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ABSTRACT

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THE RELATIONSHIP BETWEEN EMOTION REGULATION AND TEMPER TANTRUMS

BY

GAVIN LOCKHART

Childhood behaviour problems affect a substantial proportion of children, representing the majority of referrals to child clinical services. Further, they are highly stable over time and serve as markers for the development of psychosocial difficulties throughout life. In order to intervene effectively with behaviour problems clinical psychologists must have solid models to work from. The literature review paper therefore outlines research directions that have traditionally dominated the literature and their clinical utility and limitations are discussed. The need to develop better models of child behaviour is established and the emerging literature regarding emotion regulation is reviewed in detail. Conclusions are drawn regarding the contribution of this literature to models of child behaviour.

Although evidence from a number of studies consistently demonstrates an association between children's emotion regulation and their overall levels of behaviour problems, few studies have explored its relationship with specific behaviour problems and no known studies have examined its role in temper tantrums. The empirical paper therefore describes a study investigating the relationship between emotion regulation and temper tantrums in seventy-eight preschool age children. Caregivers completed the Behaviour Checklist (BCL, Richman, 1977) and the Emotion Regulation Checklist (ERC, Shields & Cicchetti, 1997), and nurseries also completed the ERC. A tantrums composite was created from caregiver ratings on the tantrums items of the BCL and ERC. Generalised deficits in emotion regulation were not found across children with temper tantrums. However, a subgroup of children with additional behaviour problems had lower levels of emotion regulation and higher levels of dysregulation than children with tantrums as an isolated complaint and children without tantrums. Possible explanations for this pattern of results are discussed, including the distinction between instrumental and reactive tantrums and the role of emotion regulation as a resiliency factor against the development of multiple behaviour problems. Future research directions are outlined and the clinical implications of the findings are examined.

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Literature Review Paper

Emotion Regulation: An Extension to Traditional Models of Childhood Behaviour Problems

Clinical Psychology Review was used as a guide in determining the preparation of this paper. See Appendix 1 for notes to contributors.

Abstract

Childhood behaviour problems affect a substantial proportion of children and represent the majority of referrals to child clinical services. Further, they are highly stable over time and serve as markers for the development of psychosocial difficulties throughout life. They therefore present a significant challenge to clinical psychologists. In order to intervene effectively with childhood behaviour problems clinical psychologists must have solid models to work from. Developmental psychopathologists have argued that the most comprehensive models of childhood disorder will arise from an integration of research from different theoretical orientations and disciplines, as this will identify the various pathways leading to the development of maladaptive behaviour. Research directions that have traditionally dominated the literature on child behaviour problems are therefore reviewed and their clinical utility and limitations are discussed. As it has been identified that there is a need to expand on traditional models of childhood disorder, the emerging literature regarding emotion regulation is explored and research into its role in the development of behaviour problems is examined. Conclusions are drawn regarding the contribution of this literature to models of child behaviour and directions for future research are identified, particularly with regards to the link between emotion regulation and temper tantrums.

Introduction

Childhood behaviour problems represent the majority of referrals to child clinical services, presenting a significant challenge to clinical psychologists (Audit Commission, 1999; Shields & Cicchetti, 1998). They affect up to thirteen percent of preschoolers and between six and twenty percent of school age children, and these prevalence rates are rising (Richman, Stevenson & Graham, 1982; Rutter, Hagell & Giller, 1998; Thompson et al., 1996). Children with one behaviour problem are more likely to have additional behavioural problems (Eisenberg et al., 1996; Richman et al., 1982; Thompson et al., 1996), and these difficulties are highly stable over time, with some studies suggesting stability equivalent to that of IQ (Deater-Deckard & Plomin, 1999; Fergusson & Horwood, 2004; Loeber & Hay, 1997; Olweus, 1979; Richman et al., 1982). Further, early internalising and externalising behaviours have been found to predict later difficulties in behavioural (Caspi, Moffitt, Newman & Silva, 1996; Goodwin, Fergusson & Horwood, 1993; Prior, Smart, Sanson & Oberklaid, 2000; Richman et al., 1982; Schwartz, Snidman & Kagan, 1996; Zahn-Waxler, Iannotti, Cummings & Denham, 1990), social (Eisenberg, Guthrie et al., 1997; Spinrad et al., 2004; Zahn-Waxler et al., 1990) and academic functioning (Caspi, Elder & Bem, 1987; Henry, Caspi, Moffitt, Harrington & Silva, 1999; Ramsden & Hubbard, 2002; Zahn-Waxler et al., 1990). Research has also suggested that early externalising problems are linked with criminal activity in adolescence and adulthood (Block, Block & Keyes, 1988; Caspi, 2000; Farrington, 1994; Henry, Caspi, Moffitt & Silva, 1996; Slattin & Magnusson, 1989; Stevenson & Goodman, 2001). The long-term public costs of children with behavioural difficulties are therefore high (Scott, Knapp, Henderson & Maughan, 2001). Given the immediate

impact and potential long-term outcomes of children with early behaviour problems, it is thus critical that psychological interventions for these problems are effective.

In order to intervene effectively with early behaviour problems clinical psychologists must have solid models regarding the development and continuity of these problems to work from (Goodman & Gotlib, 1999). Several models regarding the development of childhood behavioural difficulties have emerged in the psychological literature and these span a variety of theoretical orientations and disciplines. Developmental psychopathologists have therefore argued that the most comprehensive models of childhood disorder will arise from an integration of research from these different theoretical orientations and disciplines, as this will identify the various pathways leading to the development of maladaptive behaviour (Goodman & Gotlib, 1999; Shields & Cicchetti, 1997, 1998, Shields, Ryan & Cicchetti, 2001). This perspective formed the framework for the current review.

A brief overview of the literature to date regarding pathways to childhood behaviour problems therefore follows. This is not intended as an exhaustive review, but to provide examples of research directions that have traditionally dominated the literature, explore their utility in clinical practice, and establish the need to expand on traditional models of child behaviour. The emerging literature regarding emotion regulation is then discussed in detail. Research into the role of emotion regulation in the development of childhood behaviour problems is explored and its application to models of child behaviour is examined. As externalising behaviours have been most consistently related to a range of later psychosocial difficulties they form the main focus of the review.

Pathways to Behaviour Problems

Environmental Risk Factors, Genetic Influences, and Temperament

Across the psychological literature various internal and external influences have been associated with an increased risk of children developing behaviour problems. For example, research investigating environmental pathways has identified the role of socio-economic factors, child maltreatment and parental mental state in children's maladaptive behaviours. Epidemiological studies have consistently shown that children living in overcrowded environments, urban populations and socio-economically deprived areas experience higher levels of behaviour problems (McLoyd, 1998; Quinton, 1988; Richman et al., 1982; Thompson et al., 1996). Children exposed to maltreatment, abuse, or inter-adult violence have also been found to be at an increased risk of developing behaviour problems across a number of studies (Loeber & Hay, 1997; Ramsden & Hubbard, 2002; Shields & Cicchetti, 1998). Parental mental state, particularly maternal depression, has further been linked with a higher risk of children developing a range of behavioural problems including peer relationship difficulties, internalising and externalising behaviour problems (Cummings & Davies, 1994; Goodman & Gotlib, 1999; Gotlib & Goodman, 1999; Sonuga-Barke, Stevenson & Thompson, 1996; Zahn-Waxler et al., 1990). Socio-economic disadvantage, maltreatment and parental mental state are therefore widely recognised environmental pathways to the development of childhood behaviour problems.

The role of genetic influences on child behaviour has also been explored. Evidence from twin and adoptive studies has suggested that genetic influences account for between thirteen and ninety-four percent of the variance in externalising problems

such as aggression and delinquency (Deater-Deckard & Plomin, 1999; Eaves et al., 1997; Edelbrock, Rende, Plomin & Thompson, 1995; Gjone & Stevenson, 1997; Schmitz, Fulker & Mrazek, 1995; Van den Oord, Boomsma & Verhulst, 1994). For example, Deater-Deckard and Plomin (1999) investigated the behaviour of seventy-eight unrelated adoptive siblings and ninety-four biologically related siblings. Pairs were matched on gender, number of children in the family, father's age, father's occupational status and father's years in education. Mothers and teachers completed the child behaviour checklist (CBCL, Achenbach, 1991) once every year when children were between eight and twelve years of age. Genetic influences significantly contributed to aggressive and delinquent behaviours, accounting for nearly half of the variance in teacher-rated aggression and over a third of the variance in parent-rated delinquency.

Evidence regarding internalising behaviour problems is somewhat less conclusive. Although genetic influences have been associated with the development of internalising behaviours (Kovacs, Devlin, Pollock, Richards & Mukerji, 1997), research has suggested that these influences are non-significant when they are explored solely in relation to children with clinical levels of internalising problems (Goodman & Gotlib, 1999; Rende, Plomin, Reiss & Hetherington, 1993). Genetic pathways therefore appear particularly influential in the development of externalising behaviour problems, and this has been suggested as one mechanism through which children of parents with affective disturbance develop behaviour problems (Cummings & Davies, 1994; Goodman & Gotlib, 1999; Gotlib & Goodman, 1999; Sonuga-Barke et al., 1996; Zahn-Waxler et al., 1990).

As it is widely considered that temperament is at least in part genetically determined, authors have argued that temperament represents one mechanism through which genetic factors may influence the development of behaviour problems (Gjone & Stevenson, 1997). Research has therefore explored the role of temperament in children's maladaptive behaviour. Studies have consistently revealed that a difficult temperament is associated with both internalising and externalising behaviour problems, the relationship with externalising problems being strongest (Bates & Bayles, 1988; Caspi, Henry, McGee, Moffitt & Silva, 1995; Prior, 1992; Sonuga-Barke et al., 1996; Thompson et al., 1996). However, definitions of difficult temperament vary widely across studies and this has led authors to break the definition down into its specific traits and explore the relationship between these traits and child behaviour (Gjone & Stevenson, 1997).

Negative emotionality has been of particular interest as this has consistently been included in definitions of difficult temperament (Gjone & Stevenson, 1997; Sonuga-Barke et al., 1996; Thompson et al., 1996). Studies have therefore explored the relationship between child behaviour and the temperamental traits of emotionality, activity and sociability (EAS, Buss & Plomin, 1984). It has been hypothesised that in extreme form these traits become abnormal, maladaptive behaviour, namely emotional disorder, hyperactivity and antisocial behaviour (Graham & Stevenson, 1987). Research into this hypothesis has produced mixed results. Emotionality has consistently been found to predict anxious and depressed behaviour (Eisenberg, Fabes & Murphy, 1995; Gjone & Stevenson, 1997; Rende, 1993). However, of the three traits emotionality is also the strongest predictor of delinquent behaviour, aggression and attention problems (Gjone & Stevenson, 1997; Rende, 1993). By

contrast, low sociability has not been linked with antisocial behaviour, nor has activity been associated with hyperactivity or attention problems (Gjone & Stevenson, 1997; Rende, 1993). Emotionality therefore appears the most important temperamental pathway to the development of behaviour problems (Eisenberg et al., 1996; Eisenberg, Guthrie et al., 1997).

Research has also investigated the interaction between temperament and environmental risk factors. Again this research has produced mixed results. Studies have shown that temperamental traits and environmental factors interact in predicting child behaviour, explaining around fifty percent of the variance in boys' behaviour and thirty percent of the variance in girls' behaviour (Patterson & Sanson, 1999; Stevenson et al., 1996; Thompson et al., 1996). However, using latent variable modelling Stevenson and colleagues (1996) found that a model where temperament and environmental factors contributed separately to child adaptation best fit their data. The interaction between temperament and environmental risk factors for child behaviour problems therefore requires further investigation.

Overall however, research exploring the role of child and environmental influences has identified a number of pathways associated with an increased risk of children developing behaviour problems. These have included socio-economic disadvantage, maltreatment, parental mental state, genetics, and temperament. Clearly the factors described do not represent a comprehensive review of the literature, but provide examples of directions that have traditionally been dominant. For a broader review the reader is referred to Carr (1999, Chapter 2). The identification of the risk factors described has been influential in allocating resources and providing proactive

interventions for the families of children at risk of developing behaviour problems. An example is the Government's Sure-Start Programmes (Sure-Start, 2004). Additionally, the identification of risk factors has shaped clinical psychologists' assessment and formulation of childhood behaviour problems, particularly through highlighting predisposing factors. There are a number of limitations to the literature described however.

The prediction of behaviour problems based on known risk factors is less than perfect and in some cases the associations are non-significant (Shields & Cicchetti, 1998). For example, although Deater-Deckard and Plomin (1999) found significant genetic influences on teacher-rated aggression and parent-rated delinquency, these were non-significant for parent-rated aggression and teacher-rated delinquency. Further, behaviour problems themselves significantly predict later psychosocial difficulties even when environmental risk factors and aspects of child development are controlled for (Caspi et al., 1987; Stevenson & Goodman, 2001). There are also limitations to the clinical utility of the research outlined. Although it highlights vulnerable groups and contributes to clinical psychologists' understanding of factors predisposing children to develop behaviour problems, it does not indicate how these problems develop or how to intervene with them. An area of research that has been particularly influential in this respect is the study of parenting behaviour and this has been of greatest utility to interventions for externalising behaviour problems.

Parenting Behaviour

Behavioural models propose that all behaviours are developed and maintained through positive or negative reinforcement cycles. Positive reinforcement occurs

when behaviour gains something that is desired, whilst negative reinforcement arises when an aversive aspect of the internal or external environment is removed following the behaviour. The pioneering work of Patterson and colleagues (Patterson, 1982; Patterson, Reid & Dishion, 1992) demonstrated that these principles apply to childhood externalising behaviours. They found that parents play a causal role in the development and maintenance of antisocial behaviour and the extinction of desirable behaviours as they give antisocial behaviour attention, whilst ignoring desirable behaviour. Other studies have provided further support for the role of parenting behaviour, consistently linking negative parenting behaviours such as power assertive control with child behavioural difficulties, and positive parenting behaviours such as structuring the child's environment by adopting their perspective with desirable child behaviour (Pettit & Bates, 1989; Richman et al., 1982; Scott, Spender, Doolan, Jacobs & Aspland, 2001; Stoolmiller, 2001; Zahn-Waxler et al., 1990).

Parenting behaviour is therefore widely acknowledged as a pathway to the development of childhood behaviour problems and several authors have hypothesised that it interacts with pathways from environmental risk factors and temperamental traits to behavioural difficulties (Gjone & Stevenson, 1997; Needlman, Stevenson & Zuckerman 1991; Zahn-Waxler et al., 1990). With respect to environmental risk factors it has been argued that parents in these contexts demonstrate inadequate parenting behaviour, are less likely to set consistent limits and are more likely to be emotionally unavailable to their children except when the child commands attention through disruptive behaviour (Goodman & Gotlib, 1999; Needlman et al., 1991; Zahn-Waxler et al., 1990). Consistent with this hypothesis,

studies of depressed parents (Dumas, Gibson & Albin, 1989; Goodman, Adamson, Riniti & Cole, 1994; Goodman & Gotlib, 1999; Kochanski, Kuczynski, Radke-Yarrow & Welsch, 1987), and those living in urban, overcrowded and economically deprived areas (Dodge, Pettit & Bates, 1994; McLeod & Shanahan, 1993; McLoyd, 1998; McLoyd, Jayaratne, Ceballo & Borquez, 1994; Middlemiss, 2003) have shown that these parents display more inconsistent and negative parenting behaviours, in addition to inadvertently reinforcing misbehaviour. Further, a number of these studies have directly linked the differing levels and patterns of parenting behaviour with increased child behaviour problems. With regards to maltreatment it is considered that maltreating parents will, by definition, show inconsistent, unpredictable, punitive, neglectful, and inadequate parenting behaviour and it is assumed that this will negatively affect child behaviour (Shields & Cicchetti, 1998, 2001; Shields, Ryan et al., 2001).

Interactions between parenting behaviour and child temperament have also been explored, although findings from these studies are less clear. In a review of studies investigating this interaction Bates, Pettit, Dodge, and Ridge (1998) concluded that the effect sizes are at best very modest. However, recent studies have provided strong evidence that temperament predicts later parenting skills (Stoolmiller, 2001). Exactly how this influence exerts itself is likely to be complicated (Gjone & Stevenson, 1997; Stoolmiller, 2001). Three main mechanisms have been hypothesised, namely that temperament directly affects parenting behaviour by eliciting negative responses and thus creating difficulties in parent-child interactions; that temperament creates a poor fit between the child and environment; or that temperament moderates the potential impact of parenting practices and stressful

experiences on the child (Gjone & Stevenson, 1997; Rutter & Quinton, 1984; Stoolmiller, 2001). Further research is required to explore these hypotheses.

Overall, the literature to date regarding parenting behaviour strongly supports it role as a pathway to the development of child behaviour problems. Further, evidence has shown that parenting behaviour interacts with environmental risk factors and may interact with temperament in influencing child behaviour. Additional research is needed to clarify the interconnections between these pathways however. The strong association between parenting behaviour and child behaviour difficulties has had a significant influence on clinical practice. As a result of these findings the majority of clinical interventions for early behaviour problems include behavioural management, primarily through training parents in behaviour management techniques (Barkley, 1987; Buchanan, 1992; Carr, 1999; Chamberlain, 1994; Douglas, 1989; Kaplan & Busner, 1993). This has included individual and group parent training (e.g. Webster-Stratton & Hancock, 1998).

There is a consensus in the clinical literature that parent training is the most effective intervention for early behaviour problems, as evidence from meta-analyses and controlled trials has shown that it is significantly effective in reducing behaviour problems in early childhood (Anastopoulos, Barkley & Shelton, 1996; Scott et al., 2001; Stoolmiller, 2001; Weisz, Weiss & Donenberg, 1992). The clinical significance of these findings has been questioned however, as studies in community clinics, rather than centres of clinical excellence, have only revealed modest improvements (Andrade, Lambert & Bickman, 2000; Scott et al., 2001; Weisz et al., 1992). For example, although Scott and colleagues (2001) found significant

improvements in their treatment group post-intervention, a third of the children in this group still met the criteria for oppositional defiant disorder (ICD-10, World Health Organisation [WHO], 1992). Despite these limitations parent training remains the most effective clinical intervention for early behaviour difficulties, and the incorporation of strategies addressing children's cognitions has been limited with younger children and does not significantly improve outcomes (Stallard, 2003; Stoolmiller, 2001). Therefore, the most effective clinical intervention currently available for early behaviour problems is potentially of limited clinical efficacy for a significant number of children.

Given the limitations of current interventions, and the fact that the traditional pathways described account for around half of the variance in child behaviour problems at best, it has been argued that there is a need to develop better models of these difficulties (Shields & Cicchetti, 2001; Southam-Gerow & Kendall, 2002; Stallard, 2003; Stevenson, Thompson & Sonuga-Barke, 1996). It is emphasised that this does not represent a revolution against traditional models, but an evolution of these models through exploring alternative pathways to the development of childhood behaviour problems (Southam-Gerow & Kendall, 2002). One area that has been of specific interest in this respect is the role of emotional processes, and in particular emotion regulation.

Emotional Processes

Emotional processes are implicated in over half of the DSM-IV axis-I disorders and all axis-II disorders (American Psychiatric Association [APA], 1994; Gross, 1998). With regards to the childhood disorders Southam-Gerow and Kendall (2002) have

argued that three main patterns of emotion expression characterise children at risk or diagnosed with these, namely the inhibition of emotions, poor emotional control and non-normative emotional expression. Emotions are thus considered one of the four main processes in cognitive-behavioural conceptualisations of childhood disorders, alongside cognitions, behaviours and physiological reactions (Carr, 1999). However, few models, research studies or interventions adequately consider the role of emotional processes, instead favouring a focus on behavioural, cognitive and physiological processes (Gross, 1998; Southam-Gerow & Kendall, 2002). An increased emphasis on emotional processes has therefore been advocated as a development to traditional models of childhood behaviour difficulties (Shields & Cicchetti, 2001; Southam-Gerow & Kendall, 2002).

Before discussing emotional processes it is important to have an understanding of what emotions are. Emotions have been notoriously hard to define however and several theories have emerged (Blumberg & Izard, 1986; Gross, 1998; Izard, 1977; James, 1884, 1894, as cited by Gross, 1998; Oatley, 1992; Weiner & Graham, 1984). The functionalist theory of emotion incorporates aspects from a number of these theories and arguably presents the most useful conceptualisation of emotions. Within the functionalist theory, emotions are viewed as a conscious mental state or feeling with identifiable eliciting conditions (Oatley, 1992). Further, it is argued that emotions serve specific functions and hold consequences in both inter and intra-personal domains (Oatley, 1992). Intra-personal functions include the facilitation of problem solving and decision taking, preparation for motor response and attention focusing. Inter-personal functions include communication, the scripting of social behaviour and the provision of information regarding other's behaviour and whether

the situation is good or bad (Dale, 1996; Gross, 1998; Oatley, 1992). Within the functionalist theory emotions are therefore seen to consist of attentional, physiological and expressive reactions, and the functions emotions serve are seen as survival promoting (Oatley, 1992). The theory also builds on James' (1884, 1894, as cited by Gross, 1998) proposal that emotions can be modulated, arguing that modulation occurs to determine the duration and intensity of emotions and to shape their expression (Lang, 1995; Oatley, 1992). This perspective therefore conceptualises emotions as both a regulated phenomena and subsequently a behaviour regulator (Gross, 1998; Oatley, 1992).

Although the functionalist theory proposes that emotions serve adaptive, survival-promoting functions, it is widely accepted that they can disrupt as well as enhance skilful responding to the environment (Gilliom, Shaw, Beck, Schonberg & Lukon, 2002). For example, research has demonstrated that intense emotions can affect the ability of individuals to cope in specific situations, causing disorganisation of thinking and behaviour (Eisenberg, Guthrie et al., 1997; Gilliom et al., 2002; Oatley, 1992). Regulation of the intensity, duration and expression of emotions is therefore considered critical to adaptive psychosocial development. This has led to an interest in the role of emotion regulation as a central emotional process in the development of childhood behaviour problems (Eisenberg, Guthrie et al., 1997; Penza-Clyve & Zeman, 2002; Shipman & Zeman, 2001; Zahn-Waxler et al., 1990).

Emotion Regulation

Operational Definition

There is a lack of consensus in the emotion regulation literature regarding the precise definition of emotion regulation and dysregulation (Keenan, 2000). Throughout this paper the term *regulation* is taken to mean moderation, adjustment or adaptation to fit requirements. The conceptualisation of *emotion regulation* throughout the paper is therefore consistent with Thompson's (1994) definition as the "monitoring, evaluation and modification of emotional reactions in order to achieve individual goals and to facilitate adaptation to the social environment". The term *emotion regulation* is thus used to refer to the way in which individuals manage their emotional experiences and expressions, and emotion regulation is viewed as a dynamic process affected by the demands of the social situation and individual goals. The term "emotion regulation strategies" refers to the intrinsic and extrinsic processes or strategies used to achieve emotion regulation. The terms "well-regulated" and "high levels of emotion regulation" are used to refer to a pattern of emotion regulation where individuals are able to regulate their emotions effectively, in a socially appropriate and flexible way, adjusting their regulation according to the demands of the environment and their own personal goals. *Dysregulation* is used throughout the paper to refer to an inability to adaptively regulate emotions. It thus refers to inability to manage the experience of emotions and /or an inability or inflexibility to adjust emotion regulation to fit the demands of the specific situation. Dysregulation is therefore used to describe a pattern of unmanaged intense emotions, unmodulated responding, situationally inappropriate affect and a lack of flexibility.

Precursors to the Study of Emotion Regulation

A number of precursors to the study of emotion regulation can be found in the psychological literature, the most obvious of which are in the psychoanalytic and stress-coping traditions (Gross, 1998). The psychoanalytic tradition discusses the concept of ego defence, a general term for the processes regulating reality-based and id- or superego-based anxiety. Reality-based anxiety occurs when situational demands overwhelm the ego, and can lead to individuals avoiding similar situations in the future. Superego- or id-based anxiety occurs when impulses are curtailed as the ego judges they will create high levels of future anxiety. Ego defence is seen as the cognitive and behavioural processes aimed at reducing the negative emotions elicited by these two types of anxiety and other types of negative emotion (Paulhaus, Fridhandler & Hayes, 1997).

Similar to the concept of reality-based anxiety, the stress-coping tradition also discusses the demands that the external and internal environment place on the individual. It is proposed that when these demands are appraised as taxing or exceeding the individuals' resources coping occurs to manage them. As with ego defence, coping is conceptualised as cognitive and behavioural processes, and can be divided into problem-focused coping and emotion-focused coping. Problem-focused coping is aimed at solving the problem, whilst emotion-focused coping has the purpose of reducing negative emotional experience (Lazarus & Folkman, 1984). Whilst the notions of ego defence, problem-focused and emotion-focused coping clearly identify the use of cognitive and behavioural processes to reduce negative emotions, it was the advent of the emotion regulation literature that saw the

elaboration of these processes and empirical investigation of their links with child adaptive functioning.

Expanded Definition

Emotion regulation refers to the processes involved in influencing which emotions an individual has, when they have them and how they experience and express them (Gross, 1998). Essentially this constitutes the management of emotions through their initiation, modulation, monitoring and the modification of reactions to them (Calkins & Fox, 2002; Eisenberg, Guthrie et al., 1997; Rydell, Berlin & Bohlin, 2003; Shields & Cicchetti, 1997, 1998; Shipman & Zeman, 2001; Thompson, 1994). The modulation of negative emotions has been of particular interest in relation to child behaviour (Gilliom et al., 2002; Kopp, 1989; Melnick & Hinshaw, 2000).

Gross (1998) proposes that there are five points in the emotion generative process where regulation can occur, namely the selection of the situation, the modification of the situation, the deployment of attention, the change of cognitions and the modulation of responses. To act at these points emotion regulation involves biological, behavioural, cognitive, attentional and communication systems (Eisenberg, Fabes et al., 1997; Keenan, 2000, Maughan & Cicchetti, 2002; Penza-Clyve & Zeman, 2002; Rydell et al., 2003; Thompson, 1994). The management promoted by these systems results in changes to emotion dynamics, such as alterations in rise time, magnitude, duration, and offset of responses in behavioural, experiential or physiological domains (Eisenberg, Guthrie et al., 1997; Gross, 1998). The consequences of adaptive regulation therefore include the modulation of negative experiences, inhibition of negative social responses, the maintenance of an

optimal level of engagement with the environment and the achievement of personal goals (Melnick & Hinshaw, 2000; Shields & Cicchetti, 1997, 1998; Shipman & Zeman, 2001). By definition emotion regulation is thus central to adaptive functioning, influencing socio-emotional competence and mental health (Eisenberg, Fabes et al., 1997; Southam-Gerow & Kendall, 2002; Zimmerman & Stansbury, 2003)

Emotion regulation is viewed as part of the larger system of self-regulation, defined as the "ability to modulate behaviour according to the cognitive, emotional and social demands of the situation" (Eisenberg, Guthrie et al., 1997; Posner & Rothbart, 2000). Multiple levels of self-regulation develop throughout infancy and childhood, but the study of emotion regulation and emotion relevant behaviour regulation has been of greatest interest in relation to childhood behaviour difficulties (Calkins & Fox, 2002; Eisenberg, Fabes et al., 1997; Eisenberg, Guthrie et al., 1997). Although both of these processes are considered important to adaptive psychosocial functioning it is argued that emotion regulation is a crucial precursor to behavioural regulation (Eisenberg, Guthrie et al., 1997; Kopp, 1989). Emotion regulation has received comparatively less research interest however. In her seminal paper Kopp (1989) therefore suggested that further research into emotion regulation was required, and that this would lead to a more comprehensive perspective on the growth of self-regulation. Following this paper there has been an expansion in the theoretical and empirical literature on emotion regulation and this has cut across traditional boundaries within psychology, providing a common ground and shared focus for clinical and developmental psychologists (Eisenberg, Guthrie et al., 1997; Gross, 1998).

The Development of Emotion Regulation

Theories of emotion regulation view it as a developmentally acquired process, and have discussed its development within the broader context of overall child development (Maughan & Cicchetti, 2002). From the first few days of life infants begin to use *species-typical* emotion regulation strategies such as sucking, head turning and self-distraction through interesting sights (Kopp, 1989). These strategies are bound by arousal, increasing in efficacy as homeostatic regulation develops over the first three months (Kopp, 1989; Zahn-Waxler et al., 1990). One internal mechanism associated with the development of homeostatic regulation, and thus emotion regulation, is respiratory sinus arrhythmia (RSA). Research evidence has shown that suppression of RSA during stressful events is associated with better state regulation, greater self-soothing, and higher attention control in infancy, in addition to appropriate emotion regulation and sustained attention at preschool and school age (Calkins & Fox, 2002). Therefore children with greater control over RSA are likely to develop better emotion regulation.

Although older infants refer back to *species-typical* emotion regulation strategies to self-soothe, by the age of nine months they begin to develop *elemental cognitions* and this is considered the second stage in the development of emotion regulation (Kopp, 1989). *Elemental cognitions* refer to the learning of cause-effect associations, including the attribution of emotions to external causes and perceptual discrimination (Kopp, 1989). This clearly overlaps with Piaget's (1972, 1975) sensory-motor stage of development, where it is argued that the infant's understanding of the world is object-based, learned through trial-and-error and the development of cause-effect associations. During this stage in the development of

emotion regulation infants learn that certain objects (e.g. favourite toy, dummy, mother) are associated with reduced distress. Caregivers reinforce these associations by presenting the distressed infant with these objects and over time the infant will visually seek the objects when they are distressed. The infant also becomes increasingly able to differentiate between adults, seeking assistance from specific others (Kopp, 1989). The influence of caregivers is thus critical to the development of emotion regulation from around nine months of age and this coincides with the emergence of attachment patterns (Zahn-Waxler et al., 1990). One example of an elemental cognition related to caregivers is the infant who ceases to cry on hearing their parent's footsteps as they have learnt that the parent's approach is associated with the soothing of distress.

By the end of the first year, developments in the attention and motor systems further influence emotion regulation. Attention regulation emerges at this time, aided by the development of three related but anatomically distinct systems (Calkins & Fox, 2002). These are the reticular activating system (RAS), concerned with general alertness, the posterior attention system, controlling the switching of attention, and the anterior attention system, concerned with the executive management of attention and underlying the wilful control of behaviour (Calkins & Fox, 2002). Brain development and lesion studies have demonstrated the importance of the prefrontal regions in emotion regulation, supporting the role of the anterior attention system in particular (Fox, 1994; Gross, 1998). With the development of attention regulation the deployment of attention is possible and strategies such as distraction, concentration and rumination are subsequently available to the child (Gross, 1998). Research has shown that distraction is the most commonly used emotion regulation

strategy in older infants (Gilliom et al., 2002; Zimmerman & Stansbury, 2003). In addition to developments in the attention system, motor skills gained towards the end of infancy also influence the development of emotion regulation as these allow the infant to crawl and grasp, thus enabling them to move to the caregiver and comfort objects, explore and self-distract (Kopp, 1989; Zimmerman & Stansbury, 2003).

As children enter the preschool period it is argued that some of the most interesting developments in emotion regulation occur (Gilliom et al., 2002; Kopp, 1989). The most notable development during this time is the emergence of language. With regards to emotional language, children begin to talk about their emotions from two years of age (Dale, 1996; Hughes & Dunn, 2002). There is a major expansion in this language during the third year of life and although children do not have a fully developed theory of emotion at this age they produce increasingly sophisticated utterances regarding emotions (Dale, 1996; Hughes & Dunn, 2002). Research evidence has supported the importance of language in emotion regulation, demonstrating associations between verbal fluency, verbal ability and emotion regulation, independent of age (Cole, Usher & Cargo, 1993; Eisenberg et al., 1996). Therefore the relationship between speech and language difficulties and childhood behaviour problems (see Stevenson, 1996; Tannock & Schachar, 1996) could potentially be mediated by emotion regulation.

Language is likely to influence emotion regulation in several ways. It can be used to communicate needs and feelings, allowing children both to express their emotions in a cooler medium and use language to regulate their relationships with others (Crittenden, 1996; Dale, 1996; Kopp, 1989). Additionally, information about the

world can now be represented linguistically and this aids the formation of internal representations (Crittenden, 1996; Dale, 1996; Kopp, 1989; Piaget, 1972, 1975). As a result of these internal representations, between the age of eighteen and thirty-six months children develop self-awareness, becoming able to discriminate themselves from others, viewing themselves as both object and agent and recognising what they can do to make themselves feel better (Gilliom et al., 2002; Kopp, 1989; Zahn-Waxler et al., 1990). Further, they begin to internalise display rules regarding the expression of emotions and learn that they can hide their emotions to serve personal goals (Southam-Gerow & Kendall, 2002). Children also gain increasing control over their impulses and actions during the preschool years and this aids adherence to internal representations and rules (Calkins & Fox, 2002). In concert the changes in the child during the preschool period therefore result in a significant increase, diversification and maturation in autonomous emotion regulation (Kopp, 1989; Maughan & Cicchetti, 2002). However, it has been argued that emotion regulation strategies during this time remain bound by specific instances in episodic memory (Crittenden, 1996).

During middle childhood information from all memory systems is integrated and children can thus create increasingly sophisticated and accurate representations of reality (Crittenden, 1996; Piaget, 1972, 1975). As such, children's understanding of emotions becomes more complex (Hughes & Dunn, 2002). These developments allow children greater insight into the emotion generative process facilitating *planful emotion regulation*. This is considered the final stage in the development of emotion regulation and represents the strategic deployment of emotion regulation skills (Kopp, 1989; Southam-Gerow & Kendall, 2002). Whilst emotion regulation

strategies continue to develop into adulthood (Gross, 1998; Southam-Gerow & Kendall, 2002) many authors argue that patterns of emotion regulation become stable from around six years of age and this has been supported in the research literature (Eisenberg et al., 1996; Shields & Cicchetti, 1997, 1998).

Theories of emotion regulation therefore conceptualise it as a developmentally acquired process, influenced by normal development and with associated gains, plateaus, temporary regressions or losses and a change in the use of strategies over time (Calkins & Fox, 2002; Kopp, 1989). The mastery of early stages is regarded as crucial for the development of later stages and given the array of systems involved, the development of emotion regulation is considered fragile with all too many places it could go wrong (Calkins & Fox, 2002; Dale, 1996). In addition to the internal systems influencing the development of emotion regulation it is widely acknowledged that external influences such as parents, siblings, teachers and peers are also crucial in shaping its development (Kopp, 1989; Southam-Gerow & Kendall, 2002). It is therefore important to consider these external influences to fully understand the development of emotion regulation and how deficits in emotion regulation may arise (Southam-Gerow & Kendall, 2002). However, it should be noted that there is a lack of literature regarding sibling influences.

Parental Influences

Many authors have argued that the parent-child relationship is the most salient environmental influence on children's emotional development (Gilliom et al., 2002; Keenan, 2000; McDowell, Kim, O'Neil & Parke, 2002). Theories on the development of emotion regulation have therefore considered that this relationship is

the primary context in which children learn to regulate their emotions (Keenan, 2000; Kopp, 1989; Shipman & Zeman, 2001). In particular, two key aspects of parenting have been highlighted as the main influences on developing emotion regulation, namely the fostering of the attachment relationship and the facilitation of emotion regulation through emotion coaching (Calkins & Fox, 2002; Goodman & Gotlib, 1999; Kopp, 1989; Shields, Ryan et al., 2001).

Attachment is central to child development as it shapes the way children explore the environment, how they interpret information within the environment and how they organise behavioural responses (Ainsworth, Blehar, Waters & Wall, 1978; Carr, 1999; Crittenden, 1996). It is therefore argued that attachment is critical to the development of emotion regulation (Gilliom et al., 2002; Shields, Ryan et al., 2001). Research has consistently supported the role of attachment in emotional development and these results hold clear implications for children's developing emotion regulation. In summarising these findings Crittenden (1996) outlines the typical effects of secure, anxious, anxious-avoidant and ambivalent attachment on emotional development and expression. Securely attached children use language to express their feelings, plan for the future and negotiate compromises to achieve their goals. The use of these strategies would clearly aid effective emotion regulation. By contrast, anxiously attached children inhibit displays of affect as they have learnt that this leads to rejection or the unavailability of parents. The ability of anxiously attached children to inhibit their emotions indicates that they do have skills in emotion regulation. Further, this appears adaptive given parental responses to affective displays. However, the persistent inhibition of emotions across settings is not considered an adaptive style of emotion regulation as it can lead to explosive

outbursts, is often out of synchrony with the ongoing peer context and has been linked with a variety of mental health problems (Shields & Cicchetti, 1998, 2001; Shipman & Zeman, 2001).

With respect to anxious-avoidant attachment, Crittenden (1996) argues that children with this attachment style are unable to memorise associations as they are not active but passive in their environment. Thus anxious-avoidant attachment would restrict the development of emotion regulation, particularly the formation of *elemental cognitions*. Ambivalent attachment is associated with unpredictable outcomes, although these children are generally highly aroused by fear and anger and show an increased desire for comfort. These findings imply that children with an ambivalent attachment bond require higher levels of emotion regulation due to the high levels of arousal they experience in response to negative emotions. However, the continued need for assistance and comfort suggests that they are unable to regulate their emotions independently. Consistent links have therefore been demonstrated between attachment security and characteristics of emotional development that are likely to impact on the development of emotion regulation. However, although one recent study has shown a direct association between attachment security and emotion regulation skills (Gilliom et al., 2002), direct empirical investigation of this relationship is sparse. Further research is therefore required in this area (Southam-Gerow & Kendall, 2002).

Alongside attachment security, emotion coaching is also hypothesised to be associated with the development of emotion regulation (Eisenberg, 1996; Gottman, Katz & Hooven, 1996). Emotion coaching has been conceptualised as the

awareness, responsiveness and acceptance parents show in response to their child's emotions, and the subsequent instructions they provide (Gottman et al., 1996). This is particularly important through infancy and early childhood when children look to parents for assistance in the management of arousal and distress (Shields, Ryan et al., 2001). The responses parents give contain very specific lessons about how to label and interpret emotions, when it is appropriate to express emotions and how to manage them (Kopp, 1989; Shipman & Zeman, 2001). Parents high in emotion coaching are more aware of their child's emotions, talk about them in a differentiated way and assist children in experiencing and regulating their emotions (Gottman et al., 1996). Longitudinal research has shown that children whose parents are high in emotion coaching develop fewer behaviour problems later in childhood and adolescence (Eisenberg, 1996; Gottman et al., 1996). By contrast, parents low in emotion coaching ignore or deny their child's emotions and try to distract them from these emotions, leading to higher levels of behaviour problems (Gottman et al., 1996). In addition to their responses to children's emotions, the way in which parents express their own emotions and interact with others also contributes to emotion coaching as children learn regulation skills through observation as well as participation (Eisenberg, Cumberland & Spinrad, 1998; Maughan & Cicchetti, 2002).

Whilst it appears logical that emotion coaching influences the development of emotion regulation in children, research into this hypothesis has been sparse (Eisenberg, 1996; Kopp, 1989; Ramsden & Hubbard, 2002; Thompson, 1994). In 1996, Gottman and colleagues found that emotion coaching was associated with cardiac vagal tone, a measure of physiological arousal that has been used as an index of emotion regulation (Calkins & Fox, 2002). However, this relationship was

concurrent and the influence was bi-directional. With the exception of Cole, Teti, and Zahn-Waxler (2003) and McDowell and colleagues (2002) few other authors have explored the links between emotion coaching and emotion regulation. Further, these studies have only investigated specific aspects of emotion coaching. Cole and colleagues (2003) investigated patterns of emotional expression in interactions between parents and their five-year-old children. Mothers and teachers completed the CBCL when children were five and seven years old, and behaviours taken to reflect dysregulation were used as the index of emotion regulation. Children whose mothers responded to any of their emotions with anger were more likely to show dysregulated behaviours, whilst patterns of mutual positive emotion regulation were associated with healthy adjustment at both time points. When mothers' responses mirrored their child's negative emotions (i.e. angry response to angry child or distressed response to distressed child) children were particularly likely to show behaviours reflecting emotion dysregulation. The findings of this study therefore support the importance of the way in which parents respond to their children's emotions in the development of emotion regulation. However, the measure of emotion regulation in this study was less than optimal as a child behaviour scale was used rather than a specific measure of emotion regulation.

McDowell and colleagues (2002) also observed parent-child interactions, but during discussions of hypothetical problem situations. Characteristics of these interactions were compared with children's responses to vignettes of emotional situations. Children's responses to the vignettes were coded for aspects of emotion regulation including valence, ease of calming and intensity. Although a number of associations were found between specific characteristics of the triadic discussion and particular

aspects of emotion regulation, the characteristic most consistently associated with children's emotion regulation was a father's focus on the child as the source of the problem. Focusing on children as the source of problems is likely to limit effective problem solving and conflict resolution, and to exacerbate the negative emotional content of interactions. These results therefore provide further preliminary support for the role of parental responses in the development of emotion regulation. However, the relationship between children's reported and actual emotion regulation was not established in this study and the findings are again restricted by its cross-sectional design. Therefore, although preliminary studies have identified some associations between emotion coaching and children's emotion regulation, further research is required.

Evidence from studies with normal samples has therefore provided only limited support for the hypothesised influence of attachment and emotion coaching on the development of emotion regulation. Further support has come from research with maltreated children and children with depressed mothers. Almost by definition, maltreated children are less likely to be securely attached, and maltreating parents are less likely to show emotion coaching behaviours. Indeed, studies with maltreating mothers have shown that they have less effective strategies for helping children cope with their emotions, less understanding of why they are displaying these emotions, less sympathy, higher levels of arousal and higher levels of aversion to children's emotions (Frodi & Lamb, 1980; Shipman & Zeman, 2001) and maltreated children report that they expect little support from their parents (Shipman & Zeman, 2001; Shipman, Zeman, Penza & Champion, 2000). Research has also consistently demonstrated that maltreated children have lower levels of emotion regulation and

higher levels of dysregulation, with as many as eighty percent of maltreated children showing dysregulated patterns of emotion regulation (Eisenberg et al., 1996; Maughan & Cicchetti, 2002; Shields & Cicchetti, 2001; Shields, Ryan et al., 2001). It is therefore assumed that the negative parenting behaviour of maltreating parents directly affects the development of emotion regulation in their children.

Findings from studies with depressed mothers have also found that these parents show lower levels of emotion coaching and are less likely to facilitate the development of secure attachment bonds. This research has shown that depressed mothers are more punitive, negative, retaliatory, and less positive towards their children, engaging in more hostile, angry and intrusive behaviour with them (Goodman et al., 1994; Gotlib & Goodman, 1999). Further, they demonstrate dysfunctional problem solving and elevated expression of hostility, anger and conflict with their spouses and this is likely to be observed by their children (Gotlib & Goodman, 1999; Gotlib & Whiffen, 1989). Studies with the children of depressed mothers have provided some evidence of deficits in specific aspects of emotion regulation, including autonomic regulation (Field, 1994) and attentional control (Breznitz & Friedman, 1988). The latter study also found that depressed mothers encouraged attention switching in their children, providing some indication that the parenting behaviour of depressed mothers directly influences the development of emotion regulation in their children.

Evidence from normal samples, children with depressed mothers and most convincingly maltreated children has therefore provided support for the influence of parents on developing emotion regulation, particularly through attachment and

emotion coaching. Further research is required to clarify and establish these links however (Goodman & Gotlib, 1999). In addition to the role of attachment and emotion coaching, studies with children of depressed mothers and maltreated children have highlighted the high levels of distress they experience in their home environments. It has therefore been suggested that distress also impacts on the development of emotion regulation. It is argued that children in environments with high levels of distress have fewer resources available for developing or applying emotion regulation strategies (Zimmerman & Stansbury, 2003). However, it is also acknowledged that a certain level of distress and frustration is necessary for children to learn, adopt and practise emotion regulation skills (Kopp, 1989; Gilliom et al., 2002; Stifter, Spinrad & Braungart-Rieker, 1999). It is therefore viewed that an optimal level of distress is required for children to develop adaptive emotion regulation, with levels of distress at either extreme negatively affecting its development. Eisenberg and colleagues (Eisenberg & Fabes, 1992; Eisenberg et al., 1995; Eisenberg, Guthrie et al., 1997; Spinrad et al., 2004) have further argued that children's emotionality will interact in this process, as this will influence the intensity of distress they experience. These authors hypothesise that emotion regulation will be of greatest importance to children high in emotionality, but as these children experience distress more intensely there is a risk that this will negatively affect their developing emotion regulation.

Teacher and Peer Influences

In addition to parental influences, theories of emotion regulation have highlighted the increasing importance of peers and teachers as children enter the preschool period. When children enter nursery or school they are challenged to practice their new

emotion regulation skills among a widening circle of peers and adults (Shields, Dickstein et al., 2001). Further, these new social contexts and social contacts place closely defined standards on children's conduct and emotion regulation. They are now expected to manage distress in socially acceptable ways, suppress aggressive or destructive impulses, co-operate with peers and assert their needs without violating the needs of others (Gilliom et al., 2002). Appropriate emotion regulation therefore becomes critical, fostering children's learning and engagement in classroom activities (Shields, Ryan et al., 2001). Over time the standards placed on children within the school environment become internalised in the form of display rules and it is argued that these guide subsequent emotion regulation (Shields & Cicchetti, 1997). Consequently children become increasingly aware of the potential discrepancies between expression of emotion and internal experiences (Shields & Cicchetti, 1997). Thus, it is argued that peer and teacher influences during the early school years are a crucial catalyst in the development of emotion regulation (Shields & Cicchetti, 1997). Research into this hypothesis is in its infancy however.

In the only longitudinal study in this area Shields, Dickstein, and colleagues (2001) investigated the relationships between preschool children and their teachers at the beginning of the school year and compared this with children's emotion regulation at the end of the year. Children who had a close relationship with teachers at the beginning of the year had higher levels of emotion regulation and lower levels of dysregulation at the end of the year. The converse was true of children who were in conflict with teachers at the beginning of the year. Although these findings suggest that the teacher-child relationship influences children's developing emotion regulation, the results of the study are limited as emotion regulation was not

measured at the beginning of the school year. It is therefore not possible to determine whether patterns of emotion regulation at the end of the school year were a consequence of the teacher-child relationship, related to earlier patterns of emotion regulation or both. Further, initial patterns of emotion regulation may have shaped the relationship formed between the teacher and the child at the beginning of the school year. Research into the role of peers in the development of emotion regulation is equally limited. Studies measuring emotion regulation, peer exclusion and popularity have been reported in the literature (McDowell et al., 2002; Spinrad et al., 2004). However, these studies have not reported the correlations between popularity or exclusion and later emotion regulation. Therefore the influence of teachers, and particularly peers, on the development of emotion regulation requires extensive further study.

Theories to date regarding the development of emotion regulation have discussed the role of internal child characteristics in addition to the influence of the home, school and peer context. Further research is necessary, but preliminary evidence suggests that emotion regulation is shaped by both internal and external influences. It has therefore been argued that child characteristics place limits on the development of emotion regulation and external factors facilitate its development within these limits (Calkins & Fox, 2002). The way in which emotion regulation subsequently develops is considered crucial to socio-emotional functioning (Eisenberg, Guthrie et al., 1997; Gross, 1998; Shipman & Zeman, 2001) and it has been hypothesised that deficits in emotion regulation contribute to the development and maintenance of social difficulties, behaviour problems and psychopathology (Eisenberg, Guthrie et al.,

1997; Penza-Clyve & Zeman, 2002; Southam-Gerow & Kendall, 2002; Zimmerman & Stansbury, 2003).

In particular it has been argued that low levels of emotion regulation are associated with externalising behaviour problems and over-regulation is linked with internalising problems (Eisenberg & Fabes, 1992). However, Shields and Cicchetti (1997, 1998) have contested this, suggesting that lower levels of emotion regulation are associated with both internalising and externalising behaviour problems. The effective application of emotion regulation skills is also hypothesised to impact on child behaviour. Specifically, it is argued that the development of internalising and externalising behaviour problems is linked with dysregulation, which is conceptualised as a pervasive use of ineffective strategies across settings, or emotion regulation operating in a dysfunctional manner (Keenan, 2000; Shields & Cicchetti, 1997, 1998; Shields, Ryan et al., 2001).

Measurement

In order to investigate these hypotheses a variety of protocols have been developed for the measurement of emotion regulation. For a critical review of these methods the reader is referred to Keenan (2000). Given the wide array of systems believed to be involved in emotion regulation, protocols for its measurement have included physiological, observational and questionnaire methods (Shields & Cicchetti, 1997; Rydell et al., 2003). For example, cardiac vagal tone and respiratory sinus arrhythmia (RSA) have been used as physiological measures of emotion regulation (Calkins & Fox, 2002; Stifter et al., 1999). Typically these measures are taken during tasks evoking negative emotions such as frustration. Cardiac vagal tone is

believed to represent the regulation of physiological reactions, whilst a suppressed RSA has been associated with adaptive emotional and behavioural regulation (Calkins & Fox, 2002; Stifter et al., 1999).

In terms of observational measures, a number of coding systems have been developed by individual researchers to describe emotion regulation. For example, Gilliom and colleagues (2002) observed the reactions of children at one, three and six years of age during a strange situation and delay task. Child responses were coded into categories of active distraction, passive waiting, focussing on the delay object and physical comfort seeking. Inter-rater agreement on these categories was between eighty-nine and ninety-six percent. Zimmerman & Stansbury (2003) developed a similar system for coding the emotion regulation of three-year-olds during stranger approach, busy caregiver and delayed gratification tasks. In this study behaviours were grouped into categories of comforting, cognitive strategies, distraction and instrumental coping. Inter-rater agreement on these categories was high, with Kappas between .85 and 1.0.

Several questionnaire protocols for measuring emotion regulation have also emerged. For example, Eisenberg, Guthrie and colleagues (1997) used the attention shifting and focusing temperament subscales of Goldsmith and Rothbart's (1991) child behaviour questionnaire (CBQ) as an index of emotion regulation. However, this clearly neglects emotion regulation strategies other than attentional processes. In 1997, Shields and Cicchetti created an emotion regulation Q-scale by asking seventeen eminent doctoral-level child psychologists to select items they believed reflected emotion regulation from the California Child Q-Sort (CCQ, Block & Block,

1980). The CCQ consists of 100 cards describing behaviours typical of children and respondents are asked to place the cards into piles depending on how representative they are of the child in question. Ten cards were consistently selected as indexes of emotion regulation including items such as "can recover quickly from stress", "is rigid / repetitive when stressed" and "emotional reactions are inappropriate". A validation study revealed significant correlations between the emotion regulation Q-scale and observations of emotion regulation, measures of positive and negative mood and ego resiliency, supporting the convergent validity of the scale (Shields & Cicchetti, 1997).

A number of other emotion regulation scales have been produced (e.g. Rydell et al., 2003; Shields & Cicchetti, 1997; Zeman, Shipman & Penza-Clyve, 2001). Of these, the emotion regulation checklist (ERC, Shields & Cicchetti, 1997) has been the most frequently used across studies (Ramsden & Hubbard, 2002; Shields & Cicchetti, 1997, 1998, 2001; Shipman & Zeman, 2001). The ERC is a twenty-four-item adult-report measure of children's emotion regulation. Items tap aspects of emotion regulation including affective lability, intensity, valence, flexibility and contextual appropriateness of emotional expressions. The checklist contains positively and negatively weighted items, scored on a four-point Likert scale. An ERC composite is calculated by averaging scores across the twenty-four items, and two empirically derived subscales have also been identified, reflecting emotion regulation and lability. The emotion regulation subscale captures processes central to adaptive regulation, including socially appropriate emotional displays, empathy and emotional self-awareness, whilst the lability subscale is comprised of items representing a lack of flexibility, mood lability and dysregulated negative affect. Higher scores on the

lability subscale are taken to indicate greater dysregulation (Shields & Cicchetti, 1997). Psychometric validation of the checklist has demonstrated that the ERC and both subscales have high internal consistency (Shields & Cicchetti, 1997; Shipman & Zeman, 2001). Further, the conceptualisation of emotion regulation on the ERC is consistent with the construct definition given by expert doctoral level psychologists and the checklist is highly correlated with observational measures of emotion regulation, supporting its construct and convergent validity (Shields & Cicchetti, 1997). Research has also established the ability of the ERC to distinguish between maltreated and comparison children, and between groups of well-regulated and dysregulated children (Shields & Cicchetti, 1997, 1998, 2001).

Emotion Regulation and Behaviour Problems

Using the methods described, researchers have explored the hypothesised links between emotion regulation and the development of childhood behaviour problems. In order to avoid the misunderstanding or misapplication of these findings (see Sonuga-Barke, 1998) it is important to acknowledge that the majority of studies, particularly those with non-clinical samples, treat behaviour problems and emotion regulation as dimensional constructs. Although a handful of studies conceptualise behaviour problems as a categorical construct and emotion regulation as dimensional, none of the studies reviewed for this paper treat both behaviour problems and emotion regulation as categorical. Whilst it has been argued that the use of a categorical approach provides the "bridge of meaning" between research and clinical practice, dimensional studies still hold some relevance to clinical psychology, although the clinical significance of results should be interpreted with caution (Sonuga-Barke, 1998; Fergusson & Horwood, 1995).

In the current context, studies treating both emotion regulation and behaviour problems as dimensional are able to identify whether the two are related and this holds some relevance to the way childhood behaviour problems are understood. However, it is difficult to identify the degree to which these findings relate to clinical groups and thus their clinical significance, as they do not indicate whether extreme scores on behaviour problem scales represent the end of a normal continuum or discrete entities, namely a group of children with clinically significant behaviour problems. The use of a categorical approach to behaviour problems in studies with clinical groups circumvents this, allowing the identification of whether children with clinically significant behaviour problems differ from other children in their levels of emotion regulation. This has more direct relevance to clinical psychologists in terms of the way they formulate and potentially intervene with childhood behaviour problems. However, as these studies continue to represent emotion regulation in dimensional terms it remains difficult to ascertain whether children with clinically significant behaviour problems differ *qualitatively* in their emotion regulation from other children, or whether these differences are purely *quantitative*. These limitations should be acknowledged in reviewing the studies outlined in this paper.

Research Evidence with Non-Clinical Samples

Consistent associations have been demonstrated between emotion regulation and later behaviour across several studies with non-clinical samples of different ages. In infancy, emotion regulation has been linked with subsequent frustration tolerance (Calkins & Fox, 2002) and compliance (Stifter et al., 1999). For example, Stifter and colleagues (1999) measured the heart rate and behavioural reactivity of five and ten-month old infants during frustration tasks and compared this with compliance at

thirty months of age. Frustration was induced at five months by arm restraint and at ten months by the removal of toys. Following frustration induction behaviours believed to regulate emotional arousal and thus reflect emotion regulation were coded, including avoidance, communication and orientation. At thirty months compliance was measured during a toy clean-up task, mental development test and electrode placement. Compliance was coded over ten-second intervals into categories of defiance, passive non-compliance, self-assertion and avoidance. A significant negative relationship was found between emotion regulation at five and ten months and non-compliance in terms of defiance, avoidance and passive non-compliance at thirty months. Although the ecological validity of these results is limited due to the laboratory setting, they provide preliminary evidence that deficits in emotion regulation in infancy relate to later behaviour problems such as non-compliance. This relationship is of clinical significance as non-compliance characterises a number of childhood behaviour disorders, particularly conduct problems (APA, 1994).

Studies with school age children have also revealed associations between emotion regulation and problem behaviour. For example, Eisenberg and colleagues (1996) studied 199 children in kindergarten, first, second and third grade. Behaviour problems were measured using the child problem behaviour checklist (Lochman & Conduct Problems Prevention Research Group, 1995) and emotion regulation was scored from teacher and parent ego resiliency and ego control subscales of the CCQ (Block & Block, 1980), temperament subscales of the Child Behaviour Questionnaire (CBQ, Goldsmith & Rothbart, 1991) and children's responses to a box-puzzle behavioural regulation task. A consistent negative relationship was

found between emotion regulation and problem behaviour across raters. Fifty-six percent of the variance in child behaviour as reported by mothers, fathers and teachers was explained by teacher-rated emotion regulation, thirty percent from fathers' ratings and thirty percent from mother-rated emotion regulation. This is equivalent to the variance in behaviour problems explained by traditional factors such as temperament and environmental influences (Deater-Deckard & Plomin, 1999; Gjone & Stevenson, 1997; Stevenson et al., 1996). However, as the authors used a behavioural regulation task as part of the emotion regulation score in this study, the conclusions that can be drawn solely in relation to emotion regulation are limited. Nevertheless, the findings of this study have been supported in a number of other studies investigating the emotion regulation and behaviour of school-age children.

This research has consistently demonstrated links between lower levels of emotion regulation and higher levels of both externalising and internalising behaviours (Eisenberg et al., 1995; Gilliom et al., 2002; McDowell et al., 2002; Ramsden & Hubbard, 2002; Shields & Cicchetti, 2001; Spinrad et al., 2004). Further, preliminary findings have associated dysregulated patterns of emotion regulation with internalising problems, such as submissive-withdrawn behaviour (Shields & Cicchetti, 2001), and externalising behaviour problems, including aggressive or angry behaviour (Ramsden & Hubbard, 2002; Shields & Cicchetti, 2001; Spinrad et al., 2004), bullying (Shields & Cicchetti, 2001) and adult violent convictions (Henry et al., 1996). Studies that have included measures of child temperament have demonstrated that although levels of emotion regulation and dysregulation are consistently associated with behaviour problems, this relationship is strongest for

children high in emotionality (Eisenberg et al., 1996; Eisenberg, Fabes et al., 1997; Rydell et al., 2003; Stifter et al., 1999). Therefore, emotion regulation appears particularly important to the psychosocial outcomes of children predisposed to react with intensity to negative situations, supporting Eisenberg and Fabes' (1992) hypothesis.

Recent research has attempted to unravel the influence of particular emotion regulation strategies and the regulation of specific emotions on behavioural outcomes. In a longitudinal study Gilliom and colleagues (2002) coded the emotion regulation strategies of low socio-economic-status (SES) males during laboratory-based frustration tasks when they were three years old. Categories of emotion regulation included passive waiting, distraction, comfort seeking, information gathering and a focus on the frustrating task. Scores for these categories of emotion regulation were compared with teacher ratings on the CBCL (TRF, Achenbach, 1991) when children were six years of age. During the frustration tasks at three years of age angry displays occurred less often than expected after distraction and passive waiting, but more often than expected after information gathering and focusing on the task. This would suggest that the latter strategies are less effective for regulating anger, possibly exacerbating it. With regards to later behavioural outcomes, distraction and passive waiting were negatively associated with teacher-ratings of externalising behaviours, whilst a focus on the frustrating task was positively related to these same problems. Further, passive waiting positively predicted co-operation at six years, whilst a focus on the task negatively predicted co-operation.

The number of emotion regulation strategies used at three years of age was also related to behavioural outcomes at six years of age. Teacher ratings of externalising behaviour were around one standard deviation lower for boys who used all three effective strategies (i.e. distraction, comfort seeking, and passive waiting) compared with those who used only one (effect size = .78, Gilliom et al., 2002). No significant differences were found between these boys on teacher ratings of co-operation or assertiveness. Although this study is limited by its exclusively low SES male sample, it was the first to explore links between specific regulatory strategies and later externalising problems. The results suggest that certain emotion regulation strategies, namely distraction, passive waiting and comfort seeking, are associated with positive outcomes, whilst others, such as focusing on the source of distress, are associated with negative behavioural outcomes. Further, they highlight the importance of children developing a range of emotion regulation strategies in order to avoid negative behavioural outcomes.

Whilst Gilliom and colleagues (2002) were the first researchers to explore the individual contributions of specific emotion regulation strategies, Rydell and colleagues (2003) have been among the first to explore whether the regulation of particular emotions contributes to different behavioural outcomes. These authors conducted a longitudinal study investigating the relationship between behaviour problems and the regulation of anger, fear and positive emotions in 155 children. When children were five years old parents completed questionnaires devised by the authors to measure emotionality and the regulation of these emotions. As a measure of internalising and externalising problems parents completed the preschool behaviour questionnaire (Behar & Stringfield, 1974) when children were six years

old. Teachers completed the Child Behaviour Questionnaire (CBQ, Rutter, Tizard & Whitmore, 1970). Additionally, parents and teachers completed the social competence inventory (Rydell, Hagekull & Bohlin, 1997) when children were six and eight years old. Children's regulation of anger at five years was related to subsequent externalising behaviours at home and school. Further, anger regulation was significantly associated with later internalising behaviours as rated by parents and pro-social behaviour as rated by teachers. Fear regulation was also associated with subsequent parent and teacher-rated internalising behaviour and teacher-rated pro-social behaviour. The regulation of positive emotions was related to later externalising and pro-social behaviours at home and school. These results suggest that poor regulation of positive or angry emotions is associated with the development of externalising problems, whilst lower regulation of fear and anger is influential in the development of internalising behaviour problems. Further studies are required to replicate, clarify and extend the research of both Rydell and colleagues (2003) and Gilliom and colleagues (2002) in exploring the links between specific emotion regulation strategies, the regulation of particular emotions and the development of behaviour problems.

Nevertheless, research with non-clinical samples has supported the hypothesis that low levels of emotion regulation and high levels of dysregulation are associated with both internalising and externalising behaviour problems and this is particularly true of children high in emotionality. Findings are consistent across studies with children of different ages, varying reporters and various measures of emotion regulation. Authors have therefore begun to extend these findings by considering the role of emotion regulation in mediating the relationship between environmental risk factors

and the development of behaviour problems. The reader is referred to Baron and Kenny (1986) for a description of the criteria for mediation. In their 2002 study, Ramsden and Hubbard revealed that emotion regulation mediated the relationship between family styles of emotional expression and child aggression, providing early indications that emotion regulation may mediate the impact of environmental variables on child behaviour. However, other studies have shown that external variables such as maternal behaviours (Gilliom et al., 2002; Rubin, Cheah & Fox, 2001), peer acceptance (Spinrad et al., 2004) and school attendance (Henry et al., 1999) may mediate the effect of emotion regulation on social and behavioural outcomes. Further research is therefore required to clarify the interaction between emotion regulation and environmental factors in the development of childhood behaviour problems. Evidence from studies with maltreated children provides some clarification of this issue in addition to providing further support for the association between emotion regulation and behavioural difficulties.

Research Evidence with Clinical Samples

Across a series of studies Shields, Cicchetti and colleagues have explored the emotion regulation of maltreated and non-maltreated six to twelve year old children attending a US summer day camp (Shields & Cicchetti, 1997, 1998, 2001; Shields, Ryan et al., 2001). These studies have revealed consistent links between emotion regulation and child behaviour problems. The focus of the 1998 study was aggressive behaviours. Camp counsellors completed the CBCL-TRF and the ERC in relation to 141 maltreated and eighty-seven non-maltreated children. A significant negative association was found between the ERC emotion regulation subscale and aggression on the CBCL. By contrast, the ERC lability subscale, taken to reflect

dysregulation, was positively related to aggression. As counsellors completed both measures in this study there was a risk of shared method variance in the pattern of results. This limitation was circumvented in Shields and Cicchetti's 2001 paper comparing 169 maltreated and ninety-eight non-maltreated children. Counsellors completed the ERC, CBCL-TRF and rated children's agency in interactions with peers. Through nomination techniques peers rated children's level of withdrawal, submission, aggression, disruptive behaviour and popularity. Three factors emerged from these measures, namely a dysregulation variable incorporating both ERC subscales and the anxiety and depression subscales of the CBCL, a disruptive behaviour variable composed of peer nominations of aggression and disruption, and a withdrawn-submissive behaviour variable based on peer ratings of this behaviour. Dysregulation was significantly related to disruptive and withdrawn-submissive behaviour, but these behaviours were not associated with each other.

Shields, Cicchetti and colleagues have also revealed links between children's emotion regulation and social outcomes. For example, Shields and Cicchetti (2001) found that emotion regulation played a key role in children's peer rejection. These findings are further supported by the results of a study by Maughan & Cicchetti (2002). These authors observed the reactions of eighty-eight maltreated and fifty-one non-maltreated four to six year old children in response to stimulated inter-adult anger. Responses were coded as adaptively concerned (AC), undercontrolled-ambivalent (UA), or overcontrolled-unresponsive (OU). UA and OU were taken to reflect emotion dysregulation. Children classed as dysregulated demonstrated higher levels of social problems as rated by mothers on the CBCL, particularly those whose responses were coded as UA. The effect size of this difference was small however

(.39). Emotion regulation and dysregulation therefore appear to be more strongly associated with behavioural than social outcomes in maltreated children.

As research with maltreated children has consistently confirmed the association between emotion regulation and behavioural difficulties, studies have begun to explore whether emotion regulation mediates the relationship between maltreatment and these problems. In their 1998 study, Shields and Cicchetti revealed that maltreatment no longer significantly predicted children's behaviour problems when ERC lability scores were added to their regression analysis. Further, Shields and Cicchetti (2001) found that scores on the lability subscale also mediated the effect of maltreatment on children's bully and victim status. Scores on the emotion regulation subscale mediated the effects of maltreatment on victim status only. The results of these studies provide preliminary evidence that emotion regulation, and particularly dysregulation, mediates the effects of environmental risk factors such as maltreatment on children's behavioural and social outcomes. However, these findings are limited by the cross-sectional design of the studies and further longitudinal research is needed to confirm and clarify this relationship.

Whilst studies with maltreated children have supported the role of emotion regulation in childhood behaviour problems, these children represent a very distinct clinical population. Research with other clinical groups is sparse although a few studies are beginning to emerge in the literature. Orobio de Castro, Bosch, Veerman, and Koops (2003) compared the emotion regulation of seven to twelve year-old boys with and without aggressive behaviour problems. Thirty-one boys in special education for children with severe behaviour problems were compared with thirty-two boys in

normal education. Children were given vignettes of problem situations involving anger and asked questions about what they would do next. Responses were discussed and coded into physical aggression, verbal aggression, coercion, solution attempt and avoidance. Aggressive boys reported becoming angrier than their non-aggressive peers and described less adaptive ways to regulate this anger. Further, they generated more aggressive responses to the vignettes and evaluated aggressive responses less negatively. The findings of this study therefore suggest that children with aggressive behaviour problems are more aroused by anger, less able to regulate anger in an adaptive way and evaluate aggressive responses less negatively. However, the relationship between self-reported and actual emotion regulation was not measured, limiting these findings. Nevertheless, the results of this study were supported by Cole and colleagues (2003), who also found that children with conduct problems experience higher levels of anger and have more difficulty regulating that anger. The limited research to date with clinical samples has therefore provided some further support for the hypothesis that children with externalising behaviours, particularly conduct problems, are more highly aroused by negative emotions such as anger and have more difficulty regulating these emotions. One recent study has also begun to explore the role of emotion regulation in the co-morbidity of childhood behaviour problems.

Melnick and Hinshaw (2000) studied the emotion regulation of eighty-two six to twelve year-old boys, forty-five of whom had been diagnosed with attention deficit hyperactivity disorder (ADHD). Children were observed during peer interactions in school and rank ordered according to their levels of aggression. A subgroup of children with ADHD and aggression was created from these scores. Social

preference was obtained through peer nomination, interviews were completed with parents and children, and family interactions were videoed whilst children were completing a frustration task. Effectiveness at maintaining interest in the task, persistence in applying problem solving strategies and expression of emotions in a non-disruptive way was rated on a four-point scale as a global measure of emotion regulation. Children's levels of mild emotion ventilation, intense emotion ventilation, problem solving, help seeking, accommodating, negative responses and shut down were also rated on a four-point scale as a measure of specific emotion regulation strategies. Due to the high number of analyses completed the authors set the significance levels to .01 in the data analysis to avoid family-wise error.

Results of this study again demonstrated a significant association between emotion regulation and behavioural difficulties such as impulsivity and negative emotional displays. Further, up to thirty percent of the variance in peer-rated social preference and non-compliance during the frustration task was explained by a combination of emotion regulation and restlessness / impulsivity. Of greater clinical significance, children with ADHD and aggression had significantly lower levels of emotion regulation than both the non-aggressive ADHD children and the comparison group without ADHD. The authors therefore concluded that emotion regulation was a resilience factor in the relationship between ADHD and aggression.

Findings from studies with clinical samples such as maltreated, aggressive and ADHD children therefore provide further support for the hypothesis that emotion regulation is associated with childhood behaviour problems, particularly externalising problems. Further, they provide preliminary evidence that emotion

regulation may mediate the effects of environmental risk factors such as maltreatment on the development of behaviour difficulties. Additionally, one recent study has suggested that emotion regulation may be a resilience factor for children with one behaviour problem against the development of co-morbid behaviour problems. The literature to date with clinical samples is limited by the use of cross-sectional designs however and the bias towards exclusively male samples. Further research is therefore necessary to clarify the links between emotion regulation and specific childhood disorders.

Conclusions and Elaboration of a Direction for Future Research

Behaviour difficulties in early childhood present a significant clinical challenge affecting a substantial proportion of children and acting as markers for later difficulties in psychosocial functioning. Traditional models of childhood behaviour problems have explored the contributions of environmental, genetic and temperamental influences. Whilst these models explain around fifty percent of the variance in child behaviour and have informed clinical assessment, formulation and intervention, a significant amount of variance remains unexplained. Further, interventions based on predominant models of childhood behaviour problems are not universally effective. It has therefore been argued that there is a need to expand current models and conceptualisations of childhood disorders.

The study of emotional processes, particularly emotion regulation, has emerged as a result of this need. Emotion regulation is conceptualised as the ability to modulate emotional experience and expression. This process develops throughout childhood, shaped by both internal and external factors. Theories of emotion regulation have

argued that it underlies adaptive functioning in a number of key domains, including behavioural functioning. Although research into emotion regulation is in its infancy evidence has accumulated over the past decade to support the hypothesis that deficits in emotion regulation are related to the development of childhood behaviour problems. Studies with clinical and non-clinical samples have consistently demonstrated that lower levels of emotion regulation and higher levels of dysregulation are associated with both internalising and externalising behaviour problems, the association with externalising difficulties being strongest. Results of these studies have shown that emotion regulation predicts an equivalent amount of variance in child behaviour to traditional factors such as temperament and environmental influences. Further, preliminary evidence has suggested that emotion regulation may mediate the pathways from environmental risk factors to the development of behaviour problems and serve as a resiliency factor against the development of multiple behaviour problems in children who already show one behavioural difficulty.

In terms of its relevance to clinical psychology, research to date has therefore indicated that emotion regulation is related to childhood behaviour problems, and that children in clinical groups show higher levels of dysregulation and lower levels of emotion regulation from other children. Whilst this is important in informing clinical psychologists' understanding, formulation, and potentially intervention with childhood behaviour problems, the dimensional conceptualisations of emotion regulation in the literature mean it is not possible to identify whether children in clinical groups differ in their *type* of emotion regulation, or simply their levels of

emotion regulation. Future research taking a categorical approach to both behaviour problems and emotion regulation is needed.

Nevertheless, the literature to date on emotion regulation has therefore provided a sufficient amount of evidence to support its inclusion as an extension to traditional models of child psychopathology, and continued research is warranted. The investigation of links between emotion regulation and specific behaviour difficulties is a natural development to this literature, and once these have been explored clinical psychologists can begin to consider how emotion regulation might inform interventions for these problems (Keenan, 2000; Rydell et al., 2003; Southam-Gerow & Kendall, 2002). As studies have shown that early aggression is a strong predictor of later difficulties in social, emotional and behavioural functioning authors have highlighted aggressive behaviour problems as an area of particular interest (Keenan, 2000; Ramsden & Hubbard, 2002).

Aggressive behaviour problems represent a subcategory of externalising behaviour problems (Loeber & Hay, 1997). In the present paper, aggression is conceptualised as any verbal or physical act that causes or threatens to cause physical or psychological harm to self or others or damage to property (see Loeber & Hay, 1997). Aggression is not a unitary term, but consists of different manifestations at various stages throughout development (e.g. fighting, bullying, violence). Further, the manifestations of aggression can be divided into instrumental and reactive aggression (Berkowitz, 1993; Dodge & Coie, 1987; Dodge, Coie, Pettit & Price, 1990). Reactive aggression represents an impulsive, retaliatory reaction to the emotional content of the situation, whilst instrumental aggression is incentive

motivated, controlled and purposeful. One manifestation of aggression during early childhood is temper tantrums.

Temper tantrums are conceptualised in the current paper as an episode of explosive, extreme physical and verbal behaviours occurring simultaneously or within close proximity to one another in response to frustration or adult authority (Caspi et al., 1987). Physical behaviours constituting a tantrum include kicking, biting, stamping, pinching, hitting and throwing, and verbal behaviours include shouting, screaming and crying (Caspi et al., 1987; Potegal, Kosorok & Davidson, 1996). Problematic tantrums are defined by their frequency, severity and duration (Caspi et al., 1987; Needlman et al., 1991; Richman et al., 1982). The underlying function of tantrums varies, with some representing a learned behaviour (Cole et al., 2003; Gilliom et al., 2002). However, there is no empirical evidence to suggest that the behaviours constituting these tantrums are any less aggressive in nature to other tantrums. "Learned" tantrums are therefore conceptualised as a form of instrumental aggression in the current paper. Thus, all tantrums are viewed as a manifestation of aggression in this paper, although it is recognised that some may represent instrumental aggression whilst others represent reactive aggression.

Tantrums peak at around two years of age and decline between two and seven years simultaneous with developments in cognitive, communicative and social functioning (Carr, 1999; Einon & Potegal, 1994; Stoolmiller, 2001). However, five to ten percent of children continue to display tantrums of sufficient frequency, severity and duration to cause parental concern and children often present to clinical services with temper tantrums as a specific complaint (Needlman et al., 1991; Richman et al.,

1982). Consistent with research on other externalising behaviours studies have indicated that temper tantrums are significantly associated with additional emotional and behavioural problems, with around fifty percent of children with tantrums showing concurrent multiple behaviour problems (Needlman et al., 1991; Richman et al., 1982). Further, longitudinal research has shown that temper tantrums predict later difficulties in behavioural, emotional and social functioning (Caspi et al., 1987; Stevenson & Goodman, 2001). Caspi and colleagues (1987) found that tantrums in childhood were associated with poor occupational and socio-economic outcomes in adults and men with a history of tantrums were more likely to be divorced than their peers. Stevenson and Goodman (2001) also found differences in the life course of individuals who had a history of tantrums as children. In this study, temper tantrums were the only childhood behaviour to significantly predict adult violent crime when gender, social development and child social circumstances were controlled for.

Given the immediate and long-term impact of temper tantrums, and the finding that they are the most consistent early childhood behaviour problem in predicting later difficulties, the investigation of links between emotion regulation and temper tantrums is justified and of clinical utility. Temper tantrums are often highly emotionally charged (Potegal et al., 1996) and the behaviours displayed during tantrums appear dysregulated in nature. Further, the normative decrease in temper tantrums during the preschool period coincides with the emergence of increasingly sophisticated and autonomous emotion regulation. It is therefore possible that deficits in emotion regulation may be associated with severe temper tantrums occurring beyond the normative age. This hypothesis has not previously been

investigated. The exploration of this link would thus provide a useful development to the emotion regulation literature.

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Empirical Paper

The relationship between emotion regulation and temper tantrums

The Journal of Child Psychology and Psychiatry was used as a guide in determining the preparation of this paper. See Appendix 2 for notes to contributors.

Abstract

Evidence from a number of studies has consistently demonstrated an association between children's emotion regulation and their overall levels of behaviour problems. However, few studies have investigated the association between emotion regulation and specific behaviour problems and no known studies have examined its association with temper tantrums. The present study therefore explored the relationship between emotion regulation and temper tantrums in seventy-eight preschool age children. Caregivers completed the behaviour checklist (BCL, Richman, 1977) and the emotion regulation checklist (ERC, Shields & Cicchetti, 1997) and nurseries also completed the ERC for 41 children. A temper tantrums composite was created from the BCL tantrums item and the caregiver ERC tantrums item and children were divided into those with or without tantrums based on their scores on this composite. Contrary to the primary research hypothesis no differences were found in the levels of emotion regulation or dysregulation between these groups. However, when the tantrums group was subdivided into those with or without additional behaviour problems it was found that children with tantrums in the context of multiple behaviour problems had significantly lower levels of emotion regulation and significantly higher levels of dysregulation than children with tantrums as an isolated complaint and children without tantrums. Possible explanations for this pattern of results are discussed, including the distinction between instrumental and reactive tantrums and the role of emotion regulation as a resilience factor against the development of multiple behaviour problems.

Introduction

Childhood behaviour problems represent the majority of referrals to child clinical services, presenting a significant challenge to clinical psychologists (Audit Commission, 1999; Shields & Cicchetti, 1998). They affect up to thirteen percent of preschoolers and between six and twenty percent of school age children, and these prevalence rates are rising (Richman, Stevenson & Graham, 1982; Rutter, Hagell & Giller, 1998; Thompson et al., 1996). Children with one behaviour problem are more likely to have additional emotional and behavioural difficulties (Eisenberg et al., 1996; Richman et al., 1982) and these problems are remarkably stable over time, with some studies suggesting stability equivalent to that of IQ (Deater-Deckard & Plomin, 1999; Fergusson & Horwood, 1993; Loeber & Hay, 1997; Olweus, 1979; Richman et al., 1982). Further, longitudinal research has also shown that early behaviour problems, particularly aggressive behaviours during the preschool period, serve as markers for the development of later difficulties including internalising and externalising behaviour problems (Goodwin, Fergusson & Horwood, 2004; Prior, Smart, Sanson & Oberklaid, 2000; Zahn-Waxler, Iannotti, Cummings & Denham, 1990), negative social outcomes (Eisenberg, Guthrie et al., 1997; Spinrad et al., 2004; Zahn-Waxler et al., 1990), poor academic performance (Ramsden & Hubbard, 2002; Zahn-Waxler et al., 1990) and criminal activity in adolescence and adulthood (Block, Block & Keyes, 1988; Caspi, 2000; Farrington, 1994; Henry, Caspi, Moffitt, Harrington & Silva, 1999; Stevenson & Goodman, 2001). The long-term public costs of children with behavioural difficulties are therefore high (Scott, Knapp, Henderson & Maughan, 2001). Given the immediate impact and potential long-term outcomes of children with early behaviour problems it is thus critical that psychological interventions for these problems are effective.

The majority of clinical interventions for behaviour problems in early childhood include behavioural management, primarily through training parents in behaviour management techniques (Barkley, 1987; Buchanan, 1992; Carr, 1999; Douglas, 1989; Kaplan & Busner, 1993). This has included both individual and group parent training (e.g. Webster-Stratton & Hancock, 1998). There is a consensus in the clinical literature that parent training is the most effective intervention for early behaviour problems as evidence from meta-analyses and controlled trials has shown that it is significantly effective in reducing these problems (Anastopolous, Barkley & Shelton, 1996; Scott, Spender, Doolan, Jacobs & Aspland, 2001; Stoolmiller, 2001; Weisz, Weiss & Donenberg, 1992). The clinical significance of these findings has been questioned however, as studies in community clinic settings, rather than centres of clinical excellence, have only revealed modest improvements (Andrade, Lambert & Bickman, 2000; Stallard, 2003; Weisz et al., 1992). For example, although Scott and colleagues (2001) found significant improvements in their treatment group post-intervention, a third of the children in this group still met the criteria for oppositional defiant disorder (ICD-10, World Health Organisation [WHO], 1992). Despite these limitations parent training remains the most effective clinical intervention for early behaviour difficulties, and the incorporation of strategies addressing children's cognitions has been limited with younger children and does not significantly improve outcomes (Stallard, 2003; Stoolmiller, 2001). Therefore, the most effective intervention currently available for early behaviour problems is potentially of limited clinical efficacy for a significant number of children.

Given this concern it has been argued that there is a need for psychologists to develop better models of childhood behaviour problems in order to enhance clinical

assessment, formulation and intervention (Shields & Cicchetti, 2001; Southam-Gerow & Kendall, 2002; Stallard, 2003). It is emphasised that this does not represent a revolution against traditional models of child behaviour, but an evolution of these models through exploring alternative pathways to childhood behaviour problems (Southam-Gerow & Kendall, 2002). One area that has been of specific interest in this respect is the role of emotional processes, particularly emotion regulation (Shields & Cicchetti, 1997, 1998; Shields, Ryan & Cicchetti, 2001).

Emotion Regulation

There is a lack of consensus in the emotion regulation literature regarding the precise definition of emotion regulation and dysregulation (Keenan, 2000). Throughout this paper the term *regulation* is taken to mean moderation, adjustment or adaptation to fit requirements. The conceptualisation of *emotion regulation* throughout the paper is therefore consistent with Thompson's (1994) definition as the "monitoring, evaluation and modification of emotional reactions in order to achieve individual goals and to facilitate adaptation to the social environment". The term *emotion regulation* is thus used to refer to the way in which individuals manage their emotional experiences and expressions, and emotion regulation is viewed as a dynamic process affected by the demands of the social situation and individual goals. The term "emotion regulation strategies" refers to the intrinsic and extrinsic processes or strategies used to achieve emotion regulation. The terms "well-regulated" and "high levels of emotion regulation" are used to refer to a pattern of emotion regulation where individuals are able to regulate their emotions effectively, in a socially appropriate and flexible way, adjusting their regulation according to the demands of the environment and their own personal goals. *Dysregulation* is used

throughout the paper to refer to an inability to adaptively regulate emotions. It thus refers to inability to manage the experience of emotions and /or an inability or inflexibility to adjust emotion regulation to fit the demands of the specific situation. Dysregulation is therefore used to describe a pattern of unmanaged intense emotions, unmodulated responding, situationally inappropriate affect and a lack of flexibility.

The modulation of negative emotions has been of particular interest in relation to child behaviour problems (Gilliom, Shaw, Beck, Schonberg & Lukon, 2002; Kopp, 1989; Melnick & Hinshaw, 2000) and this process relies on a number of systems, including biological, behavioural, cognitive, communication and attention systems (Eisenberg, Fabes et al., 1997; Keenan, 2000; Maughan & Cicchetti, 2002; Penza-Clyve & Zeman, 2002; Thompson, 1994). As these systems mature throughout childhood the repertoire of emotion regulation strategies available to the child expands. The way in which children develop, rehearse and adopt these strategies is subsequently shaped by environmental influences, including parents, siblings, teachers and peers (Calkins & Fox, 2002; Kopp, 1989; Maughan & Cicchetti, 2002; Shields, Dickstein et al., 2001). Emotion regulation is therefore viewed as a developmentally acquired process, shaped by intrinsic and extrinsic experiences.

Whilst specific emotion regulation strategies continue to develop into adulthood (Gross, 1998; Southam-Gerow & Kendall, 2002) research has shown that patterns of emotion regulation are stable from around six years of age (Eisenberg et al., 1996; Shields & Cicchetti, 1997, 1998). The early years are therefore critical in the development of emotion regulation and the preschool years have been identified as a key stage in this process, as emotion regulation proceeds from a reliance on

caregivers to autonomous self-regulation during this period (Cole, Teti & Zahn-Waxler, 2003; Gilliom et al., 2002; Kopp, 1989). Entry to nursery or preschool fosters this transition as children are challenged to practice their new emotion regulation skills among a widening circle of peers and adults, and these new social contacts and contexts place closely defined standards on the expression of negative emotions (Gilliom et al., 2002; Shields, Dickstein et al., 2001). Changes occurring in the child during the preschool period also support the development of autonomous emotion regulation. Children develop self-awareness during this time and begin to view themselves as both an object and an agent, recognising what they can do to make themselves feel better when they are distressed (Gilliom et al., 2002; Kopp, 1989; Zahn-Waxler et al., 1990). Further, they develop greater control over their impulses and actions, learning that they can hide their emotions to serve personal goals (Calkins & Fox, 2002; Southam-Gerow & Kendall, 2002). Emotional language also develops during the preschool years and this allows children to express their emotions in a cooler medium and regulate their relationships with others (Crittenden, 1996; Dale, 1996; Hughes & Dunn, 2002). In concert the internal and external changes occurring during the preschool period are therefore crucial in facilitating an increase, diversification and maturation in autonomous emotion regulation (Kopp, 1989; Maughan & Cicchetti, 2002).

The development of effective emotion regulation is, by definition, central to adaptive socio-emotional and behavioural functioning (Melnick & Hinshaw, 2000; Shields & Cicchetti, 1997, 1998; Shipman & Zeman, 2003) and it has therefore been hypothesised that deficits in emotion regulation contribute to the development and maintenance of childhood behaviour problems (Eisenberg, Guthrie et al., 1997;

Penza-Clyve & Zeman, 2002; Southam-Gerow & Kendall, 2002; Zimmerman & Stansbury, 2003). Specifically, it is argued that lower levels of emotion regulation are associated with externalising behaviour problems, whilst overregulation is linked with internalising behaviour problems (Eisenberg & Fabes, 1992). However, Shields and Cicchetti (1997, 1998) have contested this, suggesting that lower levels of emotion regulation are associated with both internalising and externalising behaviour problems. The effective application of emotion regulation skills is also hypothesised to impact on child behaviour. It is proposed that the development of internalising and externalising difficulties is linked with dysregulation, which is conceptualised as a pervasive use of ineffective strategies across settings or emotion regulation operating in a dysfunctional manner (Keenan, 2000; Shields & Cicchetti, 1997, 1998).

In order to investigate these hypotheses a variety of protocols have been developed for the measurement of emotion regulation. These have included physiological (Calkins & Fox, 2002; Stifter, Spinrad & Braungart-Reiker, 1999), observational (Gilliom et al., 2002; Zimmerman & Stansbury, 2003) and questionnaire methods (Eisenberg, Guthrie et al., 1997; Rydell et al., 2003; Shields & Cicchetti, 1997; Zeman, Shipman & Penza-Clyve, 2001).

Using the methods described, researchers have explored the hypothesised links between emotion regulation and the development of childhood behaviour problems. In order to avoid the misunderstanding or misapplication of these findings (see Sonuga-Barke, 1998), it is important to acknowledge that the majority of studies, particularly those with non-clinical samples, treat behaviour problems and emotion

regulation as dimensional constructs. Although a handful of studies conceptualise behaviour problems as a categorical construct and emotion regulation as dimensional, none of the studies reviewed for this paper treat both behaviour problems and emotion regulation as categorical. Whilst it has been argued that the use of a categorical approach provides the "bridge of meaning" between research and clinical practice, dimensional studies still hold some relevance to clinical psychology, although the clinical significance of results should be interpreted with caution (Sonuga-Barke, 1998; Fergusson & Horwood, 1995).

In the current context, studies treating both emotion regulation and behaviour problems as dimensional are able to identify whether the two are related and this holds some relevance to the way childhood behaviour problems are understood. However, it is difficult to identify the degree to which these findings relate to clinical groups and thus their clinical significance, as they do not indicate whether extreme scores on behaviour problem scales represent the end of a normal continuum or discrete entities, namely a group of children with clinically significant behaviour problems. The use of a categorical approach to behaviour problems in studies with clinical groups circumvents this, allowing the identification of whether children with clinically significant behaviour problems differ from other children in their levels of emotion regulation. This has more direct relevance to clinical psychologists in terms of the way they formulate and potentially intervene with childhood behaviour problems. However, as these studies continue to represent emotion regulation in dimensional terms it remains difficult to ascertain whether children with clinically significant behaviour problems differ *qualitatively* in their emotion regulation from

other children, or whether these differences are purely *quantitative*. These limitations should be acknowledged in reviewing the studies outlined in this paper.

Longitudinal and cross-sectional studies with non-clinical samples have consistently demonstrated a negative association between emotion regulation and both internalising and externalising behaviour problems (Eisenberg, Fabes & Murphy, 1995; Eisenberg et al., 1996; Gilliom et al., 2002; McDowell, Kim, O'Neil & Parke, 2002; Ramsden & Hubbard, 2002; Shields & Cicchetti, 2001; Spinrad et al., 2004). Further, they have provided evidence that higher levels of dysregulation are related to internalising problems such as submissive-withdrawn behaviour (Shields & Cicchetti, 2001), and externalising behaviour problems including aggressive or angry behaviour (Ramsden & Hubbard, 2002; Spinrad et al., 2004), bullying (Shields & Cicchetti, 2001) and adult violent convictions (Henry et al., 1999). Research with clinical samples has also found that behaviour problems are negatively associated with emotion regulation and positively associated with dysregulation. These studies have included children suffering from aggressive behaviour disorders (Orobio de Castro, Bosch, Veerman & Koops, 2003), attention deficit hyperactivity disorder (Melnick & Hinshaw, 2000) and children who have been maltreated (Shields & Cicchetti, 1997, 1998, 2001; Shields, Ryan et al., 2001).

Research to date with clinical and non-clinical samples has therefore consistently supported the hypothesis that lower levels of emotion regulation and higher levels of dysregulation are associated with both internalising and externalising behaviour problems. Further, these studies have shown that emotion regulation predicts a significant amount of variance in children's behaviour problems. Melnick and

Hishaw (2000) and Eisenberg and colleagues (1996) report that between thirty and fifty percent of the variance in children's problem behaviour is accounted for by emotion regulation. This is equivalent to the proportion of problem behaviour explained by environmental, genetic and temperamental influences (Deater-Deckard & Plomin, 1999; Gjone & Stevenson, 1997; Stevenson, Thompson & Sonuga-Barke, 1996), factors which have traditionally featured in models of child behaviour. There is also preliminary evidence that emotion regulation and dysregulation mediate the pathways between environmental risk factors, such as maltreatment (Shields & Cicchetti, 1998, 2001) or family styles of emotional expression (Ramsden & Hubbard, 2002), and the development of childhood behaviour problems. One recent study has further suggested that emotion regulation may act as a resilience factor against the development of multiple behaviour problems in children who already show one behaviour problem (Melnick & Hinshaw, 2000). This study found that children with attention deficit hyperactivity disorder (ADHD) did not differ in their levels of emotion regulation from children without ADHD. However, children with ADHD and concurrent aggressive behaviour problems had significantly lower levels of emotion regulation than both the non-clinical comparison group and children with ADHD as an isolated complaint.

The literature to date regarding emotion regulation has therefore provided sufficient evidence to support its inclusion as an extension to traditional models of child behaviour problems, and further research is warranted to extend these findings. The investigation of links between emotion regulation and specific behaviour difficulties is a natural development to this literature, and once these have been explored clinical psychologists can begin to consider how emotion regulation might inform

interventions for these problems (Rydell et al., 2003; Southam-Gerow & Kendall, 2002). As studies have shown that early aggression is a strong predictor for a range of later difficulties, authors have highlighted early aggressive behaviours as an area of particular interest (Keenan, 2000; Ramsden & Hubbard, 2002).

Aggressive behaviour problems represent a subcategory of externalising behaviour problems (Loeber & Hay, 1997). In the present paper, aggression is conceptualised as any verbal or physical act that causes or threatens to cause physical or psychological harm to self or others or damage to property (see Loeber & Hay, 1997). Aggression is not a unitary term, but consists of different manifestations at various stages throughout development (e.g. fighting, bullying, violence). Further, the manifestations of aggression can be divided into instrumental and reactive aggression (Berkowitz, 1993; Dodge & Coie, 1987; Dodge, Coie, Pettit & Price, 1990). Reactive aggression represents an impulsive, retaliatory reaction to the emotional content of the situation, whilst instrumental aggression is incentive motivated, controlled and purposeful. One manifestation of aggression during early childhood is temper tantrums, and these were selected as the focus of the present study.

Temper tantrums are conceptualised in the current paper as an episode of explosive, extreme physical and verbal behaviours occurring simultaneously or within close proximity to one another in response to frustration or adult authority (Caspi et al., 1987). Physical behaviours constituting a tantrum include kicking, biting, stamping, pinching, hitting and throwing, and verbal behaviours include shouting, screaming

and crying (Caspi et al., 1987; Potegal, Kosorok & Davidson, 1996). Problematic tantrums are defined by their frequency, severity and duration (Caspi et al., 1987; Needlman et al., 1991; Richman et al., 1982). The underlying function of tantrums varies, with some representing a learned behaviour (Cole et al., 2003; Gilliom et al., 2002). However, there is no empirical evidence to suggest that the behaviours constituting these tantrums are any less aggressive in nature to other tantrums. "Learned" tantrums are therefore conceptualised as a form of instrumental aggression in the current paper. Thus, all tantrums are viewed as a manifestation of aggression in this paper, although it is recognised that some may represent instrumental aggression whilst others represent reactive aggression.

Temper Tantrums

Between fifty and eighty percent of preschool age children exhibit temper tantrums once a week or more (Richman et al., 1982). These behaviours peak at around two years of age and in most children decline between two and seven years, simultaneous with developments in cognitive, communicative and social functioning (Carr, 1999; Einon & Potegal, 1994; Stoolmiller, 2001). However, five to ten percent of children continue to display tantrums of sufficient frequency, severity and duration to cause parental concern (Needlman, Stevenson & Zuckerman, 1991; Richman et al., 1982), and children often present to clinical services with tantrums as a specific complaint (Needlman et al., 1991).

There is widespread agreement that temper tantrums are characterised by physical behaviours including kicking, biting, stamping, pinching, hitting and throwing, and verbal explosions such as shouting, screaming and crying (Caspi, Elder & Bem,

1987; Potegal, Kosorok & Davidson, 1996). Research has suggested that the duration of tantrums varies widely, with ranges from thirty seconds to seventy-five minutes reported in the literature (Goodenough, 1931; Potegal et al., 1996). However, an analysis of 330 tantrum narratives written by mothers revealed that angry behaviours reached their probable peak within thirty seconds, regardless of the duration (Potegal et al., 1996). Further, there was a significant negative correlation between the duration of tantrums and their initial angry peak, as measured by the number of angry behaviours exhibited (Potegal et al., 1996). These findings imply that there is a finite amount of anger to be displayed during temper tantrums leading to two types, namely short extreme or long restrained tantrums.

Consistent with research on other externalising behaviour problems studies have indicated that temper tantrums are associated with additional emotional and behavioural difficulties. Over fifty percent of children with temper tantrums display concurrent multiple behaviour problems and this is nearly twenty times the rate of multiple behaviour problems amongst children who do not experience temper tantrums (Needlman et al., 1991; Richman et al., 1982). Needlman and colleagues (1991) have therefore argued that it is important to distinguish between children with temper tantrums as an isolated complaint and those who experience tantrums as part of a wider constellation of behavioural difficulties.

Further to their association with concurrent behaviour problems, temper tantrums have also been found to predict later difficulties in behavioural, emotional and social functioning (Caspi et al., 1987; Stevenson & Goodman, 2001). For example, Caspi and colleagues (1987) followed up 182 children from the Barkeley Guidance Study

(MacFarlane, Allen & Hoznick, 1954) when these individuals were thirty and forty years of age. Tantrums in childhood were associated with a briefer formal education and poor occupational and socio-economic outcomes, independent of childhood social class, gender or adolescent IQ. Men with a history of tantrums were more likely to be divorced and those still married were often described as irritable and moody by their wives and children. Similarly, women with a history of tantrums were perceived as more ill tempered and less adequate mothers by their husbands and children. Stevenson and Goodman (2001) also revealed differences in the life-course patterns of individuals who experienced tantrums during childhood. These authors traced the criminal records of 828 twenty-three and twenty-four year olds who had been randomly selected for an epidemiological study during their preschool years. Temper tantrums were the only childhood behaviour to maintain a significant association with convictions for violent crime when gender, social development and child social circumstances were controlled for.

Temper tantrums are therefore an aggression-related childhood behaviour problem that commonly presents to clinical services. Children with temper tantrums are more likely than children with other behaviour problems to have co-morbid behavioural difficulties and tantrums are the most consistent early behaviour problem in predicting a range of later difficulties. The investigation of the relationship between emotion regulation and temper tantrums is therefore justified. By definition temper tantrums are emotionally charged and the behaviours displayed during tantrums appear dysregulated in nature. Further, the normative decrease in temper tantrums during the preschool period coincides with the emergence of increasingly sophisticated and autonomous emotion regulation. It is therefore possible that

deficits in emotion regulation may be associated with temper tantrums occurring beyond the normative age. This has not previously been explored.

The present study therefore aimed to investigate the relationship between emotion regulation and temper tantrums in a preschool age sample. As several studies have documented that aggressive or angry behaviours are negatively related to emotion regulation and positively associated with dysregulation (Orobio de Castro et al., 2003; Ramsden & Hubbard, 2002; Shields & Cicchetti, 2001; Spinrad et al., 2004), it was hypothesised that children with temper tantrums would have lower levels of emotion regulation and higher levels of dysregulation than children without temper tantrums.

Given the high rates of co-morbidity between temper tantrums and other behaviour problems, a secondary aim of the study was to explore whether the emotion regulation of children exhibiting tantrums as an isolated complaint differed from the emotion regulation of children with tantrums in the context of multiple behaviour problems. There is some evidence that children with isolated behavioural complaints have higher levels of emotion regulation than children with multiple behaviour problems (Melnick & Hinshaw, 2000). It was thus hypothesised that children with tantrums in the context of multiple behaviour problems would have lower levels of emotion regulation and higher levels of dysregulation than children with tantrums as an isolated complaint and children without tantrums. It was believed that more severe deficits in emotion regulation would result in a variety of behaviour problems in addition to tantrums, whilst higher levels of emotion regulation would protect

children with tantrums from developing other behaviour problems, with tantrums in these children representing more restrained, manipulative behaviour.

Ethical approval for the study was obtained from the local NHS research ethics committee (LREC) for the area in which the study was undertaken (Appendix 3).

Method

Design

The study used a cross-sectional design with a non-clinical sample. Children were divided into groups with or without temper tantrums based on caregiver ratings on the temper tantrums items of two questionnaires. To test the primary research hypothesis the levels of emotion regulation and dysregulation of these two groups were compared using independent samples t-tests. Where necessary these results were verified using non-parametric Mann-Whitney U tests. To explore the secondary research hypothesis caregiver ratings of behaviour problems other than tantrums were used to subdivide the tantrums group into those with tantrums as an isolated complaint and those with tantrums in the context of multiple behaviour problems. One-way ANOVAs and post-hoc Tukey tests were used to compare the emotion regulation and dysregulation of the two temper tantrums subgroups and the comparison group. Results were verified using non-parametric Kruskal-Wallis tests where necessary. Missing data in the study was minimal, but when questionnaire items were ambiguous or blank the modal value for that item was used.

Participants

Caregivers of 450 preschool age children seen by health visitors within a six-month period were asked to participate in the study by completing questionnaires about the behaviour and emotion regulation of their children. 75 caregivers participated in the study, providing a sample of 78 children (38 males, 40 females). The majority of respondents (97%) were mothers. Caregivers were between 20 and 56 years old, with a mean age of 34 years (SD = 6 years). The age at which caregivers had left full-time education ranged from 15 to 31 years, with a mean age of 19 years (SD = 3 years). To aid in data analysis caregiver age was recoded into categories of 29 or less (22%), 30 to 39 (67%), and 40 plus (11%). Similarly, the age at which caregivers had left full time education was recoded into categories of 17 or less (45%), 18 to 19 (28%), and 19 plus (27%), broadly representing GCSE-level, A-level or graduate education. The age of children in the sample ranged from 3 to 5 years, with a mean age of 3.5 years (SD = 7.2 months). Most children came from two-parent families (90%). In their present family system 36 children were first born (13 of which were the only child), 27 were born second, 11 born third, 3 born fourth and 1 was born fifth.

Caregivers were not asked to participate in the study if health visitors were aware that their child had been referred for an assessment of, or been diagnosed with, a pervasive developmental disorder. Diagnoses had to have been given by a psychologist, psychiatrist or paediatrician in a secondary or tertiary child and adolescent mental health service or child development service. Children with these disorders were excluded because, by their nature, they lead to a higher frequency, duration and severity of temper tantrums and restrict emotional development.

Caregivers of children with current or previous involvement from speech and language therapy services were also excluded from being asked to participate in the study due to the impact these difficulties would have on the child's ability to communicate and thus regulate their emotions.

Measures

Behaviour Problems

Caregivers completed the Behaviour Checklist (BCL, Richman, 1977), a 17-item self-administration questionnaire for the identification of behaviour problems in preschool populations. Items cover behaviours including night waking, faddy eating, worries, clinginess, concentration and activity level. For each item caregivers choose which description out of three or four choices best describes their child over the past four weeks. Items provide aggregate scores for 12 domains of behaviour, chosen because they are the most common reasons for preschoolers attending psychiatric clinics and discriminate most effectively between children attending psychiatric clinics and non-referred community groups (McGuire & Richman, 1986; Richman & Graham, 1971). The domains comprise eating, soiling, sleeping, activity, concentration, relationships with peers and siblings, dependency, control, temper tantrums, mood, worries and fears. Domain scores are summed to create a total behaviour score.

Richman (1977) reports a test-retest reliability of .81 on the BCL over four weeks. Internal consistency of the scale in the present study was .70. The validity of the BCL has been supported by its ability to distinguish between clinical and non-clinical groups (Richman et al., 1982), to predict problem cases after school entry

(Richman et al., 1982) and to detect 82% of cases identified by clinical assessment as having moderate to severe behaviour problems, at a specificity of 87% (Richman, 1977). Further, the BCL demonstrates high levels of agreement with the Behaviour Screening Questionnaire (BSQ, Richman & Graham, 1971), a questionnaire with high reliability and discriminant validity that has been validated against clinical interviews (Minde & Minde, 1977).

The BCL was selected for the current study due to its temper tantrums item. This characterises tantrums by their duration and frequency (0 = *Doesn't have temper tantrums*, 1 = *Sometimes has tantrums lasting a few minutes*, 2 = *Has frequent or long temper tantrums*), two of the central characteristics identified in previous research (Caspi et al., 1987; Needlman et al., 1991). As this domain score was used to categorise the tantrums group in the present study it was excluded from the total behaviour score in data analysis. This resulted in a slight reduction in the internal consistency of the scale (.67).

Emotion Regulation

Caregivers and nurseries completed the emotion regulation checklist (ERC, Shields & Cicchetti, 1997 – Appendix 5), a 24-item adult-report measure of children's emotion regulation. Items on the ERC tap aspects of emotion regulation including affective lability, intensity, valence, flexibility and contextual appropriateness of emotional expressions. The checklist contains positively and negatively weighted items, scored on a four-point Likert scale (1 = *Never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Almost Always*). An ERC composite is calculated by averaging scores across the 24 items and this is used as an overall index of emotion regulation. Two empirically

derived subscales have also been identified, reflecting emotion regulation (8 items) and lability/negativity (15 items). The emotion regulation subscale captures processes central to adaptive regulation, including socially appropriate emotional displays, empathy and emotional self-awareness. Higher scores on this subscale represent higher levels of emotion regulation. The lability/negativity subscale is comprised of items representing a lack of flexibility, mood lability and dysregulated negative affect. These items are reverse coded after the ERC composite has been calculated, so that higher scores on the lability/negativity subscale reflect higher levels of dysregualtion. This subscale also contains a temper tantrums item ("*Is prone to angry outbursts/tantrums easily*"). As this item was used to categorise the tantrums group in the present study it was excluded from the ERC composite and lability/negativity subscale scores in data analysis.

The ERC has been the most consistently used measure of emotion regulation across studies (Ramsden & Hubbard, 2002; Shields & Cicchetti, 1997, 1998, 2001; Shipman & Zeman, 2001). Validity of the scale has been supported by high levels of correlation with observational measures of emotion regulation (Shields & Cicchetti, 1997) and its ability to distinguish between maltreated and comparison children, and between groups of well-regulated and dysregulated children (Shields & Cicchetti, 1997, 1998, 2001). Internal consistencies of the parent and nursery ERC composite (.84 and .91) and lability/negativity subscale (.81 and .88) were high in the present study. Alphas for the parent (.65) and nursery (.78) emotion regulation subscale were slightly lower, but acceptable. There was a marginal reduction in the internal consistency of the parent and nursery ERC composite (.83 and .90) and lability/negativity subscale (.78 & .86) when the tantrums item was excluded.

Procedure

300 research packs were distributed between ten health visitors. These consisted of an information sheet (Appendix 6), consent form (Appendix 7), demographic information sheet, BCL, ERC and a freepost envelope to return questionnaires to the researcher. Packs were disseminated to caregivers of children meeting the inclusion criteria as they were seen by the health visitors over a six-month period. As the return rate for questionnaires was substantially lower than anticipated an eleventh health visitor was recruited. A further 150 research packs were sent directly to caregivers of children meeting the inclusion criteria who had been seen by this health visitor within the past six months. This had been outlined as a contingency plan in the original research protocol.

Caregivers indicated on the returned research packs whether they consented to the child's nursery being contacted, providing the nursery contact details. These nurseries were sent an information sheet, ERC and freepost envelope to return the questionnaire to the researcher. The ERC was selected as the questionnaire for both nurseries and caregivers to complete as it was considered that emotion regulation is less situationally specific than child behaviour (i.e. deficits in emotion regulation would be pervasive across settings). Further, the nursery would not have the information necessary to complete a number of the BCL items (e.g. bedtime and sleeping routines). If the questionnaire was not returned by the nursery within 15 working days a follow-up telephone call was made. A further follow-up telephone call was made after 10 working days if the questionnaire was still unreturned.

Caregivers consented to nurseries being contacted for 58 children. Completed questionnaires were returned by nurseries for 41 children (18 males, 23 females). Chi-square and t-tests revealed that there were no significant differences in the age, sex, caregiver age, or temper tantrums status of children with or without nursery data (p all > .05, Appendix 8). However, children with nursery data had significantly lower BCL total behaviour scores ($t = -2.44$, $p < .05$) and the caregivers of children with nursery data had remained in full-time education significantly longer ($t = 2.21$, $p < .05$). Nursery data was used in data analysis to cross-check any significant findings, thus controlling for the potential effects of shared-method variance that may have arisen as a consequence of caregivers completing both questionnaires.

Categorisation of Comparison Groups

Caregivers were given two opportunities to report on their child's temper tantrums, once on the BCL and once on the ERC. The BCL tantrum item reflects a generic measure of temper tantrums. It does not define the behaviours constituting a temper tantrum or refer to the underlying function of the tantrum. This item is therefore likely to capture both reactive and instrumental or learned tantrums, consisting of a variety of behaviours. The severity of temper tantrums in the BCL item is characterised by their duration and frequency. In concordance with the BCL item, the ERC tantrum item also characterises the severity of tantrums by their frequency. As with the BCL tantrum item, the ERC item does not define the behaviours constituting a temper tantrum, so is also likely to capture tantrums consisting of a variety of behaviours. However, this item does refer to angry outbursts and the child's proneness to tantrums, so is more likely to capture reactive, emotionally driven tantrums.

As the scoring of these two items differed, use of the original scoring would have resulted in a disproportionate contribution of each item to the tantrums composite, with the ERC tantrums item making a larger contribution to the composite. However, an equal contribution of both items to the composite was desirable. Scoring of the two items was therefore adjusted before aggregation so that both items made equivalent contributions to the tantrums composite. Firstly, the scoring of the BCL tantrums item was changed so scores ranged from 1 to 3 instead of 0 to 2. This revised BCL tantrums score was then multiplied by 4 to create a score from 4 to 12. Next the ERC tantrums item was multiplied by 3, creating a score from 3 to 12. This did not alter the variance of the sample on these two items, but simply ensured that the maximum contribution both items could make to the composite was equal. These two scores were then combined to create a composite temper tantrums score ranging from 7 to 24 for each child. Using Cohen's (1992) formula, power calculations on previous studies comparing well-regulated and dysregulated children, and externalising behaviour problems by effective emotion regulation strategies, revealed that 26 children were required in each group to test the primary research hypothesis in the present study (Appendix 9). The temper tantrums and comparison group were therefore created by a median split (median = 17) on the tantrums composite, generating a temper tantrums group consisting of 45 children (19 males, 26 females) and a comparison group of 33 children (19 males, 14 females).

To explore the secondary research hypothesis children within the temper tantrums group were subdivided into those with or without additional behaviour problems. Based on the criteria used by Needlman and colleagues (1991) additional behaviour problems were considered present if the child received scores of 2 on at least three

BCL domains other than tantrums. This created a subgroup of 40 children (18 males, 22 females) with tantrums as an isolated complaint and 5 children (1 males, 4 females) experiencing tantrums in the context of multiple behaviour problems.

Results

Descriptive Data

The means, standard deviations and ranges of the BCL total behaviour score, composite temper tantrums score, and the parent and nursery ERC composite, emotion regulation and lability subscales are shown in Table 1 for the total sample. There was a significant negative correlation between the BCL total behaviour score and the ERC composite and this was consistent across caregiver (r = -.66, p <.001) and nursery ratings (r = -.33, p <.05). A significant negative relationship was also found between the BCL total behaviour score and the caregiver emotion regulation subscale (r = -.49, p <.001), although this relationship did not hold for the nursery emotion regulation subscale (r = -.27, p = .09). As the latter relationship was approaching significance and there was a consistent relationship across raters for at least one index of emotion regulation it was considered unlikely that shared-method variance affected the negative correlations found between emotion regulation and behaviour problems. By contrast to its relationship with emotion regulation, the BCL total behaviour score was positively correlated with the caregiver (r = .63, p <.001) and nursery lability subscales (r = .34, p <.05)[1].

With respect to the generalisability of the current results, the scores of the sample in the present study were broadly equivalent to samples in previous studies using the

[1] Results were confirmed with non-parametric Spearmans Rho as data on the BCL was not normally distributed (see "*distribution of data on the study variables*" section)

same measures. The mean and standard deviation of the BCL ($M = 6.46$, $SD = 3.29$) was within the range of means and standard deviations ($M = 4.6–7.2$, $SD = 2.3–3.8$) reported in a recent study using the scale (Galboda-Liyanage, Prince & Scott, 2003). The means of the parent ($M = 3.37$, $SD = 0.32$) and nursery ($M = 3.38$, $SD = 0.41$) ERC composites were higher than previously published mother ($M = 2.29$, $SD = 0.22$) and teacher ($M = 2.12$, $SD = 0.33$) composites (Ramsden & Hubbard, 2002), although the standard deviations were broadly equivalent. As the means in the present study were approximately one point above previously published means and the composite is only a four point scale, the most likely explanation for this difference is that it represents an artefact of the way the scale was scored in the present study compared with Ramsden and Hubbard (2002). Parent ($M = 27.77$, $SD = 2.87$) and nursery ($M = 26.10$, $SD = 3.81$) emotion regulation subscale scores were equivalent to non-maltreating mothers' scores in previous research ($M = 26.12$, $SD = 2.40$, Shipman & Zeman, 2001). However, the mean and standard deviations of parent ($M = 23.42$, $SD = 4.95$) and nursery ($M = 22.27$, $SD = 5.97$) lability subscale scores in the current study were lower than non-maltreating mothers' scores ($M = 29.80$, $SD = 6.81$, Shipman & Zeman, 2001). It is unclear why this difference occurred, but this suggests that children in the present study were less dysregulated than children in previous research.

Table 1.

Means, Standard Deviations, and Ranges of the Study Variables (N = 78)

Variable	Mean	Standard deviation	Range
BCL total behaviour score	6.46	3.29	0-18
Temper tantrums composite	16.35	1.95	11-20
Caregiver ERC			
Composite	3.37	0.32	2.54-3.92
Emotion regulation subscale	27.77	2.87	20-32
Lability subscale	23.42	4.95	15-38
Nursery ERC*			
Composite	3.38	0.41	2.25-3.96
Emotion regulation subscale	26.10	3.81	15-32
Lability subscale	22.27	5.97	14-36

* $N = 41$

Distribution of Data on the Study Variables

In order to determine the appropriate statistical tests for data analysis, the distribution of data on the study variables was analysed using one-sample Kolmogorov-Smirnov tests. Results of these tests revealed that data on the caregiver ERC composite, caregiver lability subscale, nursery ERC composite, nursery emotion regulation subscale and nursery lability subscale were normally distributed (p all $> .05$). Data on the BCL total behaviour score ($Z = 1.82$, $p < .01$), and the caregiver emotion

regulation subscale ($Z = 1.4, p < .05$) was not normally distributed. The equivalent non-parametric tests were therefore used to verify any significant results found in parametric tests involving either the BCL total behaviour score or caregiver emotion regulation subscale. Unless otherwise reported, non-parametric tests confirmed the results of parametric analyses involving these variables.

Controlling for Confounding Effects of Demographic Variables

The next step in data analysis was to explore the demographic variables to identify potential confounds. T-tests and one-way ANOVAs were used to compare the BCL total behaviour score, tantrums composite, and caregiver and nursery ERC subscale scores of the different demographic subgroups. T-tests found no significant differences between males and females on any of these variables (p all $> .05$, Appendix 10). One-way ANOVAs were used to test the effects of the remaining demographic variables on the study variables (Appendices 11-14). No significant differences were found between children of different ages or different positions in birth order on any of the study variables (p all $> .05$). Neither were there significant differences on the study variables between children with caregivers of different ages or caregivers who had left full-time education at different ages (p all $> .05$). As none of the demographic variables significantly affected the study variables they were unlikely to confound the results and were not controlled for in subsequent analysis.

Temper Tantrums Composite

The correlation between the caregiver BCL tantrums item and the caregiver ERC tantrums item was calculated to establish whether caregiver's responses were consistent across the two measures of tantrums constituting the tantrums composite.

The correlation between these items was significant ($r = .567, p < .01$) and this was verified using a non-parametric Spearman's Rho test. The Phi co-efficient for the relationship between these two items was also highly significant ($phi = .712, p < .001$). This suggests that there was continuity in the way caregivers rated temper tantrums across the two items.

Temper Tantrums, Emotion Regulation and Dysregulation

In order to test the primary research hypothesis t-tests were completed to compare the levels of emotion regulation and dysregulation between the temper tantrums and comparison group (Table 2). No significant differences were found between the two groups on any caregiver or nursery emotion regulation or dysregulation measures, nor did any of the differences between these groups approach significance. Differences in the mean scores of these two groups on all measures of emotion regulation and dysregulation were minimal.

Temper Tantrums, Multiple Behaviour Problems, Emotion Regulation and Dysregulation

To explore the secondary research hypothesis one-way ANOVAs were completed to compare the emotion regulation and dysregulation of children with tantrums as an isolated complaint, children with tantrums in the context of multiple behaviour problems and the comparison group (Table 3). Significant differences were found between the three groups on the caregiver ERC composite [$F(2, 75) = 9.81, p < .001$], emotion regulation subscale [$F(2, 75) = 8.93, p < .001$], and lability subscale [$F(2, 75) = 6.14, p < .005$]. Post-hoc Tukey tests revealed that children with tantrums in the context of multiple behaviour problems had significantly lower

scores on the caregiver ERC composite and emotion regulation subscale, and significantly higher scores on the lability subscale than both the comparison group and children with tantrums as an isolated complaint ($p < .005$). There were no significant differences on these measures between the comparison group and those with tantrums as an isolated complaint (Tukey-test > .05). Children with tantrums in the context of multiple behaviour problems therefore had lower levels of emotion regulation and higher levels of dysregulation than children with tantrums as an isolated complaint and the comparison group. It was not possible to verify these results across raters as nursery data was not available for any of the children experiencing tantrums in the context of multiple behaviour problems.

Table 2.

Emotion Regulation and Dysregulation of the Temper Tantrums and Comparison Group

	Temper Tantrums ($N = 45$)		Comparison ($N = 33$)		t	p
	M	*SD*	*M*	*SD*		
Caregiver ERC						
Composite	3.38	0.30	3.39	0.34	.165	.87
Emotion regulation*	27.84	2.94	27.67	2.81	-.269	.79
Dysregulation (Lability)	23.56	4.43	23.24	5.63	-.274	.78
Nursery ERC						
Composite	3.35	0.43	3.39	0.39	.366	.72
Emotion regulation	25.83	3.84	26.47	3.84	.523	.60
Dysregulation (Lability)	22.42	5.96	22.06	6.17	-.187	.85

* Confirmed by Mann-Whitney U tests

Table 3.

Emotion Regulation and Dysregulation of Children with Tantrums as an Isolated Complaint, Children with Tantrums in the Context of Multiple Behaviour Problems and the Comparison Group

	Tantrums group 1* ($N = 40$) *M (SD)*	Tantrums group 2* ($N = 5$) *M (SD)*	Comparison group ($N = 22$) *M (SD)*	*F*	*p*
Caregiver ERC					
Composite	3.44 (0.24)	2.85 (0.17)	3.39 (0.34)	9.81	<.001
Emotion regulation**	28.43 (2.50)	23.20 (1.92)	27.67 (2.81)	8.93	<.001
Dysregulation (Lability)	22.70 (3.84)	30.40 (2.70)	23.24 (5.63)	6.14	<.005

* 1 = tantrums as an isolated complaint; 2 = tantrums in the context of multiple behaviour problems

** Confirmed by Krukal-Wallis test

Discussion

This study investigated the relationship between emotion regulation and temper tantrums in preschool age children. Overall behaviour problems for the total sample were negatively related to children's emotion regulation and positively related to dysregulation. When children were divided into those with or without tantrums no differences were found between these two groups on any of the caregiver or nursery ratings of emotion regulation or dysregulation. Subdivision of the tantrums group into children with or without additional behaviour problems revealed that children with tantrums in the context of multiple behaviour problems had significantly lower

levels of emotion regulation and significantly higher levels of dysregulation than children with tantrums as an isolated complaint and those without temper tantrums. No differences were found between children with tantrums as an isolated complaint and children without tantrums on any measures of emotion regulation or dysregulation.

Previous research has shown consistent associations between emotion regulation and overall behaviour problems and this was replicated in the findings of the present study. Children with lower levels of emotion regulation or higher levels of dysregulation had higher levels of overall behaviour problems. Therefore, children with fewer emotion regulation skills or who regulated their emotions in more dysfunctional and inflexible ways had more severe behaviour problems.

As several studies have documented that aggressive or angry behaviours are negatively related to emotion regulation and positively associated with dysregulation (Orobio de Castro et al., 2003; Ramsden & Hubbard, 2002; Shields & Cicchetti, 2001; Spinrad et al., 2004) it was hypothesised that children with temper tantrums would have lower levels of emotion regulation and higher levels of dysregulation than children without temper tantrums. Contrary to this hypothesis no differences were found in the emotion regulation of children with or without temper tantrums. Unexpectedly, the mean scores of these two groups were nearly identical across all caregiver and nursery ratings of emotion regulation and dysregulation.

Needlman and colleagues (1991) have identified the need for studies investigating temper tantrums to distinguish between children with tantrums as an isolated

behavioural complaint and children with tantrums in the context of multiple behaviour problems. The tantrums group was therefore subdivided into those with or without additional behaviour problems. There is some evidence that children with isolated behavioural complaints have higher levels of emotion regulation than children with multiple behaviour problems (Melnick & Hinshaw, 2000). It was thus hypothesised that children with tantrums in the context of multiple behaviour problems would have lower levels of emotion regulation and higher levels of dysregulation than children with tantrums as an isolated complaint and children without tantrums. The findings of the present study supported this hypothesis, indicating that children with tantrums and additional behaviour problems had fewer emotion regulation skills and regulated their emotions in more inflexible and dysfunctional ways than children without tantrums and those with tantrums as an isolated complaint. Overall the results of the study therefore failed to find generalised deficits in emotion regulation across children with temper tantrums, but revealed that a subgroup of children with tantrums and multiple behaviour problems did experience deficits in emotion regulation. However, it should be acknowledged that the present study used a dimensional approach to emotion regulation, so it is not possible to determine whether the differences between these groups represented a qualitative difference in emotion regulation or purely a quantitative one.

One explanation for this pattern of results is that emotion regulation serves as a resilience factor against the development of multiple behavioural difficulties in children who already show one behaviour problem. This possibility has been proposed previously in the empirical literature by Melnick and Hinshaw (2000). In relation to temper tantrums, children who experience tantrums would therefore be

protected against the development of multiple behaviour problems if they have higher levels of emotion regulation and lower levels of dysregulation. By contrast, children with tantrums who have fewer emotion regulation skills and difficulty regulating their emotions in adaptive and functional ways would be more likely to develop additional behaviour problems.

Further research is clearly required to elucidate the potential protective role of emotion regulation. In particular, there is a need for longitudinal studies examining the interaction between emotion regulation, other known risk factors and the development of isolated and multiple behaviour problems over time. If future research does show that emotion regulation is a resilience factor against the development of multiple behaviour problems this will hold important implications for clinical assessments and interventions for childhood behaviour problems. The assessment of emotion regulation skills, particularly in children with isolated behavioural complaints, would aid in identifying children most likely to develop multiple behaviour problems, allowing the implementation of proactive interventions to avoid this occurring. Further, the development of interventions to support children in learning, developing and adopting effective emotion regulation skills would potentially be of clinical utility as both a protective and ameliorative measure.

An alternative explanation for the pattern of results in the present study is that there are different types of temper tantrums and that some are associated with emotion regulation whilst others are not. The work of Potegal and colleagues (1996) suggests that there are two types of tantrum, namely long restrained or short extreme tantrums. Long restrained tantrums would imply that the child has a degree of control over

their emotions and thus some skills in regulating their emotions, whilst short extreme tantrums would suggest a high level of reactivity and lack of control, reflecting deficits in emotion regulation. A similar classification can be found in the literature on childhood aggression, which distinguishes between reactive and instrumental aggression (Berkowitz, 1993; Shields & Cicchetti, 1998). Instrumental aggression is viewed as relatively methodical and non-emotional, oriented towards attaining resources and achieving dominance. By contrast, reactive aggression is associated with high levels of sympathetic arousal and angry reactivity. Research has shown that children who show high levels of reactivity or emotionality are more likely to develop multiple behaviour problems (Eisenberg et al., 1995: Eisenberg, Fabes et al., 1997; Gjone & Stevenson, 1997; Rende, 1993; Rydell et al., 2003; Stifter et al., 1999). It is therefore possible that tantrums in children with multiple behaviour problems are more reactive and extreme, reflecting high levels of reactivity and deficits in emotion regulation, whilst children who have tantrums as an isolated complaint use tantrums in a more instrumental and controlled manner to manipulate the behaviour of others, requiring skills in emotion regulation. Future research is needed to explore these hypotheses and this should include measures of temperamental reactivity and emotionality, and distinguish between different types of tantrums.

In addition to shaping future investigation of temper tantrums, the distinction between different types of tantrums holds important implications for clinical interventions. Behavioural interventions are the most common approach to treating early behaviour problems such as temper tantrums, but these assume that the child has control over their emotions and behaviour. This would be true for children

showing instrumental tantrums who have skills in regulating their emotions. However, this would not be the case in children with reactive, explosive tantrums, who have difficulty regulating their emotions. Therefore, behavioural interventions would potentially be of limited clinical efficacy for children with reactive tantrums. Interventions with these children would need to address their underlying reactivity and emotion regulation skills in order to effectively reduce tantrums. Extending this argument beyond temper tantrums, the distinction between reactive and instrumental behaviour problems may also account for the substantial proportion of cases for which behavioural interventions such as parent training are ineffective. This should be recognised in future clinical research and practice.

Whilst the findings of this study highlight important directions and considerations for future research and clinical practice, several limitations warrant caution in the interpretation of the results. One limitation was the cross-sectional design of the study, as this restricted identification of the direction of influence between emotion regulation, temper tantrums and behaviour problems. However, the cross-sectional methodology was sufficient to allow preliminary investigation of the relationship between emotion regulation and temper tantrums, a relationship that had not previously been explored.

The sample size in the study was also relatively small and this limited the study in different ways. Firstly, due to the distribution of data across the tantrums composite, a median split had to be used to provide sufficient numbers in each group for statistical power in the investigation of the primary research hypothesis. This was not an optimal categorisation of the temper tantrums and comparison group. The

failure to use an extreme criterion on this measure risked labelling immaturity or temperamental variance as deviance (Needlman et al., 1991), potentially resulting in an over-inclusive tantrums group. This may also have contributed to the high ratio of females in the tantrums group compared with previous studies (Needlman et al., 1991). Future research should therefore use more stringent categorisation of temper tantrums.

The sample size also meant that there were only five children in the subgroup with tantrums in the context of multiple behaviour problems, restricting data analysis in two key ways. Firstly this reduced the statistical power of the results comparing children with tantrums and multiple behaviour problems, children experiencing tantrums as an isolated complaint and children without tantrums. Secondly, nursery data was not available for any of the children in this subgroup, so the differences found could not be validated across raters. This was unfortunate given that the use of nursery measures was considered a particular strength in the design of the study. Future research is therefore needed to replicate the findings of the present study with regards to the differences in the emotion regulation of children with tantrums and multiple behaviour problems compared with children experiencing tantrums as an isolated complaint and children without tantrums. This should include longitudinal research with larger samples than the present study. It should also consider more optimal ways of gathering data given the low response rates in the current study.

Conclusions

This study was the first known study to have investigated the relationship between emotion regulation and the specific behavioural complaint of temper tantrums. An

interesting pattern of results emerged and, although the study requires replication, these findings highlight important directions for future research and considerations for clinical practice. Generalised deficits in emotion regulation were not found across children with temper tantrums, but children with tantrums in the context of multiple behaviour problems did show difficulty regulating their emotions. These findings confirm that the presence or absence of multiple behaviour problems is a crucial factor in the theoretical and clinical understanding both of temper tantrums and the relationship between emotion regulation and childhood behaviour problems. The results highlight the importance of assessing for the presence of additional behaviour problems when children present to clinical services with specific behavioural complaints. Further, they indicate the need to distinguish between the different motivations, patterns of reactivity and emotion regulation skills underlying behaviour problems such as temper tantrums. Whilst the theoretical understanding of emotion regulation continues to develop and its relation to specific behavioural complaints requires clarification, its potential role in clinical interventions for early behaviour problems, particularly reactive behavioural difficulties, is apparent. Clinical psychologists must therefore begin to develop interventions to support children with deficits in emotion regulation to develop and adopt more effective, flexible and functional ways of regulating their emotions, whilst the empirical literature continues to elucidate the role of emotion regulation in childhood behaviour problems.

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List of Appendices

Appendix 1.

Clinical Psychology Review Notes to Contributors

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31 December 2003

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Dear Mr Lockhart,

REC Ref: 291/03/t – The relationship between emotion regulation and temper tantrum.

The Vice-Chairman, Mr Mervyn Griffiths on behalf of the Southampton & South West Hampshire LREC has considered your response to the issues raised by the Committee at the first review of your application on 14th October 2003, as set out in our letter dated 21st October 2003. The documents considered were as follows:

Letter from G Lockhart dated 19th December 2003
Doctoral Programme in Clinical Psychology Trainee clinical Psychology Research Information Sheet dated November 2003
Memo from Dr R Bucks dated 4th June 2003
Approval Letter from West Hampshire NHS Trust R&D dated 16th December 2003
Letter from G Lockhart to Southampton ICT Shared Services dated 15th December 2003
Patient Information Sheet (Nursery), Version 1 dated December 2003
Consent Form, Version 2 dated 6th November 2003
Participant Information Sheet, Version 4 dated 6th November 2003
Information on the Participant, Version 2 dated 6th November 2003

The Vice-Chairman, acting under delegated authority, is satisfied that your response has fulfilled the requirements of the Committee. You are therefore given approval for your research on ethical grounds providing you comply with the conditions set out below:

- **It is mandatory that ALL correspondence, information sheets, consent forms, adverts etc, carry the LREC submission number and must carry an identification version number and date. If your papers do not currently contain this information, please make them with "Version 1, dated....." Any subsequent amendments to these documents should then carry the next version number.**
- **Please submit finalised copy of the Participants Information Sheets and Consent Form taking the above condition and printed in your Departmental Headed Paper for our file.**

Conditions of approval:

- *(Where approval is given before receipt of CTX)* Please let the LREC have a copy of the CTX when it is available. If changes to the protocol are required by the MHRA (Medicines and Healthcare Products Regulatory Agency), the LREC approval will become void until those changes have been made and the revised protocol will need to be approved.

- You do not undertake this research in any NHS organisation until the relevant NHS management approval has been received.

- You do not deviate from, or make changes to, the protocol without the prior written approval of the LREC, except where this is necessary to eliminate immediate hazards to research participants or when the change involves only logistical or administrative aspects of the research. In such cases, the LREC should be informed within seven days of the implementation of the change. Likewise, you should also seek the relevant NHS management approval for the amendment, or inform the NHS organisation of any logistical or administrative changes.

- You complete and return the standard progress report form to the LREC one year from the date of this letter and thereafter on an annual basis. This form should also be used to notify the Committee when your research is completed and should be sent to the REC within three months of completion. For a copy of the progress report please see www.corec.org.uk.

- If you decide to terminate this research prematurely, a progress report form should be sent to the LREC within 15 days, indicating the reason for the early termination. For a copy of the progress report please see www.corec.org.uk.

- You must advise the LREC of all Suspected Serious Adverse Reactions (SSARs) and all Suspected Unexpected Serious Adverse Reactions (SUSARs).

- You advise the LREC of any unusual or unexpected results that raise questions about the safety of the research.

- The project must be started within three years of the date of this letter.

'Lead' LREC – other local submissions

Where this LREC is taking the role of 'Lead' LREC, it is your responsibility to ensure that any other local researchers within the Hampshire & Isle of Wight Strategic Health Authority seek the approval of the relevant LREC before starting their research. To do this you should submit **one copy** of the following documents to the relevant LRECs:

- This approval letter
- Part C of the REC Application form (with pertinent local details)
- LREC-approved version of the patient information sheet and consent form, in the appropriate local format (i.e. on pertinent headed paper and showing pertinent local contact details)
- Principal (local) investigator's CV.

No other documents are required by the LREC to consider locality issues.

NHS LRECs are compliant with the International Conference on Harmonisation/Good Clinical Practice (ICH GCP) Guidelines for the conduct of trials involving participation of human subjects.

Your application has been given a unique reference number; please use it on all correspondence with the LREC.

Yours sincerely,

pp **Mrs Clair Wright**
LREC Manager
Southampton & South West Hampshire LRECs

Appendix 4.

Author Permission to Copy the Emotion Regulation Checklist

From : Dante Cicchetti <mhfc@netacc.net>
Sent : 28 May 2004 18:19:35
To : "Gavin Lockhart" <gavandlou@hotmail.com>
Subject : Re:

Dear Gavin,

I'm writing to grant you permission to use the ERC in the appendices of your dissertation.

Best,

Dante Cicchetti, Ph.D.
Mt. Hope Family Center
187 Edinburgh Street
Rochester, NY 14608
(585) 275-2991 ext. 248
MHFC@netacc.net

> ----- Original Message -----
> **From:** Gavin Lockhart
> **To:** shieldsa@umich.edu
> **Cc:** MHFC@netacc.net
> **Sent:** Friday, May 28, 2004 7:29 AM
>
> Ann,
>
> Some time ago I contacted you about a dissertation I am preparing for my clinical psychology doctorate under the supervision of prof. Jim Stevenson. You kindly sent me copies of the ERC and published research papers using this scale. I am writing up this project at the moment as it is due in on June 30th. I know you were happy for me to use the scale in the study, but I was wondering if you would consent to me putting a copy of the whole scale in the appendices as this is required by the course because it is not a well known scale. If you could let me know as soon as possible I would greatly appreciate it as the deadline is only four weeks away.
>
> Many thanks
>
> Gavin Lockhart

Appendix 5.

The Emotion Regulation Checklist

EMOTION REGULATION CHECKLIST

Please tick the box that applies most to this child. Please answer every question as best you can.

	Never	Sometimes	Often	Almost Always
1. Is a cheerful child				
2. Exhibits wide mood swings (child's emotional state is difficult to anticipate because s/he moves quickly from positive to negative moods)				
3. Responds positively to neutral or friendly approaches by adults				
4. Transitions well from one activity to another; does not become anxious, angry, distressed or overly excited when moving from one activity to another				
5. Can recover quickly from episodes of upset or distress (e.g. does not pout or remain sullen, anxious or sad after emotionally distressing events)				
6. Is easily frustrated				
7. Responds positively to neutral or friendly approaches by peers				
8. Is prone to angry outbursts / tantrums easily				
9. Is able to delay gratification (wait for good things)				
10. Takes pleasure in the distress of others (e.g. laughs when another person gets hurt or punished; enjoys teasing others)				
11. Can modulate excitement in emotionally arousing situations (e.g. does not get "carried away" in high-energy play situations, or overly excited in inappropriate contexts)				
12. Is whiny or clingy with adults				
13. Is prone to disruptive outbursts of energy and exuberance				
14. Responds angrily to limit-setting by adults				
15. Can say when s/he is feeling sad, angry or mad, fearful or afraid				
16. Seems sad or listless				
17. Is overly exuberant when attempting to engage others in play				
18. Displays flat affect (expression is vacant and inexpressive; child seems emotionally absent)				
19. Responds negatively to neutral or friendly approaches by peers (e.g. may speak in an angry tone of voice or respond fearfully)				
20. Is impulsive				
21. Is empathic towards others; shows concern when others are upset or distressed				

	Never	Sometimes	Often	Almost Always
22. Displays exuberance that other find intrusive or disruptive				
23. Displays appropriate negative emotions (anger, fear, frustration, distress) in response to hostile, aggressive or intrusive acts by peers				
24. Displays negative emotions when attempting to engage others in play				

Responses should be scored on a 4-point Likert scale:
1 = Never; 2 = Sometimes; 3 = Often; 4 = Almost Always

Subscale 1 assessing Lability / Negativity is comprised of items 2, 6, 8, 10, 13, 14, 17, 19, 20, 22, and 24 (positively scored) and items 4, 5, 9, and 11 (reverse scored). Higher scores reflect greater dysregulation.

Subscale 2 assessing Emotion Regulation is comprised of items 1, 3, 7, 15, 21, and 23 (positively scored) and items 16 and 18 (reverse scored).

(** Item 12 is not scored for either of these scales, as it has not loaded on either factor in early validation analyses).

Appendix 6.

Participant Information Sheet

University of Southampton

School of Psychology
Doctoral Programme in Clinical Psychology

University of Southampton
Highfield
Southampton
SO17 1BJ United Kingdom

Tel +44 (0)23 8059 5321
Fax +44 (0)23 8059 2588
Email

PARTICIPANT INFORMATION SHEET

A Study of Children's Emotions and Behaviour

You are being asked to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss with others if you wish. If there is anything that is not clear or you would like more information, please do not hesitate to contact me. My contact details are given below.

What is the purpose of the study?
This study is trying to explore the link between children's emotions and their behaviour. Children who have difficulty understanding and controlling emotions may show more difficult behaviour.

Why have I been chosen?
We are asking all parents or caregivers of children between three and six years old seen by the Health Visitors in the last six months if they will participate in this study.

Do I have to take part?
It is up to you to decide whether or not to take part. *I would like to stress that if you do not take part it will not affect any of the services you may need in the future in any way.* If you do not want to take part, please complete the consent form fully anyway.

What will happen if I take part?
You will fill in the attached information sheet on your child and the two short questionnaires attached. This should take around fifteen minutes. Once you have completed the questionnaire, please return it to me in the pre-paid envelope provided.

We are interested to gain as wide a view of your child's behaviour as possible. We have therefore asked if you would consent to us contacting your child's nursery. *They will not be given any details about your responses to the questionnaires.* If you do not wish for us to contact your child's nursery you may still participate in the study by completing the attached questionnaires.

What are the possible risks of taking part?
Very occasionally, people find the questionnaires difficult to complete. If you find any items difficult to complete, please try to answer as best you can. There are no right or wrong answers. If you continue to experience difficulty or are upset by any of the questions, please do not hesitate to contact me.

What are the possible benefits of taking part?
There will be no direct clinical benefits to yourself or your child from taking part. However, the results of the study may help to extend our knowledge of the links between emotions and child adjustment.

Will my taking part in the study be kept confidential?
All information that is collected during the course of the research will be kept strictly confidential. *I will be the only person to see the responses you give to the questionnaires.* The results of this study will have your name address and any other identifying information removed.

What will happen to the results of the study?
A report of the study will be written. A summary of the results will be made available on request.

Who is organising and funding the research?
I am a second year clinical trainee at the University of Southampton, Doctoral Programme in Clinical Psychology. This research is being conducted as part of my training.

Who has reviewed the study?
The Department of Psychology Research Ethics Committee, University of Southampton and the Local Research Ethics Committee, Southampton and South-West Hampshire have reviewed the study.

If you have any questions about your rights as a participant in this research or you feel that you have been placed at risk, you may contact the chair of the University School of Psychology Ethics Committee [Dr Roger Ingram]

Contact for further information
If you have any questions or you wish to request a summary, please contact:
Gavin Lockhart, Department of Clinical Psychology, University of Southampton, SO17 1PN
Tel: 023 8059 5321 E-Mail: gpl101@soton.ac.uk

Thank you for your help with this study.

Appendix 7.

Participant Consent Form

University of Southampton

School of Psychology
Doctoral Programme in Clinical Psychology

University of Southampton
Highfield
Southampton
SO17 1BJ United Kingdom

Tel +44 (0)23 8059 5321
Fax +44 (0)23 8059 2588
Email

CONSENT FORM

Study of Children's Emotions and Behaviour

Gavin Lockhart
Department of Clinical Psychology
University of Southampton
SO17 1BJ
Tel: 023 8059 5321

Please initial box

1. I confirm that I have read and understood the information sheet (version 4, dated 6th November 2003) for the above study. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without any of the services I receive or my legal rights being affected. ☐

3. I agree to take part in the above study. ☐

4. I agree to my child's nursery being contacted and asked to complete the behaviour checklist for the study. ☐
   (NB: You can still participate in the study without your child's nursery being contacted. Just leave this box blank)

Name of participant	Date	Signature
Name of researcher	Date	Signature

1 copy for participant; 1 copy for researcher
(Please retain one copy of this form for yourself)

When this pack is completed, or if you do not wish to participate, please return in the prepaid envelope provided.

Appendix 8.

Comparison of the Demographics of children with and without nursery data

Chi-Square tests

Variable	Chi-Square (*df*)	*p*
Child sex	0.80 (1)	.37
Birth order	9.28 (4)	.05
Temper tantrums group	0.03 (1)	.87

t-tests

	Nursery data ($N = 41$) *M* (SD)	No nursery data ($N = 37$) *M* (SD)	*t*	*p*
Child age	3.37 (0.54)	3.59 (0.76)	-1.54	.13
Caregivers age	34.48 (6.13)	33.38 (6.65)	0.75	.45
Age caregiver left education	19.44 (3.91)	17.85 (2.06)	2.21	.03
BCL total behaviour score	15.93 (2.60)	17.54 (3.23)	-2.44	.02

Appendix 9.

Power Calculations (based on Cohen, 1992)

Effect Size Formula:

$$\frac{\text{Mean}^1 - \text{Mean}^2}{\text{SD}}$$

1. Shields & Cicchetti (1997) well regulated versus dysregulated – above/below 1*SD* from mean:

ERC Lability/negativity	$\frac{65.10 - 41.01}{4.80}$ = effect size 5.02 (large)
ERC Emotion regulation	$\frac{63.67 - 43.75}{5.78}$ = effect size 3.45 (large)
Emotion regulation observations	$\frac{55.81 - 42.64}{8.34}$ = effect size 1.58 (large)

2. Gilliom et al. (2002) mean externalising scores versus number of effective anger regulation strategies:

1 versus 3 effective strategies	$\frac{59.30 - 50.63}{11.15}$ = effect size 0.78 (large)

Large effect size at power 0.8 for alpha .05 = 26 per group (Cohen, 1992)

Appendix 10.

Tests of Demographic Variables as Confounds

Sex Differences

	Males ($N = 38$)		Females ($N = 40$)		t-test	
	M	*SD*	*M*	*SD*	*t*	*p*
BCL total behaviour score*	16.61	2.52	13.78	3.43	-0.25	0.80
Temper tantrums composite*	16.03	2.14	16.65	1.73	-1.42	0.16
Caregiver ERC						
Composite	3.36	0.31	3.40	0.35	-0.62	0.54
Emotion regulation*	27.71	2.92	27.83	2.85	-0.18	0.86
Lability	23.92	5.15	22.95	4.77	-0.87	0.39
Nursery ERC						
Composite	3.35	0.38	3.38	0.44	-0.21	0.83
Emotion regulation	26.94	2.88	25.43	4.35	1.27	0.21
Lability	23.56	6.20	21.26	5.72	1.22	0.23

* Verified by Mann-Whitney U tests

Appendix 11.

Tests of Demographic Variables as Confounds

Age Differences

	3 year-olds ($N = 48$) *M (SD)*	4 year-olds ($N = 23$) *M (SD)*	5 year-olds ($N = 7$) *M (SD)*	*F*	*p*
BCL total behaviour score*	16.67 (2.97)	16.57 (3.00)	17.29 (3.68)	0.16	.86
Temper tantrums composite*	16.50 (1.91)	16.26 (2.09)	15.57 (1.81)	0.72	.49
Caregiver ERC					
Composite	3.43 (0.31)	3.32 (0.31)	3.27 (0.28)	1.54	.22
Emotion regulation*	28.06 (3.11)	27.35 (2.19)	27.44 (3.24)	0.67	.52
Lability	22.63 (4.66)	24.39 (5.47)	27.71 (4.42)	1.86	.16
Nursery ERC					
Composite	3.40 (0.40)	3.30 (0.45)	3.35**	0.26	.77
Emotion regulation	26.22 (3.67)	25.77 (4.34)	27.00**	0.09	.92
Lability	21.74 (6.02)	23.23 (6.19)	24.00**	0.31	.74

* Verified by Kruskal-Wallis tests

** Only one complete data set in this category

Appendix 12.

Tests of Demographic Variables as Confounds

Birth Order Differences

	1st Born ($N = 36$) *M (SD)*	2nd Born ($N = 27$) *M (SD)*	3rd Born ($N = 11$) *M (SD)*	4th or 5th Born ($N = 4$) *M (SD)*	*F*	*p*
BCL total behaviour score*	16.94 (3.50)	17.26 (2.61)	15.09 (1.81)	15.00 (1.41)	1.93	.13
Temper tantrums composite*	16.17 (2.02)	16.70 (1.92)	16.00 (2.19)	16.5 (0.58)	0.52	.67
Caregiver ERC						
Composite	3.34 (0.33)	3.40 (0.33)	3.44 (0.22)	3.49 (0.27)	0.54	.66
Emotion reg.*	27.22 (3.09)	28.37 (2.71)	27.82 (2.79)	28.50 (1.73)	0.92	.44
Lability	23.89 (5.35)	23.56 (5.21)	22.27 (2.83)	21.50 (4.36)	0.50	.68
Nursery ERC						
Composite	3.35 (0.41)	3.32 (0.44)	3.47 (0.29)	3.74 (0.00)	0.77	.52
Emotion reg.	25.64 (4.36)	25.90 (3.78)	27.4 (3.21)	28.00 (0.00)	0.43	.74
Lability	22.43 (5.46)	23.10 (6.79)	21.00 (3.94)	16.00 (0.00)	0.94	.43

* Verified by Kruskal-Wallis tests

Appendix 13.

Tests of Demographic Variables as Confounds

Caregiver's Age

	Up to 29 ($N = 17$) *M (SD)*	30-39 ($N = 52$) *M (SD)*	40 plus ($N = 8$) *M (SD)*	*F*	*p*
BCL total behaviour score*	17.12 (3.92)	16.69 (2.69)	15.88 (3.23)	0.45	.64
Temper tantrums composite*	16.24 (2.31)	16.35 (2.09)	16.50 (0.53)	0.05	.95
Caregiver ERC					
Composite	3.36 (0.34)	3.39 (0.30)	3.40 (0.36)	0.06	.94
Emotion regulation*	26.88 (3.43)	28.04 (2.61)	27.63 (3.29)	1.04	.36
Lability	23.18 (4.95)	23.50 (4.94)	22.88 (5.67)	0.07	.93
Nursery ERC					
Composite	3.14 (0.44)	3.43 (0.38)	3.48 (0.38)	1.77	.19
Emotion regulation	23.86 (5.27)	26.70 (3.36)	26.67 (3.21)	1.67	.20
Lability	25.57 (5.44)	21.33 (5.68)	20.00 (5.29)	1.81	.18

* Verified by Kruskal-Wallis tests

Appendix 14.

Tests of Demographic Variables as Confounds

Age Caregiver Left Full-time Education

	Up to 17 ($N = 35$) *M (SD)*	18-19 ($N = 22$) *M (SD)*	19 plus ($N = 21$) *M (SD)*	*F*	*p*
BCL total behaviour score*	17.17 (3.43)	16.18 (2.65)	16.43 (2.58)	0.84	.44
Temper tantrums composite*	16.17 (1.82)	16.18 (1.65)	16.81 (2.42)	0.81	.45
Caregiver ERC					
Composite	3.31 (0.28)	3.44 (0.31)	3.44 (0.36)	1.63	.20
Emotion regulation*	27.2 (2.85)	28.23 (3.09)	28.24 (2.62)	1.26	.29
Lability	24.40 (4.18)	22.64 (4.85)	22.62 (6.07)	1.24	.29
Nursery ERC					
Composite	3.30 (0.52)	3.36 (0.27)	3.44 (0.38)	0.45	.64
Emotion regulation	25.47 (4.79)	25.67 (3.28)	27.14 (2.98)	0.80	.46
Lability	22.87 (7.30)	22.08 (3.80)	21.79 (6.28)	0.12	.89

* Verified by Kruskal-Wallis tests