant correlation being found between external dysfunctional emotion regulation and the DEBQ emotional eating scale. Internal dysfunctional emotion regulation strategies were positively correlated with all three of the eating measures and external dysfunctional emotion regulation was positively correlated with the total EAT-26 score and DEBQ restraint scores.

4.1.2 Findings in relation to the mediation hypotheses

The main aim of the study was to determine if dysfunctional emotion regulation mediated the link between emotional maltreatment and disordered eating. Results were indicative of mediation occurring in four out of the six mediation analyses, with the two remaining analyses showing significant indirect effects.

Emotional abuse

Internal dysfunctional emotion regulation was found to mediate the link between emotional abuse and disordered eating (on the EAT-26 and DEBQ restraint scales). An indirect effect of emotional abuse exerting its influence on DEBQ emotional eating through internal dysfunctional emotion regulation was also found, although this cannot be termed ‘mediation’ as there was no *direct* relationship between emotional abuse and emotional eating (Hayes, 2009; MacKinnon, 2008). Support was therefore found for Mediation Hypotheses 1 and 2 – that dysfunctional emotion regulation would mediate the link between emotional abuse and disordered eating, as measured by the EAT-26 and DEBQ restraint.

Emotional neglect

Both internal and external dysfunctional emotion regulation were found to mediate the significant relationship between emotional neglect and disordered eating, as measured by the EAT-26. Internal dysfunctional emotion regulation also mediated the significant relationship between emotional neglect and disordered eating on the DEBQ restraint scale. As with emotional abuse, an indirect effect of emotional neglect exerting its influence on DEBQ emotional eating through internal dysfunctional emotion regulation, was also found.

What is interesting is that for all of these relationships, internal dysfunctional emotion regulation appeared to have a significant indirect effect on the relationship between maltreatment and disordered eating. Hayes (2009) promotes the benefit of testing for indirect effects, even in non-significant relationships, explaining that many researchers, especially those adhering to the traditional Baron and Kenny (1986) approach to mediation, have potentially been missing identification of significant indirect effects, by abandoning analysis at this point – missing out on learning about important and interesting mechanisms by which X is exerting an effect on Y (Hayes, 2009). Indeed the present author agrees, having identified the apparent underlying significance of internal dysfunctional emotion regulation in all mediation analyses, adding to the knowledge base regarding the potential underlying mechanisms in the maltreatment/disordered eating behaviour relationship.

4.1.3 Gender differences

Previous research has reported both a gender bias in disordered eating research and gender differences in reports of disordered eating problems. Despite not being a main focus of the study, the present research included both male and female participants, to provide further insight into differences between males and females on use of emotion regulation strategies and eating behaviour. Regarding emotion regulation, females scored significantly higher than males on external functional and internal dysfunctional emotion regulation, partly supporting previous findings of females utilising emotion regulation strategies more than males (Larsen *et al.*, 2006). In terms of eating behaviour, females scored significantly higher than males on all

three disordered eating measures (EAT-26, DEBQ restraint and DEBQ emotional eating). This is in contrast to one study which found no differences between males and females on emotional eating in an adolescent sample (Nguyen-Rodriguez *et al.*, 2009), although in support of others who have (Goossens *et al.*, 2009; Wardle *et al.*, 1992). It may be of interest for future studies to study gender-specific mediation analyses, to further explore the indirect/mediation influence of dysfunctional emotion regulation in the relationship between early emotional maltreatment and disordered eating behaviour. This was not explored in the current study as the power calculation was derived for use of the sample as a whole (and not for analyses involving males and females individually).

4.2 Discussion of findings

Reflecting on the findings of the multiple mediation analyses, two important learning points stand out. Firstly, the clearest mediation effect was observed for emotional abuse/neglect and total EAT-26 score. While the emotional abuse/neglect and DEBQ restraint analyses also found internal dysfunctional emotion regulation to be a mediator, these results did not seem to be quite as clear-cut as for the EAT-26 analyses (for example, due to a non-significant or only just significant effect and the total effects not being greatly higher than the direct effects in the DEBQ restraint analyses). The fact that the strongest mediation effect was found for maltreatment and the EAT-26 could be hypothesised as being to do with the severity of disordered eating behaviour being measured. The EAT-26, measuring dieting, bulimia and oral control, quantifies behaviours more likely to be indicative of individuals being at risk of a clinical eating disorder. The restraint and emotional eating scales of the DEBQ, however, are measures of eating styles endorsed to some degree by the population at large (Wardle *et al.*, 1992) and therefore could be considered nearer the subclinical end of the disordered eating continuum. Given that the current study was with a general population sample, however, it seems worth considering the specific behaviours endorsed by each of the scales, which could have contributed to the results with the EAT-26 being more salient. In general, the items of the EAT-26 are more extreme forms of disordered eating (e.g. ‘Vomit after I have eaten’ and ‘Have gone on eating binges where I found that I may not be able to stop’). Items of the

EAT-26 could also be considered to be quite punitive or critical of the self (e.g. ‘Avoid eating when I am hungry’, ‘Feel extremely guilty after eating’ and ‘Like my stomach to be empty’). In comparison, the DEBQ items are at a lesser extreme of the disordered eating continuum. The DEBQ restraint scale, for example, measures dieting behaviour likely to be observed in the population at large, such as, ‘Do you deliberately eat foods that are slimming?’ and ‘How often do you try not to eat between meals because you are watching your weight?’. The emotional eating scale items are also behaviours which could be endorsed by many, largely exploring different emotions and whether these result in the individual having a desire to eat (e.g. ‘Do you have a desire to eat when you have nothing to do?’). It could be considered that many in the sample would be more likely to endorse various items on the DEBQ, regardless of their backgrounds or emotional histories. On the other hand, those who had experienced emotional maltreatment in childhood may have been more likely to resort to coping with their emotions with more extreme disordered eating in comparison to other members of the general population sample – perhaps because they are more extreme methods of disordered eating behaviour (therefore ways of attempting to regulate emotion) or perhaps because some of the disordered eating behaviours could be considered quite punitive (e.g. if they have low self-esteem or shame as a result of abusive histories). As mentioned in the introduction chapter, the majority of studies which have found significant relationships between emotional abuse and disordered eating used outcome measures designed to inform risk of a clinical eating disorder (the Eating Disorder Inventory; EDI-II). The current study therefore provides further evidence of this relationship, through use of a different measure of higher end disordered eating behaviour – the EAT-26.

The second interesting learning point is the fact that it was internal dysfunctional emotion regulation strategies which were found to mediate or have an indirect effect on the maltreatment/disordered eating relationship. This type of emotion regulation involves the use of strategies such as “I dwell on my thoughts and feelings” and “I keep the feeling locked up inside”. In looking at the differences between this type of emotion regulation strategy as opposed to the external dysfunctional emotion regulation style (which includes items such as “I take my feelings out on others

verbally” and “I take my feelings out on objects around me”) an interesting conclusion can be drawn. While these external dysfunctional emotion regulation styles are ‘dysfunctional’, they are essentially serving the function of letting the emotion out in an external way. This seems to be in contrast to the internal dysfunctional methods of regulating emotions, with them involving rumination and a sense of the emotion remaining ‘within’. Indeed, internal dysfunctional emotion regulation strategies, such as rumination, have been found to be linked to other psychological problems, such as depression, anxiety and anger (Ehring *et al.*, 2008; Martin & Dahlen, 2005). Individuals endorsing internal dysfunctional emotion regulation strategies could therefore be turning to disordered eating behaviour in attempt to diffuse emotion they are experiencing. This is in line with affect regulation theory, which posits that food is used to fulfil a mood regulatory role. It is also in line with psychosomatic theory, which views the internal states of emotion and hunger to be experienced in very similar ways in certain individuals, which may be akin to the idea of the emotion and its regulation as ‘within’. Although the study did not aim to directly test the disordered eating theories, some support was also found for restraint theory. This theory posits that restraint cannot be maintained over time, therefore leading to overeating, for example, in response to negative emotion. In the current study, the DEBQ restraint and DEBQ emotional eating subscales were found to be moderately correlated, therefore suggesting that those engaging in dieting practices were also engaging in emotional eating.

The results are also in support of attachment theory, in the proposed role that attachment plays in the relationship between early emotional maltreatment, dysfunctional emotion regulation and disordered eating behaviour. Although cause cannot be ascertained, mediation implies that an independent variable causes the mediating variable, which then causes the dependent variable (MacKinnon, 2008). The results are therefore suggestive of an insecure attachment style, originating from an unresponsive or emotionally abusive/neglecting caregiver (as proposed by Shaver & Mikulincer, 2007), contributing to difficulties in learning adaptive, functional ways to regulate emotions, leading the individual to adopt various coping strategies, such as using food as a form of self-soothing.

4.2.1 Findings in relation to previous research

The current study has therefore found further support for a relationship between emotional abuse and disordered eating behaviour, supporting the findings of Kent *et al.* (1999), Kong and Bernstein (2009) and Witkiewitz and Dodge-Reyome (2000). The current study appears to be the first study to find emotional abuse to be linked to disordered eating in a general adolescent population, with the above previous studies being either general population studies with adults (Kent *et al.*, 1999; Witkiewitz & Dodge-Reyome, 2000) or with young people and adults with a clinical eating disorder (Kong & Bernstein, 2009). What appears to be of interest is that the current study found similarly significant results of emotional abuse being linked to disordered eating despite methodological differences in terms of the measures used (with the Eating Disorder Inventory [EDI] being used in all three previous studies, and a different abuse measure in the Kent *et al.* study –The Child Abuse and Trauma Scale [CATS]). This therefore provides additional support for the relationship between emotional maltreatment and disordered eating existing, with significant results being found even when other methods of measurement were used. The current study also expands on the previous literature, by providing not only significant findings of emotion regulation playing a mediating role in the emotional maltreatment and disordered eating link, but more specific detail regarding the *type* of emotion regulation difficulties (i.e. the most problematic strategies for regulating emotion). The current study has shown that internal dysfunctional emotion regulation in particular appears to be important in the relationship between early emotional maltreatment and disordered eating, with it being found to exert an indirect influence on the relationship between emotion maltreatment and disordered eating behaviour in all analyses. This therefore suggests that internal dysfunctional emotion regulation could be the mechanism by which emotional maltreatment leads to disordered eating. External dysfunctional emotion regulation was only found to mediate the relationship between emotional neglect and disordered eating (on the EAT-26), along with internal dysfunctional emotion regulation. It is unclear whether there may be something unique in the emotional neglect/EAT-26 relationship that has contributed to this significant finding.

Given that direct effects were not found in the current study for emotional abuse or emotional neglect and DEBQ emotional eating (and yet they appeared to have a relationship through dysfunctional emotion regulation), perhaps this helps to explain why some previous studies have found non-significant results between emotional abuse measures and disordered eating (e.g. Mitchell & Mazzeo, 2005). It could be considered that the current study provides evidence suggesting that it is when maltreatment affects *emotion regulation abilities*, that eating behaviour will be more likely to be affected.

The current study has also provided further support for emotion regulation difficulties being related to disordered eating behaviour, which is in contrast to one previous study (e.g. McEwen & Flouri, 2009) but in support of another (Norwood *et al.*, 2011). The current findings therefore seem a particularly helpful addition to the research base with adolescents, with the only previous general population study with adolescents identified in this area being the Norwood *et al.* (2011) study looking at anger regulation in particular. While providing further support for the Norwood *et al.* findings (of regulation being linked to emotional eating and restraint), the current study appears to be the first study linking all three research areas – emotional maltreatment with emotion regulation and disordered eating- in a general population of adolescents. The anger component studied by Norwood and colleagues is interesting, as indeed other researchers have commented that anger suppression in particular may be leading to eating difficulties in those with eating disorders (Fox & Power, 2009; Ioannou & Fox, 2009). The results of the current study could be indicative of support for this, if for example, anger was one of the emotions participants had in mind when they were completing the emotion regulation measure. This would of course need to be explored in a further study, looking at the regulation of specific emotions (with the REQ used in the current study asking only generally ‘How do you respond to your emotions?’). Perhaps therefore, future research could look at merging these ideas and look at early emotional maltreatment, eating behaviour and emotion regulation in regard to internal and external strategies for managing *specific* named emotions.

In research with clinical eating disordered populations, it has been proposed by some researchers that difficulties with emotion regulation may develop as a clinical eating disorder worsens (Harrison *et al.*, 2009), for example, if their cognitive abilities are affected as the disorder progresses. While it is still possible that these difficulties would worsen, the current study has found support for emotion regulation difficulties existing in disordered eating behaviour in adolescence and in a general population, where disordered eating behaviour is generally at a lower end of the continuum from eating disorder patients. The current study provides some evidence therefore of emotion regulation difficulties being present arguably *before* significant difficulties in disordered eating begin (as attachment theorists would indeed propose). The only way of testing this truly would be for a longitudinal study to capture this data from a very young age.

4.3 Strengths and limitations

4.3.1 Measures

The reliance on self-report questionnaires for data collection carries with it a caution in interpretation. Self-report relies on participants reporting accurately and honestly on their experiences and may be open to bias. Despite the researcher being present during data collection to answer any queries, it is possible that the participants had misinterpreted certain questions. It was not considered appropriate, however, to have used an alternative method of data collection, such as a semi-structured interview for example, given the general population sample.

Self-report has been commented as being particularly problematic in reporting on emotional constructs. For example, in measuring alexithymia, participants are being asked to self-report on their emotions –the very construct that their difficulties lie in (Fox & Power, 2009). In the current study, it is considered that arguably the REQ measure goes some way to address this issue, as participants could potentially identify the behaviours they engage in, even if they were not always aware they engaged in them at times when they felt emotional. Indeed, it is recognised in the emotion regulation literature that emotion regulation can be difficult to measure as

the strategies employed, at times, can be unconscious (Phillips & Power, 2007). In relating this to the current study, perhaps eating (for example at times of extreme emotion) is not always something people do consciously. Indeed, authors in the field recognise that this is another reason why it can be difficult to capture accurate reporting of emotional eating, as participants are outwith the circumstances in which they would engage in the behaviour. Evers *et al.* (2009) tried to address this by using experimental conditions to test out whether inducing an emotional condition (e.g. a sad film) and presenting food to participants (explaining it was a taste test) would result in consumption reflecting emotional eating scores on the DEBQ. This study found that emotional eaters did not consume an increased amount in the emotional condition and the authors therefore questioned the accuracy of measures such as the DEBQ. It could be thought, however, that in an artificial experimental condition participants may have been inhibited or restrained, whereas if they were in their own environment they would feel more at ease to eat as they please (e.g. just as one would assume that binge eating or bulimic behaviour is more likely to occur behind closed doors). Indeed, in a reply to Evers *et al.* van Strien (2010) criticises the study's method of classifying emotional eaters vs. not. Evers *et al.* cite studies, however, that have stated that individuals may be biased when recalling emotional experiences (see Evers *et al.*, 2009) – in the case of emotional eating, therefore, perhaps recalling their emotional eating in an exaggerated way (i.e. individuals may not have eaten as much or as often as they thought they had). Perhaps indeed, this could be more likely in individuals who are normally very restrained – potentially another explanation why restraint and emotional eating are usually highly correlated. With the current study finding emotional eating to be the least significant outcome measure, perhaps there could be something in it being exaggerated and therefore not as extreme a disordered eating behaviour as the others.

Regarding the measures used in the current study, the internal consistencies were largely viewed as a strength, with the majority of them (the EAT-26; the CTQ; the DEBQ and part of the REQ) falling within the range considered to be acceptable in psychological research (Cronbach's $\alpha \geq 70$; Kline, 1999). Two subscales of the REQ – the internal functional and external functional subscales fell just below that range in the current study, which could be viewed as a limitation. As these were the

functional emotion regulation scales and the main research questions were regarding the dysfunctional scales, this is not considered to have been a significant problem in the current study.

Despite the current study including three disordered eating measures, there are further aspects of disordered eating behaviour which were not captured in the current study. Constructs such as disinhibition and external eating behaviour (eating in response to food cues in front of you) are also frequently studied in the disordered eating literature. The researcher was keen to limit the number of measures used in the current study, choosing to include only the ones hypothesised to be most relevant to the emotion regulation component of the study. Given the evidence in the literature, however, that binge eating in particular is widely cited as playing a mood regulatory role (e.g. Clyne & Blampied, 2004; Whiteside *et al.*, 2007), it could be viewed as a limitation in the current study that a measure capturing this more accurately was not included. Although the current study found the EAT-26 bulimia subscale to be moderately and highly correlated with dysfunctional emotion regulation (internal and external respectively), a measure focussing on this aspect of disordered eating in more detail would have been interesting. The Three-Factor Eating Questionnaire (TFIQ; Stunkard & Messick, 1985) restraint and disinhibition scales could, for example, be more appropriate in capturing this specific type of disordered eating behaviour more accurately, which future studies may want to take into account.

4.3.2 Statistical approach

It was noted that similar research to the current study studying the mediation effects of alexithymia (e.g. Hund & Espelage, 2006; Mazzeo & Espelage, 2002) used structural equation modelling (SEM) in their statistical analyses. It is argued by some who have used SEM to be more robust than regression, as it facilitates the testing of specific mediating associations (Hund & Espelage, 2006). Use of SEM was considered in the current study, as it seems to be highly useful in multivariable models, particularly those with many predictor variables. Given that the current research was a fairly straightforward model, however, and did not have multiple predictor variables, it was considered that the multiple mediation analysis method

was just as appropriate. It is indeed commented by Hayes on his website that running the macro one at a time for each dependent variable should give the same result as if the researcher had estimated the effects simultaneously in a structural equation model.

Given the ‘often confused’ functions of mediation and moderation (e.g. Baron & Kenny, 1986) it was considered important by the researcher to consider the theoretical standpoint for a potential need to test for moderation as well. In reflecting on both the theoretical position (that emotional maltreatment is argued to be contributing to emotion regulation difficulties) and the definitions of mediation and moderation – i.e. that in mediation “X exerts its effect on Y by influencing intervening variables” and in moderation “X’s effect on Y varies as a function of some third variable M, the moderator variable” (Hayes, 2009, pp. 415), it was considered that mediation was the appropriate analysis (i.e. it insinuates the origin of the emotion regulation difficulty stemming from emotional maltreatment). As this was found in all of the mediation analyses, it was considered that testing for moderation effects was not necessary.

One further potential limitation was regarding using internal and external dysfunctional emotion regulation as separate mediators in the same model. It is noted by Preacher and Hayes (2008) that researchers are best to select two mediators which are unique constructs, unlikely to overlap, to avoid problems such as collinearity. It could therefore be considered a limitation that two variables from a similar scale that were significantly correlated were used in the analysis. Despite acknowledging this limitation however, the two strategies did show evidence of working in different ways (e.g. with internal dysfunctional being particularly related to all other constructs studied) and so it is hoped that this should not have significantly affected the results.

4.3.3 Generalisability of the research findings

The population sample was from one high school. In some respects this could be viewed as a limitation, in terms of how generalisable the findings could be for the population at large. It is considered an advantage, however, in this preliminary study

that extraneous variables such as great variety in socioeconomic status and deprivation codes could be considered controlled for to some extent (as opposed to a study with multiple schools in both urban and rural areas, for example). What could be interesting however, is for future research to explore this further. It is likely that childhood emotional maltreatment may be more prevalent in areas with greater deprivation, as studies in the UK have shown (e.g. Sidebotham *et al.*, 2002). Comparison of different deprivation codes or of an urban versus a rural population may be of interest therefore, now that preliminary analysis has found significant effects in this area of study. In terms of prevalence rates in the current study, the measures were found to capture very similar rates to other general population studies, therefore suggesting that there was no reason to assume it was a biased sample.

4.3.4 Interpreting research findings in this area as a whole

While it is proposed that the current study adds to the existing knowledge base, it has to be acknowledged that the three topic areas of maltreatment, disordered eating and emotion regulation are extremely vast, meaning it can be difficult for researchers to draw clear conclusions, as indeed other authors have acknowledged (Kent & Waller, 2000). Despite the volume of research on emotional constructs in eating disorders, it is recognised that emotion is only one part of a complex, heterogeneous aetiology (e.g. Fairburn *et al.*, 2003; Polivy & Herman, 2002) and indeed the ‘multidimensional nature’ of early maltreatment has also been commented on (Kent *et al.*, 1999). This is the nature of research in many areas, however, and seems understandable given the complexity in studying human behaviour and in the challenges of accurately measuring constructs which are difficult to measure, such as emotion in the current study. While the majority of studies use standardised measures, there can be great variation methodologically between studies, meaning direct comparison and integration of findings can be difficult. Further studies grounded in theory, using well constructed methodologies and standardised measures should go some way to each, individually, helping to inform and shape these complex areas of research. As commented earlier, in comparing the current results with previous research, where different measures (attempting to measure the same

constructs) both find significant results, researchers can be further convinced of research findings holding true.

4.4 Implications for clinical practice

Researchers in the field acknowledge a need for effective intervention with young people in particular, to deter disordered eating behaviour from further developing (Ricciardelli & McCabe, 2001). Indeed, it has been commented that good quality research on eating disorder interventions with young people is lacking (Gowers & Waugh, 2004), and this was indeed pointed out in the recent NHS Scotland “Matrix” policy document on evidence based practice (Scottish Government, 2008). The current study found that those with a history of early emotional maltreatment were more likely to use dysfunctional strategies to regulate their emotions, with internal dysfunctional emotion regulation in particular being linked to disordered eating behaviour across the measures. This insinuates that internal regulation of emotions in a negative way (e.g. ruminating) can be particularly ineffective, leading individuals to find alternative means of helping them manage the emotional state. Indeed, it is recognised that effective emotion regulation is crucial for functioning in relationships, in the workplace, and for mental health in general (Gross & Muñoz, 1995). It seems there is therefore a need for effective intervention to help those identified in clinical practice as having emotion regulation difficulties. Given the findings of the current study, this may be more likely in those presenting clinically who have experienced early emotional maltreatment and those displaying clinical eating disorders. Given that the current results were found with those in the general population, however, intervention which could target adolescents in the general population could also be helpful. Perhaps there is potential in schools, for example, for constructive coping strategies to be promoted pre-adolescence, in the hope that this would facilitate effective emotion regulation. In this way, young people could find at least one positive outlet for emotion (e.g. a sporting activity, playing music, greater social contact) which could potentially buffer them against engaging in maladaptive ways of coping, such as disordered eating behaviour. A recent study indeed showed potential for effectiveness of a school based emotion regulation intervention for young children with behavioural problems. Wyman *et al.* (2010)

studied the effectiveness of a 14 session classroom intervention with 5-8 year olds, teaching skills in monitoring emotions and adopting strategies for controlling the escalation of emotions. Post intervention, there was a 46 per cent decrease in disciplinary referrals and 43 per cent fewer suspensions in a four month period, therefore appearing to be a successful programme.

In those with clinical eating disorders, a Cognitive Behavioural Therapy (CBT) approach (one of the psychological therapies recommended by National Institute for Clinical Excellence guidelines; NICE, 2004) could be considered as a type of intervention which functions as essentially modifying behaviours towards adaptive ways of regulating emotions (as other authors have described CBT for depression; Gross & Munoz, 1995). Indeed, anger management – looking at alternative ways of responding to anger triggers is essentially another form of a well utilised clinical intervention which is also a form of promoting alternative emotion regulation strategies (as recognised by Wyman *et al.*, 2010).

The idea of those with disordered eating behaviour benefiting from intervention targeting adaptive ways of coping has indeed been put forward by researchers finding similar results (e.g. Hund & Espelage, 2006). Some studies have shown potential for psychoeducation in emotion regulation as a potentially effective treatment in those with clinical eating disorders. As presented in the introduction chapter, Clyne and Blampied (2004) reported positive findings with women with BED, through an intervention teaching them emotional awareness and regulation techniques to manage their condition more effectively. These authors indeed point out that clinical intervention for binge eating disorder rarely endorses an emotion regulation focus (Clyne & Blampied, 2004), despite research suggesting that it could be beneficial. In describing Cognitive Emotional Behavioural Therapy for eating disorder patients, Corstorphine (2006) proposes that this therapy could potentially reduce maladaptive attempts to regulate emotions (eating), although this was for future research to determine. It appears then that for nearer the clinical end of the disordered eating continuum, there are therapeutic approaches which could potentially help. Regarding subclinical disordered eating, the current findings would suggest that providing young people with a health/psychology education lesson

promoting the psychological benefit of using functional coping strategies in response to emotions could have the potential to make a difference. It would be of interest for future research to explore how ‘changeable’ emotion regulation style could be for such a population.

As pointed out in Fox and Power’s (2009) review on emotion and eating, the research base is still a long way from understanding why some will turn to eating (or restraint) to manage emotions and not other forms of emotion regulation, such as self-harming or abusing substances. Indeed, in response to emotional maltreatment, many others will not use disordered eating behaviour to help regulate emotion, but may take to risk taking behaviours or substance misuse instead (Ford, 2005). Given that histories of emotional abuse and neglect have been found to predict anxiety, depression and physical symptoms in adulthood (Spertus *et al.*, 2003), it seems important for clinicians to bear these links in mind, during assessment.

4.5 Recommendations for future research

Given that this is a preliminary study, as far as the author is aware, replication would be an important first step, perhaps measuring those with various types of abuse history, to determine if they are also linked to disordered eating via the same mechanism. As discussed, it would also be of interest to explore whether higher levels of deprivation, likely in an urban population, would find similar if not even stronger relationships between the three areas of study. Considering that the long-term effects of emotional abuse in childhood have not received much attention in the research literature (Hund & Espelage, 2006) and that eating disorder patients reporting childhood trauma are the most likely to have poorer treatment outcomes (Kong & Bernstein, 2009), it seems crucial that this area is clarified to a greater extent, to support effective clinical intervention.

It has been pointed out by other researchers that those with varying abuse histories may develop a different type of disordered eating from others, or arrive at it through different mechanisms (Wonderlich *et al.*, 2001), with research being indicative of a stronger association between a history of childhood sexual abuse and bulimia, than anorexia for example (Wonderlich *et al.*, 1997). It could be of interest for future

studies to address the dysfunctional emotion regulation mediation component, with other types of early abuse and disordered eating to help elucidate the different eating disorder pathways further.

While the current study focussed on the three key research areas of early maltreatment, emotion regulation and eating, research in this area has also often included measures of mood and the study of mediating influences in this regard (e.g. Kent *et al.*, 1999; Mazzeo & Espelage, 2002; Hund & Espelage, 2006). Indeed, self-esteem has also been found to be a significant mediator of the childhood emotional abuse and disordered eating behaviour relationship (Groleau *et al.*, 2011).

Researchers may therefore, want to consider including these additional measures in future studies in order to establish a more comprehensive model of the aetiology of disordered eating. It would be of interest, while expanding the constructs studied, for future researchers to consider longitudinal studies, in order for the sequence of various contributor variables to be better understood. This could help in allowing the inference of causal influences. Clinically, this could be particularly helpful in informing the evidence base around risk factors, as well as variables which contribute to problem behaviours (in this case, dysfunctional emotion regulation strategies and disordered eating behaviour) being maintained. It is recognised by researchers that mediating relationships can be very complex and it is of course possible that additional variables come into play in these relationships (e.g. MacKinnon, 2008) –both in the current study and in others in the research at large. If adding additional variables to a mediation model, researchers recommend this is done from a theoretical standpoint, and that they should be tested altogether in a multiple mediator model (Preacher and Hayes, 2008).

Given that it has been recognised by many researchers in this field that disordered eating is just one way that individuals can cope with regulating emotions (e.g. Fairburn *et al.*, 2003; Fox & Power, 2009; van der Kolk & Fisler, 1994) it could also be of interest for future research to study other dependent variables/outcome measures and their relationships with childhood maltreatment and emotion regulation and to consider ways in which these different outcomes can be distinguished from each other.

4.6 Conclusions

In conclusion, the current study provides interesting preliminary data on the role of emotion regulation strategies in the well researched area of childhood maltreatment and disordered eating. The study adds to previous research in two ways, (1) by having an adolescent, general population as a sample group, measuring history of emotional abuse and neglect in particular and (2) through determining a significant indirect effect of internal dysfunctional emotion regulation strategies on the relationship between early emotional maltreatment and disordered eating behaviour. MacKinnon (2008) proposes that science often progresses through the study of mediating influences, allowing identification of underlying constructs, helping in the understanding of complex relationships. This mode of analysis in the current study identified internal dysfunctional emotion regulation as having an indirect effect on the relationship between childhood emotional maltreatment and disordered eating behaviour in a general population of adolescents. The field of emotional maltreatment, emotion regulation and disordered eating behaviour research would benefit from replication, expansion of constructs studied and longitudinal research studies, to inform the richness of understanding in such a complex, yet fascinating area of clinical research.

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Appendices

Appendix 1: Questionnaire Pack – Regulation of Emotions Questionnaire

Please indicate your age and gender below:

Female Male (please tick)

Age_____

We all experience lots of different feelings or emotions. For example, different things in our lives make us feel happy, sad, angry and so on...

The following questions ask you to think about **how often** you do certain things **in response to your emotions**. You do not have to think about specific emotions but just how often you **generally** do the things listed below.

Please tick the box corresponding to the answer that fits best. We all respond to our emotions in different ways so there are no right or wrong answers.

In GENERAL how do you respond to your emotions?	Never	Seldom	Often	Very Often	Always
1. I talk to someone about how I feel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I take my feelings out on others verbally (e.g. shouting, arguing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I seek physical contact from friends or family (e.g. a hug, hold hands)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I review (rethink) my thoughts or beliefs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I harm or punish myself in some way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I do something energetic (e.g. play sport, go for a walk)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I dwell on my thoughts and feelings (e.g. It goes round and round in my head and I can't stop it)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I ask others for advice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In GENERAL how do you respond to your emotions?	Never	Seldom	Often	Very Often	Always
9. I review (rethink) my goals or plans	○	○	○	○	○
10. I take my feelings out on others physically (e.g. fighting, lashing out)	○	○	○	○	○
11. I put the situation into perspective	○	○	○	○	○
12. I concentrate on a pleasant activity	○	○	○	○	○
13. I try to make others feel bad (e.g. being rude, ignoring them)	○	○	○	○	○
14. I think about people better off and make myself feel worse	○	○	○	○	○
15. I keep the feeling locked up inside	○	○	○	○	○
16. I plan what I could do better next time	○	○	○	○	○
17. I bully other people (e.g. saying nasty things to them, hitting them)	○	○	○	○	○
18. I take my feelings out on objects around me (e.g. deliberately causing damage to my house, school or outdoor things)	○	○	○	○	○
19. Things feel unreal (e.g. I feel strange, things around me feel strange, I daydream)	○	○	○	○	○
20. I telephone friends or family	○	○	○	○	○
21. I go out and do something nice (e.g. cinema, shopping, go for a meal, meet people)	○	○	○	○	○

Please turn over the page

Appendix 1 - Questionnaire Pack (cont'd): Childhood Trauma Questionnaire

Please answer the questions below:

Please tick the box that applies

When I was growing up...	Never True	Rarely True	Some-times True	Often True	Very Often True
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Questionnaire items omitted, due to them being protected by copyright).

Appendix 1-Questionnaire pack (continued) –Eating Attitudes Test

Please indicate your height & weight if you know it:

Height _____ Weight _____

Please fill out the below form as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

Please tick the box that applies

	Always	Usually	Often	Some times	Rarely	Never
1. Am terrified about being overweight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Avoid eating when I am hungry.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Find myself preoccupied with food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Have gone on eating binges where I feel that I may not be able to stop.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Cut my food into small pieces.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Aware of the calorie content of foods that I eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Feel that others would prefer if I ate more.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Vomit after I have eaten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Feel extremely guilty after eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Always	Usually	Often	Some times	Rarely	Never
11. Am preoccupied with a desire to be thinner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Think about burning up calories when I exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Other people think that I am too thin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Am preoccupied with the thought of having fat on my body.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Take longer than others to eat my meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Avoid foods with sugar in them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Eat diet foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Feel that food controls my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Display self-control around food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Feel that others pressure me to eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Give too much time and thought to food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Feel uncomfortable after eating sweets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Engage in dieting behaviour.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Like my stomach to be empty.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Have the impulse to vomit after meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. Enjoy trying new rich foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please turn over the page

Appendix 1 –Questionnaire Pack (continued) –Dutch Eating Behaviour Questionnaire

Please tick the box that applies

	Never	Seldom	Some times	Often	Very often
1. If you have put on weight, do you eat less than you usually do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Do you have a desire to eat when you are irritated?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Do you try and eat less at meal times than you would like to eat?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Do you have a desire to eat when you have nothing to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Do you have a desire to eat when you are depressed or discouraged?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. How often do you refuse food or drink offered because you are worried about your weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Do you have a desire to eat when you are feeling lonely?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Do you watch exactly what you eat?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Do you have a desire to eat when somebody lets you down?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Do you deliberately eat foods that are slimming?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Do you have a desire to eat when you are cross?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Do you have a desire to eat when you are expecting something to happen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. When you have eaten too much, do you eat less than usual on the following days?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Do you get a desire to eat when you are anxious, worried or tense?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Seldom	Some times	Often	Very often
15. Do you deliberately eat less in order not to become heavier?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Do you have a desire to eat when things are going against you or when things have gone wrong?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. How often do you try not to eat between meals because you are watching your weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Do you have a desire to eat when you are frightened?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. How often in the evenings do you try not to eat because you are watching your weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Do you have a desire to eat when you are disappointed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Do you take your weight into account with what you eat?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Do you have a desire to eat when you are emotionally upset?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Do you have a desire to eat when you are bored or restless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I am very grateful for you taking part in my study.

Thank you.

Appendix 2: Permission for EAT-26 use

-----Original Message-----

From: info@eat-26.com [mailto:info@eat-26.com]

Sent: 27 September 2010 16:53

To: [Researcher's email address]

Subject: EAT-26 Permission Response

Eating Attitudes Test (EAT-26.com)

Dear [Researcher's name],

Thank you for your request to use the EAT-26 or to link the EAT-26 administration and scoring to your website. Although the EAT-26 is protected under copyright, all fees and royalties have been waived because it has been our wish for others to have free access to the test,

1) If you are requesting to use a physical copy of the EAT-26, please consider this letter as granting you permission to reproduce the test for the purpose suggested in your e-mail as long as the EAT-26 is cited properly. The correct citation is: "The EAT-26 has been reproduced with permission. Garner et al. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, 12, 871-878."

You can download a copy of the scoring instructions and the test on the homepage of the EAT-26 website. If you use the written version of the test, it is recommended that you provide respondents with the link to the EAT-26 website (www.eat-26.com) so that they can learn more about the test.

2) If you wish to put a link on your website to the EAT-26, you can embed either of the links below and users will be to take the test anonymously and then submit it for immediate and anonymous scoring intended to encourage people to seek professional help when appropriate.

The link below does not identify the EAT-26 website but makes it appear like your website is administering the EAT-26 and providing feedback. However, if you use the EAT-26 link in this way, it is recommend that you provide respondents with the link to the EAT-26 website to provide them with further information on the scoring and interpretation of the test (www.eat-26.com).

Link not identifying the EAT-26: <http://eat-26.com/Form/index.php?iframe=true>

Alternatively, you can direct respondents to the EAT-26 website from

your webpage. The test will be administered the same way with anonymous feedback but since they are on the EAT-26 webpage, respondents can navigate to other areas of the website for further information. The link for this variation in the test administration is:

Link identifying the EAT-26 website: <http://eat-26.com/Form/index.php>

Again, thank you for requesting permission to use the EAT-26. Please consider this letter as granting you permission to reproduce the test for the purpose suggested in your e-mail. If you intend on publishing your work, please send me your results so that they can be included in a research database being developed on the EAT-26 website (www.eat-26.com).

Best wishes,

David M. Garner, Ph.D.
eat-26.com Website Administrator
e-mail: info@eat-26.com
alternate e-mail: dm.garner@gmail.com

Appendix 3 –Clinical Governance confirming full NHS ethics process was not required

From: Governance, Research

Sent: 06 October 2010 08:56

To: [Researcher]

Subject: Childhood emotional maltreatment and disordered eating in a general adolescent population. Does emotional regulation play a mediating role?

Dear *[Researcher's name]*

Apologises for late reply. I can confirm NHS Ethics is not required however you are required to have R&D management acknowledgment/approval prior to commencing your study.

Once you have the LEA approval please send this on and the Research Governance Committee within *[Health board area]* will start their acknowledgement/approval process.

A letter will be issued to you confirming your eligibility to start your study once approval has been gained.

Kind regards

[Clinical risk administrator]

Appendix 4: Permission from LEA to undertake research in schools

From: [Secretary's name] **On Behalf Of** [Head of schools name]

Sent: 08 March 2011 15:05

To: [Researcher]

Subject: RE: Written confirmation

Hi [Researcher's name]

My sincere apologies for the delay in responding to you. I email to confirm that I am happy to grant you permission to undertake research in schools.

Many thanks

[Head of schools]

Appendix 5: Permission from NHS Clinical Governance to proceed with study

NHS [Health board]

Research Administration
Clinical Governance

(Contact details of
Clinical Governance)

(Health Board logo)

(The Researcher's address)

Date 17 March 2011

Our Ref

Enquiries to
Extension
Email

Dear *[Researcher's name]*

Childhood emotional maltreatment and disordered eating in a general adolescent population. Does emotional regulation play a mediating role?

Thank you for sending details of your study to *[Health board area]*. Given that ethics has deemed your study an evaluation, your study does not require R&D Management approval. However, it has been noted by our Research Governance Committee.

You may proceed with your study in the *[Health Board area]* area. We ask that you inform the R&D Office when the study is completed.

May I take this opportunity to wish you every success with your project. Please do not hesitate to contact the R&D Office should you require any further assistance.

Yours sincerely

[Name]

Associate Medical Director (Clinical Governance)

Appendix 6: Participant information sheet



(Health board logo)

Invitation to take part in a study looking at the impact of early emotional maltreatment on emotion and eating behaviour.

I am a Trainee Clinical Psychologist working in [Health board area] and I am currently doing some research as part of my training with Edinburgh University. I am asking young people in schools across [Health Board area] about their eating behaviour, their emotions and whether they experienced various types of emotional maltreatment in their childhood.

What does the study involve?

The study involves completing a consent form, giving information on your age and gender and answering a set of questionnaires. This should take approximately 20 minutes. Your answers would be confidential, as the questionnaire responses will be recorded anonymously, and stored separately from the consent form.

Why is the study being conducted?

The study hopes to gather further information regarding whether early emotional experiences impact both on our emotions and eating behaviour. It is hoped that it could help us to know more about how to help young people who have experienced or are experiencing these difficulties.

Do I have to take part?

No. It is completely up to you whether you wish to take part or not. You may also feel free to stop completing the questionnaires at any point, and you don't have to give a reason for this.

What if this leaves me with any worries or wishing to seek some support?

If anything in the questionnaires has been upsetting for you and you would like to seek some support, you could:

- Obtain some guidance from websites or help-lines:
 - The Eating Disorders Association:
 - Website www.b-eat.co.uk/Home Youth helpline – 0845 634 7650
 - ChildLine
 - Website www.childline.org.uk/ or ChildLine – 0800 11 11
- Speak to your school nurse
- Speak to a teacher, such as your guidance teacher or another teacher you trust
- Speak to your doctor – if you feel you would like to see someone who can help you with your problems, your GP can arrange this for you

Please keep hold of this sheet and have a think about whether you would like to take part. I will be back in school next week with the questionnaires and if you do want to take part, we will complete them then.

Many thanks for your time,

[Researcher's name]
Trainee Clinical Psychologist

Consent Form

Early emotional maltreatment, emotion and eating behaviour in adolescents.

I would like to seek your consent to take part in my study. You do not have to take part in the study and if you decide not to, you don't have to give a reason for this.

Please make sure you understand what the research is about and what is being asked of you before you sign this consent form. If you do decide you wish to take part, please complete the section below and the questionnaires which follow.

Many thanks,
[Researcher's name]
Trainee Clinical Psychologist

Please place
your initials in
the boxes

I confirm that I have read and I understand the information sheet dated March 2011 for the above study

I understand what is being asked of me and I have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw from participating at any time, without giving any reason.

I agree to take part in the above study.

Name: _____

Signed: _____ Date _____

Appendix 7: Information sheet for parents/guardians



(Health Board logo)

Dear Parent/ Guardian,

I am a Trainee Clinical Psychologist working in *[health board area]* and I am currently doing some research as part of my training with Edinburgh University. I am asking young people in schools across *[health board area]* about their eating behaviour, their emotions and any emotional maltreatment in their childhood.

I am writing to you to make you aware that your child's school is one of the schools participating in the research project, and I will be inviting your child to take part. This will involve completing a consent form, giving information on their age and gender and answering a small set of questionnaires. This should take no longer than 20 minutes. Their answers would be confidential, as no note of their name would be kept beside their questionnaire responses.

The study hopes to help us gain a better understanding of the factors which lead some young people to have problems with eating and therefore how we may be better able to help them.

If you do not wish your child to take part in the study, could you please make the school aware by sending back the tear off slip below. If you are happy for your child to take part, then you do not need to take any action.

Many thanks for your time,

[Researcher's name]
Trainee Clinical Psychologist

I _____(name) do not wish my son/daughter
_____ (name) to take part in the research on eating behaviour.

Signed _____ Date _____

Appendix 8: Thank you sheet for pupils for taking part

Thank you so much for taking part.

If anything in the questionnaires has been upsetting for you and you would like to seek some support, please do one or more of the following:

- Obtain some guidance from websites or help-lines:
 - The Eating Disorders Association:
 - Website www.b-eat.co.uk/Home Youth helpline – 0845 634 7650
 - ChildLine
 - Website www.childline.org.uk/ or ChildLine – 0800 11 11
- Speak to your school nurse
- Speak to a teacher, such as your guidance teacher or another teacher you trust
- Speak to your doctor – if you feel you would like to see someone who can help you with your problems, your GP can arrange this for you

If there is anything you would like to discuss regarding the research, please feel free to contact me or my supervisor Jill Cossar on: 0131 651 3972.

Many thanks for your time,

[Researcher's name]

Trainee Clinical Psychologist