An evaluation of the effectiveness of the *Zones of Regulation* cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders in Ireland.

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(i) Abstract

Background and Aims: Emotional regulation is a transactional process between an individual, their environment and involves controlled or automatic strategies executed in response to stimuli which trigger emotions (Gross & Thompson, 2007). Cognitive Behaviour Therapy (CBT) is an evidenced-based therapeutic intervention which addresses behavioural expressions of problems and the underlying cognitions. Adapted CBT interventions can be used to address emotional regulation challenges for children with Autism Spectrum Disorders (ASD) (Weiss et al., 2018) despite being an area of limited appraisal. This research evaluates the effectiveness of "The Zones of Regulation". **Sample:** Participants included a non-random sample of 12 primary school children (9-12 years) with a diagnosis of ASD, their guardians and teachers from three ASD classes in Ireland. **Method:** The intervention was delivered within a school environment over 12 weeks using a quasi-experimental waitlist control design. Parent-, child- and teacher-reported measures were administered at baseline, post-intervention, and at post-waitlist/follow-up. **Results:** Results suggest initial but mixed evidence for The Zones of Regulation on improving emotional regulation outcomes for children diagnosed with ASD. No interaction effects or significant difference between groups were found although a significant effect of time was found. The Waitlist group scores improved significantly on teacher-reported measures directly following their intervention. While not the target group, results offer preliminary evidence for the intervention as the effect size was found to be large. The CBT group scores indicated a decline in lability/negativity as reported by parents following intervention and at follow-up. While results did not reach significance, the CBT group indicated an increase in coping skills and a decrease in dysregulation following intervention and at follow-up as reported by children. Social validity outcomes indicate that the intervention has high feasibility amongst teachers. **Conclusion:** This research provides empirical data on the use of CBT-based interventions, can assist Educational Psychologist's in selecting and evaluating interventions for children with ASD, and provides information regarding the feasibility, implementation and lasting outcomes of such interventions within an Irish school context. Further research is required in order to provide more consistent and reliable statistical evaluations of the intervention.

(ii) Declaration

I, Aoife Lalor, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Aoife Lalor

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(iii) Dedication

This thesis is dedicated to my Grandparents.

(iv) Acknowledgements

Foremost, I would like to thank the children, teachers and parents who took part in this study. I would also like to thank the principal and the school for their continued support throughout the intervention.

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Finally, to my parents, without whom this journey would never have been possible, I am indebted to you both. Thank you for your patience, encouragement and numerous proof readings! I am so thankful for your love and support in achieving my dreams.

(i) Glossary and Abbreviations

ASD (Autism Spectrum Disorder): A neurodevelopmental condition diagnosed on the basis of marked impairments in social communication and social interaction and the presence of restricted and repetitive patterns of behaviour (APA, 2013). A diagnosis is made if the latter symptoms are present from early childhood and significantly impair everyday functioning.

CBT (Cognitive Behavioural Therapy): An evidenced based therapy, developed by the psychiatrist and trained psychoanalyst Aaron Beck, which addresses behavioural expressions of problems while also addressing the underlying cognitions influencing the expressed behaviours (Craske, 2010; Dobson, 2010).

Emotional Regulation: Emotional regulation (or emotional self-regulation) can be defined as the 'extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions… to accomplish one's goals' (Thompson, Lewis, & Calkins, 2008, pp.27-28).

Executive Functioning: Executive functioning is a self-regulatory process which modulates the expression of human behaviour. It includes focused attention, planning, impulse control and, setting and achieving personal goals (McCrimmon, Matchullis, Altomare & Smith-Demers, 2016). Executive functioning deficits including mental inflexibility is proposed as a central deficit in Autism Spectrum Disorder (Ozonoff, 1995).

Self-Regulation: Self-regulation (or self –control or self-management) is a term used to describe the ability to adapt alertness to a situation and regulate emotions in a socially adaptive manner. It includes impulse control, managing stress, motivation, and setting personal or academic goals (Bronson, 2000; Oberle et al., 2016).

Theory of Mind: Theory of Mind refers to the ability to represent and comprehend other's mental states including emotions, beliefs and goals (Baron-Cohen, 1991; Bauminger-Zviely, 2013).

Wellbeing: Well-being incorporates the concepts of feeling positive emotions and functioning effectively through experiencing positive relations and working towards personal goals (Huppert, 2009).

CEM: Children's Emotion Management Scales (Zeman, Cassano, Suveg, & Shipman, 2010)

ERSSQ; Emotional Regulation and Social Skills Questionnaire (Beaumont & Sofronoff, 2008).

ERC: Emotional Regulation Checklist (Shields & Cicchetti, 1997).

Table of Contents

List of Figures

List of Tables

1.0 Part One: Introduction

The research in the current thesis aims to examine the effectiveness of The Zones of Regulation CBT-based intervention in promoting emotional regulation outcomes for school-aged children with Autism Spectrum Disorders (ASD) within an Irish context. This is an area of relatively limited research. This thesis comprises of four sections: Introduction (Part One), Literature Review (Part Two), Empirical Paper (Part Three), Critical Review and Impact Statement (Part Four). The introduction examines the key concepts which are examined throughout the thesis. This section discusses the rationale for selecting the research topic of emotional regulation and cognitive behavioural therapy interventions for children with Autism Spectrum Disorder (ASD). It outlines the author's practice-based experiences which influenced the study and considers the epistemological approaches to the research design. The Review Paper provides a systematic review of the effectiveness of cognitive behavioural-based interventions on emotional regulation outcomes for school-aged children with ASD as well as the theoretical foundations of the research. The Empirical Paper provides a detailed account of the study's method, results and the implications of the overall findings. The Critical Review and Impact Statement includes the authors reflection on the learning that occurred during the process of the research project and aims to clarify the impact of the study across educational and child psychological domains.

1.1 Overview and Definition of Key Terms

This section examines the key concepts of the study and provides an overview of the thesis aims.

1.1.1 Emotional regulation and ASD. This study focuses on the concept of emotional regulation. Emotional regulation can be defined as both 'the intrinsic and extrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions…to accomplish one's goals' (Thompson, Lewis, & Calkins, 2008, pp.27-28). This must not be mistaken for other terms such as emotional reactivity which reflects individual differences of emotional experiences and are part of a broader set of emotional problems (Kalvin, Bierman, & Gatzke-Kopp, 2016). Emotional regulation includes the effective management of and behavioural responses to

emotional states, and can be considered on a continuum from well-regulated to dysregulated states (Weiss, 2014).

Children with ASD have significant challenges with emotional regulation including the inhibition of emotions, managing emotions, delayed gratification and the use of maladaptive coping strategies (Baron, Groden, Groden, & Lipsitt, 2006; Jahromi, Meek, & Ober-Reynolds, 2012; Laurent & Gorman, 2018). Emotional regulation has been relatively neglected in ASD research until recently despite evidence of these emotional regulation difficulties (Mazefsky et al., 2013).

1.1.2 Cognitive behavioural therapy and ASD. Cognitive Behavioural Therapy (CBT) is an evidenced based intervention which addresses behavioural expressions of difficulties and the underlying cognitions influencing the expressions. It has also been modified for use with children using the framework of thoughts, feelings and behaviours (Rotheram-Fuller & MacMullen, 2011). A recent review highlights that CBT is considered an effective therapy for affective challenges among children with ASD (Weston, Hodgekins, & Langdon, 2016). However, the effectiveness of CBT interventions among children with ASD has almost exclusively focused on anxiety (Ehrenreich-May et al., 2014; Sze & wood, 2007; Wood et al., 2014). Given the emotional regulation challenges associated with ASD, the current research focuses on the effectiveness of CBT interventions on emotional regulation outcomes for children with ASD.

1.2 The Current Intervention and Previous Experience

The current study expands the depth of CBT intervention research on emotional regulation outcomes for school-aged children with ASD within an Irish context through the use of a direct instruction-based CBT programme. It evaluates the effectiveness of an emotional self-regulation intervention 'The Zones of Regulation' (Kuypers, 2011). The intervention is based on the principles of CBT (Beck, 1995). The lessons are based on a cognitive-behavioural framework and aim to help individuals become increasingly aware of their feelings, behaviours and thoughts. Individuals learn how to independently self-monitor, reflect on their level of alertness and utilise strategies or "Zone tools" to regulate emotions (Kuypers, 2011). The author

first came across the Zones of Regulation while working as an assistant psychologist with Clinical Educational and Neuropsychology Services (CENS Ltd.) in England. This service provides psychological input to children and young adults who have an Acquired Brain Injury (ABI). The Zones of Regulation was utilised with clients, their families and schools as part of a broader multi-disciplinary rehabilitation programme. The programme was found to be extremely effective, particularly when all stakeholders (schools, parents) were involved.

The intervention is based on an adapted CBT framework which targets autism specific deficits including executive functioning, emotional regulation and sensory processing. Children learn to reflect on how their behaviour affects themselves and those around them while also providing them with adaptive strategies. This in turn results in increased problem-solving abilities and increased impulse control. Although the Zones of Regulation is based on evidence in the fields of ASD and social-emotional theories, there is only one paper currently published using this population (Anderson et al., 2017). The aim of this research is to evaluate the effectiveness of the intervention on emotional regulation outcomes for children with ASD.

1.3 Relevance to Educational Psychology Practice

Up to 30% of an Educational Psychologist's total caseload, within Ireland and the UK, comprises of implementing interventions for children with ASD (Robinson, Bond, & Oldfield, 2018). While emotional regulation challenges are transdiagnostic, it is often an observed phenomenon among individuals with ASD. Consequently, Educational Psychologists need to develop their expertise in selecting and demonstrating interventions to support children with ASD who present with emotional regulation needs. As previously discussed, CBT is considered an effective intervention. However, recent research suggests that Educational Psychologists in Ireland are not regularly involved in delivering evidence-based therapies such as CBT to this population (Robinson & Bond, 2017; Robinson et al., 2018). Educational Psychologists in Ireland are now eligible to work in Health Care settings such as Primary Care and Child and Adolescent Mental Health Services (CAMHS). These recent revised changes to the eligibility requirements for psychology posts in the

Health Service Executive (HSE) reference that Educational Psychologists need to be competent in a range of therapeutic approaches including CBT (HSE, 2017). The current research investigates the effectiveness of this therapeutic approach in an applied context.

Educational Psychologists also have a role in disseminating research (Keith, 2008). The systematic review of the current study provides evidence for the use of CBT-based interventions for improving emotional regulation outcomes for children with ASD. The main research study investigates the effectiveness of the Zones of Regulation programme. The aim of this research is to provide empirical data on the efficacy of CBT practices for emotional regulation in children with ASD within an Irish context.

1.4 The Post Positivism Paradigm and Assumptions

The postpositive paradigm, influenced by critical realism, is consistent with the proposed research approach. Positivism was the predecessor to the post positivist paradigm. The focus was on neutral and empirical data with the view that the social world could be examined equally to the natural world through observations (Mertens, 2015). In comparison to the deterministic view of causality in positivism, post positivist psychologists accept the importance of objectivity but acknowledge that reality is changeable and influenced by individual experiences. One assumption of this paradigm is that an independent reality exists which can be examined through the scientific method but that this is not known with complete certainty (ontology and epistemology) (Mark & Gamble, 2009; Mertens, 2015). The design of the current study reflects the ontological assumption of the post positivist paradigm. The researcher is aware of an existing reality but that this is also influenced by the researcher's experiences and beliefs (i.e. critical realism) and is never fully absolute (Maxwell, 2012; Ryan, 2006). Individual experiences and beliefs exist but objectivity can still be achieved through the use of multiple measures. The study looks at both multiple measures and multiple sources to determine the effectiveness of the Zones of Regulation. This facilitates a triangulation of findings and allows for the examination of a more precise view of reality in terms of the effectiveness of the independent

variable (the intervention) on the dependent variable (emotional regulation) (Maxwell, 2012).

Evaluation of the effectiveness of the Zones of Regulation CBT intervention is central to the current research proposal. Evaluation in education and psychology initiated within the post positivist paradigm (Mertens, 2015). Research on the implementation of such interventions within a school context are low indicating a gap between the science and service (Forman, 2012; Fixen, Blase, Duda, Naoom, & Van Dyke, 2010). The current research is intervention led and aims to address this science to service gap. This would guide Educational Psychologists in recommending appropriate interventions. The intervention is theory-based, and the research evaluates the intervention using a quasi-experimental design consistent with a post positivist approach to evaluation. Ethics is also central to conducting good research in the postpositive paradigm (Mertens, 2015). In the current research, the Waitlist group received the intervention after the experimental (CBT) group delivery. This maximizes the potential benefits for all the individual participants.

The proposed research looks to conduct an investigation which carefully collects and reports precise data, aims to maximize positive outcomes for the participants and uses random assignment to time of treatment (axiology) (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978). The research approach is also quantitative which aligns itself with the methodological assumption of the post positivism paradigm. The addition of a simple social validity measure, post-intervention, is used to qualitatively discuss the students and teachers experiences of the intervention.

2.0 Part Two: Literature Review

2.1 Introduction

The following review presents a critical account of the literature relevant to the topic of 'The effectiveness of cognitive behavioural therapy-based (CBT) interventions on improving emotional regulation outcomes of school aged children with a diagnosis of Autism Spectrum Disorder (ASD)'.

The literature review will begin with the rationale for evaluating this topic and its relevance to educational psychology practice and policy. Particular attention will be paid to the relevance of this topic within an Irish educational and educational psychology context. The studies included in the qualitative synthesis will be summarised and their methodological quality appraised. This will be completed by using an adapted version of the Kratochwill (2003) coding protocols from the APA Task Force on Evidence Based Interventions in School Psychology for group-based designs and Gough's (2007) weight of evidence (WoE) framework. A systematic literature review approach was chosen as it allows for a rigorous, explicit and accountable method to review evidence found and synthesise its findings. In the closing section of the literature review, gaps in the research will be identified and implications for psychology practice and policy will be addressed. These literature gaps will be subsequently addressed in the research described in the main thesis.

2.2 Rationale and Relevance to Educational Psychology Practice and Policy

The area of childhood well-being or mental health has received considerable critical attention from multiple professions including psychologists, educators and researchers over the past number of years (Greenberg, Domitrovich, & Bumbarger, 2001; Public Health England, 2015). Well-being incorporates the concepts of feeling positive emotions and functioning effectively through experiencing positive relations and working towards personal goals (Huppert, 2009). The effects of emotions on well-being are related to several factors. Such factors include the outcome or consequences of emotional expression on an individual's self-concept, psychological outcomes and the relationship with the person to whom the emotion is expressed (Nyklíček, Vingerhoets, & Zeelenberg, 2010).

Although, positive mental health and well-being leads to better life outcomes, it is estimated that, in Ireland, eight per cent of children have a moderate to severe mental health difficulty which requires direct intervention and that 15.6 percent of adolescents have a diagnosed mental health difficulty (Irish College of Psychiatrists, 2005;2013). The National Council for Special Education (NCSE) has further suggested that children with additional needs and those from vulnerable groups are increasingly at risk of experiencing mental health difficulties (NCSE, 2014).

The increased interest in mental health and emotional well-being is reflected in the publication of guidelines, frameworks and polices for practice at both a national and international level. The EU Youth Strategy created the "Joint Action Mental Health and Well-being" strategy (Joint Action Mental Health and Well-being, 2016) to promote mental health and well-being in schools. Within an Irish context, well-being is one of four themes used in the Early Childhood Education Aistear framework to describe preschool children's learning and development (National Council for Curriculum and Assessment (NCCA), 2009). The Social Personal and Health Education (SPHE) curricular policy at primary school level and the Well-being Framework at post-primary level target learning opportunities to enrich the emotional well-being of Irish school-aged children. More recently, the Draft Primary Curriculum Framework (NCCA, 2020), proposes to redevelop the curriculum areas and subjects to include well-being. The framework aims to foster the holistic development of children by including emotional well-being as a key competency. The Government of Ireland has also explicitly focused on improving the emotional well-being outcomes of children. For example, one of the five national outcomes in the publication 'Better Outcomes, Brighter Futures 2014-2020' is to support children in being active and healthy with positive physical and mental wellbeing (DCYA, 2014).

Since 2004, the Health Service Executive (HSE) has promoted continued professional development training programmes for all professionals involved with children's health screening. This focuses on interagency work (at a health service, community and education level) to improve mental health and emotional outcomes for children (HSE, 2008). The promotion of emotional well-being for children is also evident in the National Educational Psychological Service (NEPS). Their recent national and regional conferences focused on well-being interventions and

frameworks. Therefore, Educational Psychologists working in various health and education settings have a major role in recommending, selecting, implementing and evaluating evidence-based interventions to improve the emotional well-being of children within an Irish context.

Internationally, within an educational context, teachers have expressed interest in implementing emotional well-being strategies but state that they require additional support and resources to implement the strategies (Buchanan, Gueldner, Tran, & Merrell, 2009; NCSE, 2016). Evidence suggests that teachers in the Republic of Ireland perceive the inclusion of children with emotional and behavioural difficulties particularly challenging (Shevlin, Winter, & Flynn, 2013). One of the groups that have been found to present with significant behavioural and emotional challenges are children with a diagnosis of ASD. As one of the main characteristics of ASD is an impairment in the area of social and emotional functioning (American Psychiatric Association (APA), 2013), Educational Psychologists need to develop their expertise in selecting and demonstrating interventions to support teachers in better managing these challenges.

2.3 Autistic Spectrum Disorder

Children with ASD present with significant emotional, social, communicative and behavioural challenges. ASD is a neurodevelopmental condition diagnosed on the basis of marked impairments in social communication and social interaction and the presence of restricted and repetitive patterns of behaviour (APA, 2013). A diagnosis is made if these characteristics are present in the early childhood period and significantly impair everyday functioning (APA, 2013). ASD is predominantly diagnosed in males with rates found to be as much as five times higher than female rates (Carr, 2016; Gardner, Erkfritz-Gay, Campbell, Bradley, & Murphy, 2016). While previous diagnostic criteria (DSM-IV-TR, APA, 2000) were based on a categorical approach with a number of subcategories (e.g. Autistic Disorder, Asperger's disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder Not Otherwise Specified), the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-V) are based on a two dimensional approach.

ASD is now seen as a single disorder on a spectrum with three levels of severity; requiring very substantial support, requiring substantial support and requiring support (APA, 2013). Restricted or repetitive behaviours are characterised by stereotyped or repetitive speech, use of objects or motor movements, inflexibility and insistence on routines and/or highly restricted or fixed interests. Sensory issues, such as hyper- or hypo-reactivity to stimuli, are also recognised in DSM-V. Deficits in social communication and interaction are characterised by difficulties in social-emotional reciprocity, reduced integration of eye contact and body language, and challenges in developing, maintaining or understanding relationships (APA, 2013).

Transnational epidemiological research reports that 0.66% of the population has ASD (Carr, 2016). Within an Irish context current prevalence rates reflect frequencies reported in America and in the UK. The report from the National Council for Special Education (NCSE, 2016) found that 1.5% (one in every 65 pupils or 14,000 pupils) have a diagnosis of ASD. The high incidence rates of ASD in Ireland has implications for educational psychology policy and practice. Educational Psychologists are well placed to support schools and families by using research to facilitate informed decisions on selecting, utilising and evaluating interventions for children with ASD who exhibit emotional and behavioral difficulties.

In order to examine the impact of the condition on behaviour, the current review will consider emotional regulation outcomes of evidence-based interventions for school-aged children with ASD.

2.4 Emotional Regulation

A significant number of studies on well-being in school aged populations have focused on the regulation of emotional states. These include the concepts of 'self-regulation' and 'emotional regulation'. Self-regulation (or self-control or self-management) is a term used to describe the ability to adapt alertness to a situation and regulate emotions in a socially adaptive manner (Bronson, 2000; Kuypers, 2011). Self-regulation includes impulse control, managing stress, motivation, and setting personal or academic goals (Oberle et al., 2016). In addition to emotional skills, evidence suggests a relationship between self-regulation, social competence and peer

relationships (Barkley, 2001; McKown, Gumbiner, Russo, & Lipton, 2009). The current review will specifically look at emotional regulation, a critical component of self-regulation.

Emotional regulation (or emotional self-regulation) can be defined as the 'extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions… to accomplish one's goals' (Thompson. Lewis, & Calkins, 2008, pp.27-28). An ongoing international survey by the Organisation for Economic Co-operation and Development (OECD, 2017) on social and emotional skills illustrates evidence that emotional regulation skills are the greatest predictor of mental health and well-being in youths. Furthermore, in the field of scientific investigation and in educational psychology practice, emotional regulation is deemed to be a fundamental component of well-being (Nyklíček, Vingerhoets & Zeelenberg, 2010).

The cognitive model of emotional regulation can be depicted as a transactional process between an individual and their environment which involves controlled or automatic strategies executed in response to stimuli which generate emotions (Gross & Thompson, 2007; Weiss, Thomson, & Chan, 2014). It examines adaptive and maladaptive emotional regulation strategies across domains such as attention, cognitive change, situation selection and modification, and response modulation (Gross & Thompson, 2007). The model categorises strategies into antecedent focused and response focused strategies. Antecedent focused strategies involve cognitive reappraisal, situation modification and attention. Response focused regulation strategies include the modification or suppression of emotions by changing the resulting behaviour (Gross & John, 2003; Gross & Thompson, 2007). This regulation of emotions can be considered on a continuum where emotional regulation can increase or decrease and where an individual can move between well-regulated states to states of dysregulation (Mazefsky et al., 2013).

2.4.1 Emotional regulation: typical development. The developmental profile of emotional regulation can be explored on three levels (Prizant, 2012). The first developmental level is that of behaviour, where a child engages his or her sensorimotor strategies to self-soothe. These strategies are influenced by observing and interacting with care givers (Kim, Stufter, Philbrook, & Teti, 2014; Morris, Silk,

Steinberg, Myers, & Robinson, 2007). The second level includes language strategies where a child can use words or symbols to regulate emotional states. For example, during their second year, infants display increased verbal expression while pre-schoolers show increased use of internal speech and use conversations as a means to regulate their affective experiences (Carr, 2016). The final level is where a child uses his or her meta-cognitive strategies to reflect on emotional states and manifest behaviour in a socially acceptable manner (Prizant, 2012). As children develop, their capacity to self-regulate increases and they begin to depend on more cognitive or internal mechanisms of regulation (Posner & Rothbart, 2000). At this stage they start to internalise social and environmental rules, and develop the ability to inhibit behavioural responses and display signs of cognitive reappraisal (Carlson, 2005; Cole, Hall, & Hall, 2008). Parents also play a significant role in the development of emotional regulation in children. Early regulation strategies are influenced by attachment styles (Kim et al., 2014). Parent's use of soothing at an early age, acceptance of their child's expressed emotions and providing opportunities for independent problem-solving has been associated with adaptive regulation strategies (Laurent & Gorman, 2018).

Emotional regulation is an essential protective factor. Research indicates that it is the regulation of an emotion which is fundamental, not whether the emotion is deemed to be positive or negative (Alvord & Grados, 2005). Emotional regulation can impact on adaptive functioning and ineffective emotional regulation abilities are linked to poorer mental health outcomes (Gross & Monoz, 1995). It is also associated with positive social and emotional development in early childhood, increased academic outcomes and positive social engagement in later development (Eisenberg, Spinrad, & Eggum, 2010; McCleland & Cameron, 2012).

2.4.2 Emotional dysregulation. Emotional regulation difficulties or emotional dysregulation is defined as the inability to effectively or appropriately regulate emotions (Samson et al., 2014). Difficulties and negative strategies of emotional regulation, including increased physiological reactivity, poor impulse control, rumination and emotion modulation, are correlated with externalising and aggressive behaviours throughout childhood (Lauret & Gorman, 2018; White, Jarrett, & Ollendick, 2012). Emotional regulation difficulties are also related to decreased

well-being and increased mental-health problems such as depression, anxiety, social dysfunction and lower quality of life (Gross & Munoz, 1995; Campbell-Sills et al, 2006; Quoidbach et al., 2010).

2.5 Emotional Dysregulation in Children with ASD: Theories and Causes

Individuals with ASD have significant difficulties with emotional dysregulation and can display challenges in inhibition of emotions, transitioning, managing emotions and delayed gratification (Baron, Groden, Groden, & Lipsitt, 2006; Laurent & Gorman, 2018). They also have challenges in expressing emotions and in recognising and understanding their own and others emotions or mental states (Baron-Cohen, 1991). This can often result in the use of maladaptive coping strategies when compared to typically developing same-age peers (Jahromi, Meek & Ober-Reynolds, 2012; Shaffer et al., 2019). Deficits in emotional regulation among this population are also associated with internalising and externalising difficulties with school-aged children frequently experiencing significant mental health and well-being problems (Dapretto et al., 2006; Eisenberg et al., 2001; Shaffer et al., 2019). For example, research indicates that up to 50% meet the diagnostic criteria for at least two psychiatric conditions including Attention Deficit Hyperactivity Disorder (ADHD) and anxiety disorders (Leyfer et al., 2006; Simonoff et al., 2008; Thomson, Riosa, & Weiss, 2015).

2.5.1 Socioemotional processing. Socioemotional processing is a core deficit of ASD (Bachevalier & Loveland, 2006) and is described as "deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions" (APA, 2013, pp. 50). It is suggested that individuals with ASD have deficits in perceiving and processing emotions. This is evident during infancy through poor joint attention, shared attention and imitation with caregivers (Charman et al., 1997; Kasari et al., 1990). Compelling evidence indicates that core social communication and sensory processing deficits, such as the engagement in repeated repetitive behaviours and sensory processing difficulties, are significantly linked to emotional dysregulation

(Samson et al., 2014). Research also highlights that social ability incorporates skills such as emotional competence and that emotional skills deficits can impact on social competence among children with ASD (Feng, Lo, Tsai & Cartledge, 2008; Lee et al., 2019).

2.5.2 Executive functioning. Empirical evidence has led to an increased understanding of brain functioning in individuals with ASD (Bachevalier & Loveland, 2006). For example, one of the main theories of ASD is an impairment in executive functioning. Executive functioning is a self-regulatory process which modulates the expression of human behaviour (McCrimmon, Matchullis, Altomare, & Smith-Demers, 2016). It includes working memory, focused attention, planning, impulse control as well as setting and achieving personal goals. Children demonstrate advanced regulation skills when they utilising appropriate executive functions.

Difficulties in executive processing have been consistently shown in individuals with ASD (Ozonoff, 1995). Executive functioning deficits in ASD are associated with organisational, planning and problem solving difficulties and are also associated with cognitive flexibility and emotional management (Hill, 2008; Scarpa, White, & Attwood, 2013). Deficits in executive functioning have also been found to be associated with social cognition abilities including emotion recognition and Theory of Mind (Sivaratnam, Newman, & Rinehart, 2018).

2.5.3 Theory of mind and affective functioning. Theory of Mind refers to the ability to represent and comprehend other's mental states including emotions, beliefs and goals (Baron-Cohen, 1991; Bauminger-Zviely, 2013). The majority of studies have indicated that individuals with ASD display challenges in Theory of Mind (Kimbi, 2014). However, there is clear evidence which suggests that Theory of Mind deficits are also associated with challenges in assessing one's individual mental states (Frith, 1989; Samson, Huber, & Gross, 2012). This impacts emotion states of children with ASD as they may also display challenges in labelling their own emotions, which in turn has implications for emotional regulation. Cognitive emotional regulation strategies, such as appraisal, can be negatively affected by Theory of Mind deficits (Gross & John, 2003). Previous research also suggests that individuals with ASD are less positive and less differentiated with their emotional responses, and have greater

difficulty than typically developing peers in assessing and labelling their emotions (i.e. alexithymia) (Berthoz & Hill, 2005; Samson et al., 2012).

2.5.4 Neural processing. Developing research also indicates that disruptions in neural circuitry and processing across various brain regions are implicated in ASD. These studies show that neural circuitry can significantly impact emotional functioning. They suggest that the atypical neuroanatomy associated with ASD may reflect a disproportionate level of regulation difficulties (Mazefsky & Minshew, 2010; Ni et al., 2018). Particular difficulties have been associated with the amygdala (Ashwin, Baron-Cohen, Wheelwright, O'Riordan, & Bullmore, 2007). Ashwin et al. (2007) found differential patterns of activation in these brain areas during emotion processing among participants with ASD in comparison to controls. Further research indicates that emotional regulation and perspective taking-difficulties are associated with abnormal Prefrontal Cortex (PFC) activity (Mazefsky et al., 2013).

Additionally, research in this area indicates that the expression of emotional regulation difficulties in ASD may be distinct from mood disorders. Further research associates ASD language difficulties with increased emotional regulation difficulties (Simonoff et al., 2012). Disparities in information processing and perception may also influence emotional regulation in children with ASD. This includes hypo- or hypersensitivity to environmental factors which in turn can result in heightened or dysregulated behaviours (Dunn, 1997; Mazefsky et al., 2013).

2.6 Emotional Dysregulation and Proposed Casual Mechanisms

Given the previous highlighted evidence, the construct of emotional regulation may help to explain and understand the emotional and behavioural challenges associated with ASD. This combination of core characteristics, co-morbid diagnoses and proposed causal mechanisms is depicted in Figure 1.

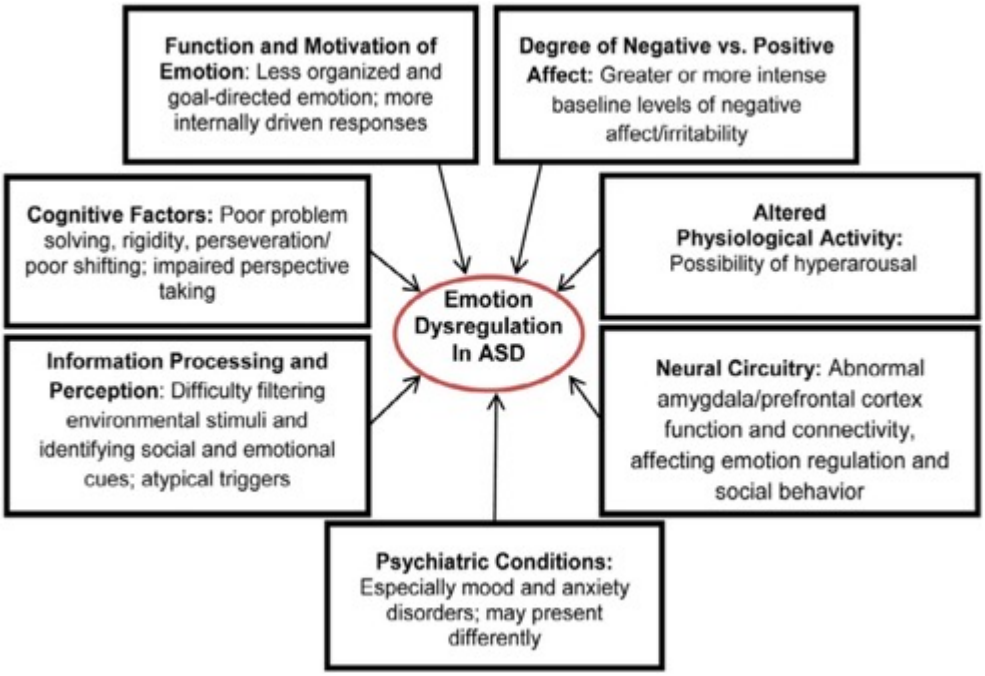

Figure 1. Factors contributing to emotional regulation difficulties in ASD (Mazefsky et al., 2013).

In light of the illustrated challenges, difficulties in emotional regulation are frequently the primary referral reason for intervention in ASD practice (Mazefsky et al., 2013; Samson, Hardan, Lee, Philips, & Gross, 2015). Educational Psychologists can report on a client with ASD's emotional regulation, emotional understanding and emotional expression (Belva et al., 2016). Given these emotional difficulties and referral concerns, Educational Psychologist's should have knowledge on and be able to select and implement evidence-based interventions to address emotional regulation in children with ASD.

2.7 Cognitive Behaviour Therapy

Promoting evidence-based practices has become one of the principal roles of Educational Psychologists in recent times with the aim of identifying interventions of high quality that result in positive outcomes for students (Fox, 2003). Evidence-based psychological interventions such as Cognitive Behaviour Therapy (CBT) frequently involves using strategies to enhance emotional regulation and have been found to improve well-being (Hofmann & Asmundson, 2008). Cognitive Therapy was

developed by the psychiatrist and trained psychoanalyst Aaron Beck. He developed a cognitive model which was originally used in the context of treating adult depression and was ground on the idea that maladaptive behaviours are a direct result of maladaptive thought patterns (McSweeney & Murphy, 2014; Plotnik & Kouyoumdjian, 2010). His scientific approaches aimed to challenge and explore an individual's cognitive distortions (Rait, Monsen, & Squires, 2010). The principles of CBT, according to expanded works by Judith Beck, include emphasising collaboration, education, problem-solving and active participation (Beck,1995).

CBT principles and techniques are supported by scientific evidence and are based on cognitive and behavioural theories (Craske, 2010; Dobson, 2010). Cognitive components of CBT relate to how our thoughts effect how we act and feel, with a focus on changing cognitive processing and emotional responses. Behavioural components of CBT examine how a behaviour is learned though associations. Behavioural changes occur by utilising CBT techniques to modify associated responses to a heightened situation (Scarpa, White, & Attwood, 2013; Craske, 2010).

CBT has been modified for use with children using the general framework of cognition, feelings and behaviours (Rotheram-Fuller & MacMullen, 2011). The cognitive-behaviour management framework of the relationship between thoughts, feelings and behaviours is illustrated in Figure 2.

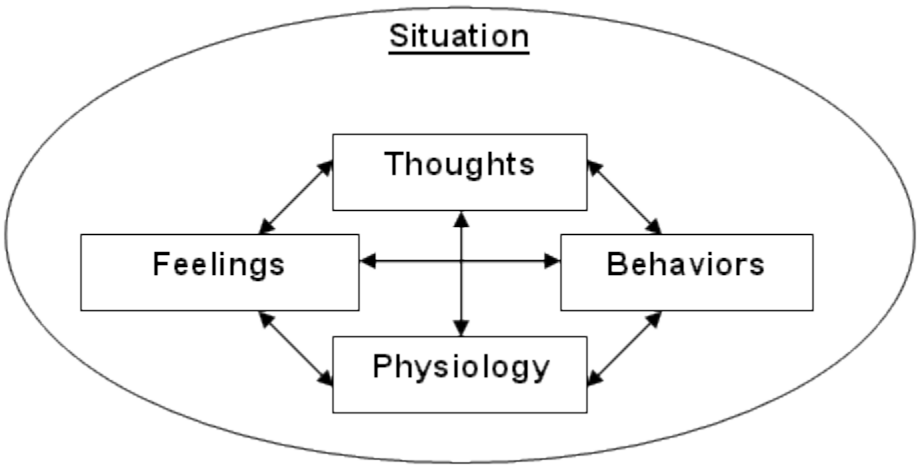

Figure 2. A cognitive behaviour framework (Michael Grandner, 2017).

Evidence-based CBT interventions have been used to address emotional difficulties in children within an international and Irish context. Interventions include the 'FRIENDS for life' emotional resiliency programme (Barrett, Sonderegger, & Sonderegger, 2001; Higgins, Slattery, Perry, & O'Shea, 2019), the 'Think-good-feel-good' cognitive behaviour therapy workbook for children (Stallard, 2002), the 'Superflex' social thinking curriculum and 'The Zones of Regulation' curriculum designed to foster self-regulation and emotional control (Kuypers, 2011). The Zones of Regulation programme also addresses emotional awareness, thinking patterns and problem solving. Other techniques and strategies used in CBT-based interventions include the development of coping skills, positive self-talk and psychoeducation. These strategies help a child or young adult to problem-solve or cope in various situations (Scarpa, White, & Attwood, 2013).

2.8 Adaptations of Cognitive Behaviour Therapy Interventions to Improve its Accessibility for Individuals with Autism Spectrum Disorder

Adaptations to psychological therapies such as CBT are important when working with children who have ASD due to the clinical characteristics and deficits associated with the condition. When adapting standard CBT practices, consideration of a child's emotional, cognitive and language capacities are essential (Rotheram-Fuller & MacMullen, 2011). Adaptations to CBT interventions for children with ASD were examined in a 2016 systematic review (Walters, Loades, & Russell, 2016). Adaptations recommended include use of increased visual or written information, explicit guidance, incorporating breaks and focusing on behavioural changes over cognitive methodologies (Cooper, Loades, & Russell, 2018; NICE, 2012). The inclusion of caregivers in behavioural interventions for children with ASD is also an essential element of intervention effectiveness (Factor et al., 2019). Similarly, adaptations are necessary to increase the efficacy of CBT interventions for individuals with ASD with and without intellectual disabilities. This includes using simplified language, repetition of learning, carer involvement and the use of visual materials (Cooper et al., 2018; Parent, Birtwell, Lambright, & DuBard, 2016).

Furthermore, targeting autism specific characteristics can add to standard CBT practices when working with children with ASD (Moree & Davis, 2010) as core executive function deficits, difficulties with socioemotional processing and lack of flexible thinking can impact on a CBT intervention delivery. Given these challenges, children with ASD may require different pacing in order to fully benefit from the CBT intervention (Cooper et al., 2018). CBT interventions which are highly structured and that include real-life practice, behavioural rehearsals or brief activities can support impaired executive functioning in children with ASD (Scarpa, White, & Attwood, 2013).

Effective CBT interventions for children with ASD need to consider the time required to process and respond to socioemotional information and the use of memory aids (Scarpa, White, & Attwood, 2013). Additional studies have utilised adapted curricula based on CBT and the principles of behavioural analysis or mindfulness-based techniques to address ASD related emotional and social communication difficulties (de Bruin et al., 2015; Lee et al., 2019; Shaffer et al., 2019). Other modified CBT curricula such as The Zones of Regulation CBT-based curriculum also targets autism specific deficits by integrating the neurological processes of executive functioning, emotional regulation and sensory supports (Kuypers, 2011).

2.9 The Current Research Field on CBT Interventions to Support Emotional Regulation in Children with ASD

The clinical effectiveness of CBT interventions among children with ASD has almost exclusively focused on anxiety (Ehrenreich-May et al., 2014; Sze & wood, 2007; Wood et al., 2014). Additionally, ASD research to date has focused more on emotional experience as opposed to emotional regulation with one review finding only 15 articles mentioning ‘emotional regulation’ and ‘ASD’ in peer-reviewed abstracts (Mazefsky et al., 2013). Although CBT research suggests the effectiveness of CBT for treating emotional regulation deficits among individuals with disorders such as anxiety, depression and Attention Deficit-Hyperactivity Disorder (ADHD), few investigations examine CBT as a probable intervention for emotional regulation

deficits in children with a diagnosis of ASD (Blake, Sheeber, Youssef, Raniti, & Allen, 2017; Cotton et al., 2016; Shaffer et al. 2019).

Given the aforementioned emotional regulation challenges among this population, and evidence illustrating a relationship between emotional regulation with social competence and peer relationships (e.g. Jahromi et al., 2013; Thomson et al., 2015), there is an increased need to investigate the effectiveness of CBT for children with ASD. CBT can teach children with ASD about the thinking processes involved in self-regulation and emotional control, by creating awareness of their thoughts, feelings and behaviours. For example, the Zones of Regulation programme (Kuypers, 2011), uses a cognitive-behaviour management framework to develop skills to regulate behaviour independently while setting personal goals.

Educational Psychologists can facilitate the implementation of interventions with children with ASD who are experiencing emotional regulation difficulties (Robinson & Bond, 2017). However, recent evidence suggests that there are several evidence-based interventions including CBT which Educational Psychologists in the UK and Ireland are not regularly involved in (Robinson & Bond, 2017; Robinson et al., 2018). In summary, as Educational Psychologist's in the UK and Ireland align themselves with models of evidence-based practices (Robinson et al., 2018) critical appraisals of existing evidence-based research on CBT interventions to address emotional regulation difficulties in a systematic manner are required. This will help to inform intervention planning and to support the use of effective practices within an Irish context and help support Educational Psychologist's in selecting, implementing and evaluating interventions for children with ASD and emotional regulation difficulties.

The current review will address the effectiveness of CBT interventions for school-aged children with ASD on emotional regulation outcomes. The review will primarily investigate the effectiveness of CBT interventions on emotional regulation outcomes for school-aged children with a diagnosis of ASD. Given the high comorbidity rates among this population the review will also note the effectiveness of CBT interventions on emotional regulation of school-aged children with ASD and comorbid diagnoses.

Review Questions

This review will evaluate the evidence base for CBT interventions to answer the following questions:

How effective are CBT interventions in improving emotional regulation outcomes among school aged children with ASD?

How effective are CBT interventions in improving outcomes for school aged children with ASD with and without comorbid diagnoses?

2.10 Literature Search

On the 21st of April 2020, a literature search was conducted using the following electronic data bases: PsycINFO, PsycARTICLES and ERIC (EBSCO). To systematically identify potential literature the reviewer inputted and combined the search terms shown in Table 1. The initial search yielded 39 studies (PsycINFO: 34, ERIC: 4, PsycARTICLES: 1). Data base tools were used to filter and limit the initial findings as part of the initial stage of the exclusionary process. The studies were filtered to limit the search to peer reviewed journals (*n*=24) and English language studies (*n*=21). Two additional records were identified through other sources. Total records identified through the database searching yielded 21 studies after duplicates were removed.

Table 1

Search terms used

Intervention	Measure	Population
cbt* OR cognitive behav* therapy	emotional regulation OR self-control OR self-regulation OR self-management OR impulse control	Asd OR autism OR autism spectrum disorder OR pddnos OR pdd OR Asperger syndrome OR high functioning autism

* was used to denote all variations of that word for example 'behav*' could be 'behaviour' or 'behavior'

The reviewer screened the 21 articles by title and abstract at stage one of the exclusion process. This excluded eight articles from the review. Thirteen full-text articles were screened for eligibility based on the inclusion and exclusion criteria at stage two of the exclusion process (see Table 2). Four articles were excluded with the nine remaining studies included in the qualitative synthesis (see Figure 3). See Appendix A for a list of the excluded studies and Table 3 for the list of studies included in the full review.

Table 2

Inclusion/exclusion criteria

Study feature	Inclusion criteria	Exclusion criteria	Rationale
1. Type of publication	Peer reviewed journal	Study comes from a non-peer reviewed journal	Studies published in peer reviewed journals have been rigorously reviewed and have met quality standards
2. Language of study	Study is published in English	Study is not published in English	Translation services are not feasible
3. Population/ Participants	(a) Study includes children aged between 4-16 as participants	(a) Participants are adults or children below 4 years of age or over 16 years	The review is examining CBT interventions for school-aged children with a diagnosis of ASD
	(b) Includes at least 2 participants who have a formal diagnosis of ASD	(b) <2 participants or participants who do not have a formal diagnosis of ASD	
4. Intervention	The study implements a CBT-based intervention	The study does not implement a CBT-based intervention	The review question focuses on CBT-based interventions for children with ASD
5. Design	(a) A primary study of a	(a) Secondary studies e.g.	This review will contain

		CBT-based intervention (b) Pre-and post-measurements	systematic literature review or meta-analyses. (b) No pre-measurements	empirical studies with pre and post measures to ensure that the effect of the intervention can be more validly differentiated
6.	Outcomes	Includes a quantitative measurement of emotional regulation/an emotional skill outcome	Does not include a quantitative measurement of emotional regulation/an emotional skill outcome	The review focuses on the effects of CBT-based interventions on emotional regulation outcomes of children with ASD

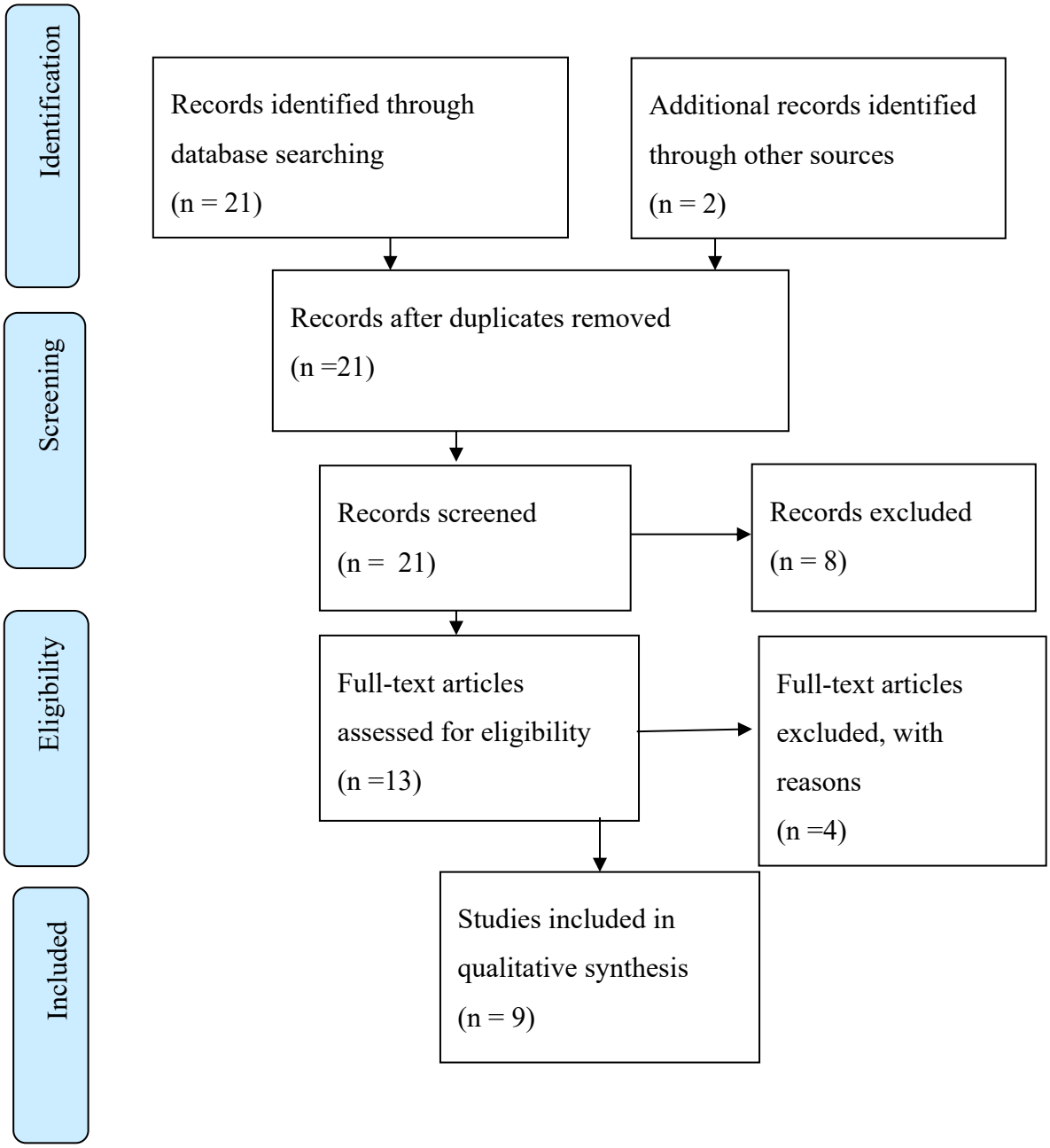

Figure 3. Flow diagram of the search and exclusion process

Table 3

List of included studies

Included studies
1. Bauminger, N. (2007). Brief report: Individual social-multi-modal intervention for HFASD. *Journal Of Autism And Developmental Disorders, 37*(8), 1593-1604.
2. Factor, R. S., Swain, D. M., Antezana, L., Muskett, A., Gatto, A. J., Radtke, S. R., & Scarpa, A. (2019). Teaching emotion regulation to children with autism spectrum disorder: Outcomes of the Stress and Anger Management Program (STAMP). *Bulletin of the Menninger Clinic*, *83*(3), 235–258.
3. Fujii, C., Renno, P., McLeod, B. D., Lin, C. E., Decker, K., Zielinski, K., & Wood, J. J. (2013). Intensive cognitive behavioral therapy for anxiety disorders in school-aged children with autism: A preliminary comparison with treatment-as-usual. *School Mental Health, 5*(1), 25-37.
4. Lee, G. T., Xu, S., Feng, H., Lee, G. K., Jin, S., Li, D., & Zhu, S. (2019). An emotional skills intervention for elementary children with autism in China: A pilot study. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *37*(2), 113-132.
5. Scarpa, A., & Reyes, N. M. (2011). Improving emotion regulation with CBT in young children with high functioning autism spectrum disorders: A pilot study. *Behavioural and Cognitive Psychotherapy, 39*(4), 495-500.
6. Thomson, K., Riosa, P. B., & Weiss, J. A. (2015). Brief report of preliminary outcomes of an emotion regulation intervention for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*(11), 3487-3495.
7. Weiss, J. A., Thomson, K., Burnham Riosa, P., Albaum, C., Chan, V., Maughan, A., . . . & Black, K. (2018). A randomized waitlist-controlled trial of cognitive behavior therapy to improve emotion regulation in children with autism. *Journal of Child Psychology and Psychiatry, 59*(11), 1180-1191.

8. Wood, J. J., Drahota, A., Sze, K., Van Dyke, M., Decker, K., Fujii, C., ... & Spiker, M. (2009). Brief report: Effects of cognitive behavioral therapy on parent-reported autism symptoms in school-age children with high-functioning autism. *Journal of Autism and Developmental Disorders, 39*(11), 1608-1612.

9. Wood, J. J., Fujii, C., Renno, P., & Van Dyke, M. (2014). Impact of Cognitive Behavioral Therapy on observed autism symptom severity during school recess: A preliminary randomized, controlled trial. *Journal of Autism and Developmental Disorders, 44*(9), 2264-2276.

2.11 Critical Evaluation

The nine studies included in the qualitative synthesis were summarised (see Appendix B) and their methodological quality evaluated. This was completed by using an adapted version of the Kratochwill (2003) coding protocols from the APA Task Force on Evidence Based Interventions in School Psychology for group-based designs and Gough's (2007) weight of evidence (WoE) framework (see Table 4 for WoE and Appendix C for framework used).

The nine studies were allocated scores which were calculated using three sets of evidence weighting: weight of evidence A (WoE A), weight of evidence B (WoE B) and weight of evidence C (WoE C). For an example of a completed protocol see Appendix D. For the purpose of the current systematic review, WoE A included fidelity, measurement and comparison group. The scores for each set were then combined to create weight of evidence D (WoE D). WoE D is a rating of the overall extent to which the specific study provides evidence for answering the proposed review questions (Gough, 2007). Table 5 contains the ratings of the nine included studies.

Table 4

The Weight of Evidence framework and areas of focus according to Gough (2007)

Weight of Evidence A	Weight of Evidence B	Weight of Evidence C	Weight of Evidence D
Methodological Quality: Accuracy, coherency and transparency of the study in relation to quality standards of the study type	Methodological relevance: appropriateness of methodology and research design for addressing the review question	Topic relevance : relevance of focus of study to the review question	Overall weight of evidence: the average of A, B & C to give the degree to which the study answers the specific review question

Table 5

Summary of Weight of Evidence Ratings (Based on Gough, 2007)

Studies	WoE A	WoE B	WoE C	WoE D
Bauminger, 2007	Low (0.7)	Medium (2)	Low (1)	Low (1.2)
Factor et al., 2019	Medium (1.7)	High (3)	High (3)	High (2.6)
Fujii et al., 2013	Medium (2.3)	Medium (2)	Medium (2)	Medium (2.1)
Lee et al., 2019	Medium (1.8)	Low (1.5)	Medium (2)	Medium (1.8)
Scarpa & Reyes, 2011*	Medium (2.3)	High (2.5)	Medium (2)	Medium (2.3)
Thomson et al., 2015	Medium (2)	Low (1.5)	Medium (2)	Medium (1.8)
Weiss et al., 2018	High (2.7)	High (3)	High (3)	High (2.9)
Wood et al., 2009	Medium (2.2)	Low (1.5)	Low (1.5)	Medium (1.7)
Wood et al., 2014	Medium (2.3)	Low (1.5)	Low (1.1)	Low (1.6)

*Please note the extended version of the study was located through the author and appraised in this review

** Ratings of 1-1.6 are considered low, ratings of 1.7- 2.3 are considered medium and ratings of 2.4-3 are considered high.

2.12 Participants Characteristics

The studies selected for review investigated the effectiveness of CBT interventions on emotional regulation outcomes for school aged children with ASD, as stipulated in the inclusion criteria. There were 186 participants in total aged between 4-12 years of age. Parents were involved in some aspect of the intervention in six studies (Factor et al., 2019; Lee et al., 2019; Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018; Wood et al., 2009). This is significant as evidence indicates that parental involvement can improve the generalisability of skills gained by a child following intervention (Burrell & Borrego, 2012; Cooper et al., 2018).

Attrition rates were low across all included studies. Sample sizes in the studies ranged from 8 (Lee et al., 2019) to 68 (Weiss et al., 2018). Where studies have a small sample size attention needs to be given to the generalisability of the intervention outcomes. Seven of the studies included participants aged between 7-12 (Bauminger, 2007; Fujii et al., 2013; Lee et al., 2019; Thomson et al., 2015;Weiss et al., 2018; Wood et al., 2009, 2014) while two included participants aged between 4-7 years (Scarpa & Reyes, 2011). Consequently, caution needs to be taken when interpreting the overall effectiveness of CBT interventions for a younger cohort.

Six of the nine studies were conducted in the USA (Factor et al., 2019; Fujii et al., 2013; Scarpa & Reyes, 2011; Thomson et al., 2015; Wood et al., 2009, 2014), one in Canada (Weiss et al., 2018), one in China (Lee et al., 2019), and one in Israel (Bauminger, 2007). While care must be taken when advising the use of these CBT interventions outside of these locations, consistent post-intervention findings across studies would indicate a level of generalisability across different languages and cultural settings.

Four studies included participants with a diagnosis of ASD only (Bauminger, 2007; Factor et al., 2019; Lee et al., 2019; Scarpa & Reyes, 2011) while three included participants with a diagnosis of ASD and at least one comorbid anxiety disorder (Fujii et al., 2013, Wood et al., 2009, 2014).

While participants in the remaining studies (Thomson et al., 2015; Weiss et al., 2018) did not have to reach a clinical cut off for comorbid mood or behavioural disorders, Weiss et al. (2018) found that 88% of their sample had additional emotional

problems and 93% had a diagnosed comorbid anxiety. Descriptive statistics were not stated in Thomson et al. (2015). As a result, determining whether improvements are related to changes in ASD symptoms or anxiety related symptoms is problematic.

All studies included children who were verbal or could follow verbal instructions and six studies included children who were of average intelligence (>70) (Bauminger, 2007; Fujii et al., 2013; Thomson et al., 2015; Weiss et al., 2018; Wood et al., 2009). Three children in the Lee et al. (2019) study had a mild intellectual disability. None of the included studies reported levels of severity according to the DSM-V (APA, 2013).

All studies had predominately more males with Thomson et al. (2015) reporting on an-all male sample. One study (Fujii et al., 2013) had an equal male: female ratio which may reflect the evidence discussed in the introduction that states ASD is predominantly diagnosed in males (Carr, 2016; Gardner, Erkfritz-Gay, Campbell, Bradley, & Murphy, 2016).

2.13 Design and Comparison Group

Only studies with quantitative pre and post intervention measures were included in this review with the exception of one study which included qualitative case study information on four out of 12 participants (Fujii et al., 2013). Intervention groups received treatment individually or within a group setting. Six studies measured participant outcomes, for both intervention and control/treatment as usual (TUA) groups, at pre-intervention and post-intervention (Factor et al., 2019; Fujii et al., 2013; Scarpa & Reyes, 2011; Weiss et al., 2018; Wood et al., 2009, 2014).

Utilising a control group is important as it allows for any non-intervention effects on the dependent variable to be statistically controlled for when calculating effect sizes (Carlson & Schmidt, 1999). Three studies (Bauminger, 2007; Lee et al., 2019; Thomson et al., 2015) did not have a control/TAU group. Evidence suggests that the lack of a control variable in CBT trials can result in expectancy biases and possible regression to the mean (Ehrenreich-May et al., 2014; Thomson et al., 2015). Therefore, treatment efficacy needs to be interpreted with caution for studies without a control group. This was reflected in WoE A (comparison) and WoE B weightings. Studies with a control/TAU group indicated randomisation of allocation (Factor et al.,

2019; Fujii et al., 2013; Scarpa & Reyes, 2011; Weiss et al., 2018; Wood et al., 2009, 2014). This is significant in studies as it eliminates sampling biases.

Overall comparison groups were representative of the target population. Where variables such as socioeconomic status (SES) and ethnicity were described (Factor et al., 2019; Fujii et al., 2013; Wood et al., 2009, 2014) they did not differ significantly. Although higher levels of externalising symptoms were found in the intervention group at baseline in Weiss et al. (2018), this was statistically controlled for in all analyses. One study (Scarpa & Reyes, 2011) had higher than average SES and mainly white Caucasians within the intervention group. Therefore, findings cannot be generalized to all children with ASD and emotional regulation difficulties.

Follow up procedures are important to establish long-term maintenance of treatment gains and overall intervention effectiveness. This was reflected in WoE B where studies that completed pre, post and follow measures were given a higher weighting. Only four of the included studies fulfilled this criterion (Bauminger, 2007; Factor et al., 2019; Weiss et al., 2018; Wood et al., 2009).

2.14 Intervention

All studies reviewed used a CBT framework to enhance emotion recognition, problem solving and emotional/ social competencies for children with ASD. Intervention sessions included developing skills in dyadic interactions, emotional understanding and recognition (Bauminger, 2007; Fujji et al., 2013; Lee et al., 2019), emotional and self-regulation (Factor et al., 2019; Fujii et al., 2013; Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018), coping with anxiety (Fujii et al., 2013; Wood et al., 2009, 2014) and selecting and implementing relaxation techniques (Lee et al., 2019).

As part of WoE C, each article was rated by the reviewer in relation to the quality of the description provided about the CBT intervention and an emotional regulation outcome. All nine studies implemented a CBT intervention which lasted more than 8 weeks. Four studies implemented specific emotional regulation interventions (Factor et al., 2019; Lee et al., 2019; Thomson et al., 2015; Weiss et al., 2018), two implemented CBT interventions to address emotional regulation

difficulties (Fujii et al., 2013; Scarpa & Reyes, 2011) and three implemented CBT interventions which addressed some aspect of emotional regulation (Bauminger, 2007; Wood et al., 2009, 2014). The Wood et al. studies (2009; 2014) were included as they measured an element of emotional competence in addition to social skills.

One study implemented a CB-E social –emotional ecological intervention for social-cognition capacities (Bauminger, 2007) and two studies implemented a modified version of Jr. Detective Program-Secret Agent Society (Thomson et al., 2015; Weiss et al., 2018) which focuses on social skill development in children with ASD. Three of the seven studies implemented the Building Confidence CBT programme (Fujii et al., 2013; Wood et al., 2019, 2014) which emphasises emotional regulation training and positive peer interactions. Two studies (Lee et al., 2019; Scarpa & Reyes, 2011) implemented a pilot study examining the efficacy of a modified CBT programme to develop emotion regulation strategies for reducing anger and anxiety. The latter study adapted the curriculum based on suggestions by the former study. Factor et al. (2019) implemented the Stress and Anger Management (STAMP) programme. The duration of intervention varied from nine weeks (Scarpa & Reyes, 2011) to seven months (Bauminger, 2007).

2.15 Intervention Fidelity

Interventions were delivered by trained therapists (Factor et al., 2019; Scarpa & Reyes, 2011; Thomson et al., 2015), graduates (Lee et al., 2019), post-doctoral students (Fujii et al., 2013) and clinical or educational psychology students (Wood et al., 2009, 2014). Implementation fidelity is essential in order to evaluate how an intervention is being adhered to according to its original model and the quality of delivery (Mihalic, 2004). The fidelity to the CBT interventions was evaluated in line with WoE A and B. Fidelity in six studies was particularly high (Fujii et al., 2013; Lee et al., 2019; Scarpa & Reyes, 2011; Wood et al., 2009, 2014; Weiss et al., 2018). A low fidelity weighting was given to two studies as the intervention was delivered by a class teacher with no stated training (Bauminger , 2007) or where no information was provided on fidelity (Factor et al., 2019). Those who delivered the interventions in Lee et al. (2019) and the remaining six studies were additionally supervised weekly

by a practicing psychologist or a professor of special education. Two studies also completed pilot sessions before the intervention began (Lee et al., 2019; Thomson et al., 2015). The former study utilised fidelity checklists with treatment fidelity ranging between 85-100% for all three groups. Five studies utilised observers who were blind to treatment (Bauminger, 2007; Fujii et al., 2013; Thomson et al., 2015; Wood et al., 2009; Weiss et al., 2018). This enhances treatment efficacy through the use of objective evaluations.

2.16 Intervention Measures for Emotional Domains: Reliability and Validity.

As part of the systematic evaluation, the reviewer considered the reliability and validity of the measures used by the researchers within WoE A. This is important in order to evaluate the measures used and their appropriateness for the target population (i.e. children with ASD). Validity is essential in evaluating if a concept, such as emotional regulation, is accurately measured while reliability evaluates the consistency of a specific measure (Heale & Twycross, 2015). A list of measures and a summary of each study can be found in Appendix B "Mapping the field".

Similar measures were used across studies to measure emotional regulation or emotional target skills. Child self-report on emotional regulation was measured using the Children's Emotional Management Scales (CEM; Zeman, Cassano, Suveg, & Shipman, 2010) in two studies (Thomson et al., 2015; Weiss et al., 2018). This scale measures inhibition, dysregulation and coping mechanism. Three studies assessed knowledge of emotional regulation strategies using open-ended vignette tasks (Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018). This included *Dylan is being Teased*, *James and the maths test* and *Ben and the bullies* (Attwood, 2004). Tasks such as these have been validated to assess the capacity of children with ASD to create appropriate emotional regulation strategies (Beaumont, Rotolone, & Sofronoff, 2015). Additionally, they are based on a conceptual theory of emotional regulation processes and therefore can be linked to the specific review question concerning emotional regulation outcomes of CBT interventions for school aged children with ASD. Parent reports of child emotional and behavioural difficulties were assessed using the Emotional Regulation Checklist (ERC; Shields & Cicchetti, 1997)

(Factor et al., 2019; Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018), and the Behaviour Assessment System for Children (BASC-2; Reynolds & Kamphaus, 2004). The ERC has been utilised effectively in ASD studies to examine how children with ASD manage their emotional experiences (e.g. Berkovitis, Eisenhower, & Blacher, 2017).

Lee et al. (2019) developed a parent rated emotional skills assessment and also administered the Behaviour and Emotional Rating Scale- Chinese version (BERS-Chinese; Epstein, 2000). One study also included parents perceived confidence ratings in relation to managing child emotionality (Factor et al., 2019). Additional emotional and social competency skills were measured using the Emotional Regulation and Social Skills Questionnaire (ERSSQ; Beaumont & Sofronoff, 2008; Weiss et al., 2018), the Social Skills Rating Scale and the Social Response Scale (Constantino & Gruber, 2005; Wood et al., 2009; 20014). The ERSSQ examines social skills and emotional regulation processes and has been found to have high internal consistency and concurrent validity amongst the target population (Einfeld et al., 2017). This was reflected within WoE-A. Three studies (Fujii et al., 2013; Weiss et al., 2018, Wood et al., 2009) utilised the Anxiety Disorders Interview Schedule-Parent (ADIS-P, Silverman & Albano, 1996). This measure has been used in various CBT trials for children with ASD and this is reflected in WoE A. Finally, in two studies (Thomson et al., 2015; Weiss et al., 2018) an evaluator blind to the aims of the study was used to assess symptomology posttreatment using the Clinical Global Impression Scale-severity and improvement (CGI, Guy, 1976). Studies which used multiple sources and/or methods received a higher rating for WoE A.

2.16.1 Social Validity. Social validity measures are important in intervention research particularly within special educational contexts in order to examine the social importance of intervention outcomes (Conroy, Stichter, Daunic, & Haydon, 2008 Horner et al., 2005; Snodgrass, Chung, Meadan, & Halle, 2018). One study included a measure of social validity (Lee et al., 2019) to survey intervention helpfulness, satisfaction and feasibility. The study used a five-point (1= not satisfactory to 5= very satisfied) parent measure which was developed by the authors and completed after the duration of the CBT intervention. Average intervention feasibility was 4.06

(SD=0.49), satisfaction was 4 (SD=0.45) and helpfulness on child social and emotional behaviours was 3.8 (SD=0.38).

2.17 Summary of Findings

In order to address the specific review questions, the author focused only on measures which gave an indication of the effectiveness of CBT interventions on emotional regulation outcomes. A summary of these findings are provided in Table 6. Overall, in the current review, there was a trend towards positive results for the effectiveness of CBT interventions on emotional regulation outcomes for children with ASD. Two studies (Wood et al., 2009; 20014) primarily focused on social competencies with an additional emotional regulation component. Their findings are noted in this section as research suggests that social ability incorporates skills such as emotional competence and improved emotional skills can increase social competence (Feng, Lo, Tsai, & Cartledge, 2008; Lee et al., 2019).

Table 6

Summary of Key Findings

Studies	Key Findings
Bauminger, 2007	Increased social behaviours, emotional knowledge and emotional recognition. Long term evaluation revealed maintenance of outcomes.
Factor et al., 2019	Child lability/negativity changed but regulation was not significantly changed. Parental confidence increased from pre-post treatment.
Fujii et al., 2013	In the CBT group 71% no longer met diagnostic criteria for anxiety disorder. A significant difference of treatment on anxiety severity for the CBT group.
Lee et al., 2019	Positive outcomes in children's emotional skills, emotional competence, communication and affective strength following intervention.
Scarpa & Reyes, 2011	Decreased negativity/lability on parent reported measures post CBT. Increased emotional regulation and better regulation of mood following intervention.
Thomson et al., 2015	Decreased child dysregulation following CBT intervention. Improvements in negativity/lability, internalising symptoms and increased adaptive behaviours. High programme satisfactory.
Weiss et al., 2018	Significant improvements on measures of emotionality, emotional regulation abilities and social skills. No changes reported on child reported measures of emotional regulation. Outcomes maintained at follow-up.
Wood et al., 2009	Parent reported autism symptoms were positively influenced following CBT for the intervention group. A trend favouring CBT on measures of social cognition.
Wood et al., 2014	A CBT programme for anxiety and social challenges. Large effect sizes for CBT group. No significant results for negative behaviours including avoidant responses and repetitive behaviours.

Table 7 displays a summary of studies with a reported effect size. Cohen's (1992) descriptors were used to judge the effect size reported (Small = 0.2; Moderate = 0.5; Large = 0.8). Effect sizes highlight the extent of differences post intervention and adds fundamental insights into the effectiveness of interventions in educational research (Hattie, 2008). Improvements in total coping, post CBT intervention, were found in three studies (Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018). Participants provided more appropriate coping strategies to scenarios (Scarpa & Reyes, 2011; Thomason et al., 2015) and a small effect (d=.26) was demonstrated on the Coping subscale of the CEM (Weiss et al., 2018). Small to medium significant effects were also demonstrated on measures of self-control post CBT in two studies (Bauminger, 2007; Scarpa & Reyes, 2011; Weiss et al., 2018).

Four studies demonstrated positive improvements on anxiety ratings post-CBT intervention. This included lower anxiety severity scores following CBT in comparison to the TAU group (Fujii et al., 2013), parental report of improvements in internalising behaviours (r=.30, p=.02) (Weiss et al., 2018) and improvements on clinician rated overall anxiety severity (Thomson et al., 2015; Weiss et al., 2018). Interestingly, Wood et al. (2009), explored the correspondence of anxiety reduction and ASD symptom improvements with regression models indicating that when anxiety severity decreased over time so did ASD symptoms. This evidence may illustrate the effectiveness of CBT on school aged children's core ASD symptoms.

No significant differences between groups on child reported emotional regulation measures or an increase in emotional regulation knowledge was found in Weiss et al. (2018). However, parents did report positive changes in their child's emotionality (ERC Lability), their ability to regulate emotions (ERSSQ) and improvements in aspects of symptomology. Factor et al. (2019) found similar results on parent reported emotionality measures post CBT intervention (t(9)=2.45, p=.03). In contrast, Bauminger (2007) found significant time effects on emotional knowledge and emotional recognition. Participants revealed an increased ability to explain complex emotions (F(2,17)=17.53, p<.001) and demonstrated improvements in basic emotions following CBT. Participants demonstrated reductions in Negativity and Lability subscales in Scarpa and Reyes (2011) and increased scores on emotional regulation following CBT. Similarly, less overall dysregulation was demonstrated by

Thomson et al. (2015) (t (12) = 2.14, p=.061). As the latter study utilised a small sample size and multiple comparisons, outcomes need to be interpreted with caution.

Although Fujii et al. (2013) did not report effect size for outcomes, a $\chi 2$ post treatment analysis revealed that 71.4% of the treatment group no longer met diagnostic criteria for their anxiety disorder in comparison to the treatment as usual (TUA) group. Similarly, Thomson et al. (2015) found significant improvements post intervention on number of diagnoses [t (12) =2.80, p.016] on the Anxiety Disorders Interview Schedule (ADIS-P-IV). Improvements were also observed on parent reported internalising symptoms [t (12) =3.18, p=.008], behavioural dysregulation [t (12) =2.38, p=*.035*)] and less overall dysregulation [t (11) =2.14, p=*.061*].

Four out of seven studies (Bauminger, 2007; Weiss et al. 2018; Wood et al., 2009; 2014) examined the efficacy of a CBT intervention on children with ASD's social cognition capacity and peer interactions. Participants in the intervention group in the Bauminger study (2007) demonstrated significant improvements in emotional regulation abilities in addition to a positive increase in social skills. The author observed a medium to large effect size (d=.79) with participants demonstrating more initiations and responses in eye contact and in sharing behaviour. Weiss et al., demonstrated a small effect of CBT on social interaction measures (d=.24) and cooperation (d=.21*)*. Participants in this study also provided fewer non-social solutions (F (1.18)=4.9, p<*.05, η2*=.21) and more social solutions (F(1.18)=4.74, p<*.05, η2*=.21) post-intervention. A medium to large effect (d=.77) was demonstrated on the SRS between control and intervention groups in Wood et al. (2009) with differences favouring CBT on Social Motivation, Social Awareness (ps=<.05) and Social Cognition (p=.10). Large effect sizes (1.34-1.62) were found in Wood et al. (2014). Participants in CBT doubled their rate of social interactions post-intervention and reduced their rate of solitary behaviour. No significant effect was demonstrated for Negative behaviour despite a medium effect size (d=.50). In one study (Lee et al., 2019) significant improvements with a large effect size were found on the BERS-Chinese on behavioural and emotional competencies including Affective Strength (Z=-1.49, p=.014), Intrapersonal Strength (Z=-1.69, p=0.34) and School Functioning (Z=-2.23, p=0.03) . Findings suggests that emotional regulation and its processes are a complex domain and may involve important social skills with poor regulation during

social situations resulting in maladaptive behaviours and social communication difficulties (Jahromi et al., 2012, 2013; Lee et al., 2019; Mazefsky & White, 2014).

Follow-up on the long term efficacy of outcomes following CBT were measured in only four studies (Bauminger, 2007; Factor et al., 2019; Weiss et al., 2018; Wood et al., 2009). Simple effects for positive interactions in the Bauminger study illustrated improvements between Time 1 and 3 (F (1, 15) =12.43, p <.01, η2=.45) and Time 2 and 3 (F (1, 15) =3.60, p=.07, η2=.19) while simple effects for low level interactions illustrated a significant decrease between pre-intervention and follow-up (F (1, 15) =12.43, p<.01, η2=.45). Wood et al. (2009) revealed similar results with all participants showing lower Social Responsiveness Scale (SRS) scores between three month follow-up and post-intervention. However, the study is limited due to a small sample size and possible parental report bias. Weiss et al. (2018) measured long term efficacy of emotional regulation outcomes with treatment gains maintained at ten-week follow-up for 28% of children who displayed improvement posttreatment. Although Factor et al., measured follow-up data, it was not sufficient to explore whether outcomes were maintained over time. Implications of overall study findings are highlighted in the conclusion.

Table 7

Summary of Effect sizes

Study	Source of evidence/outcome	Pre- Vs post intervention effect size	WoE D
Bauminger, 2007	*Social interaction measure*-Positive	.24	Low
	Low level	.21	
	Negative	.05	
	Emotion Inventory-		
	Overall knowledge	.63	
	Overall Audience	.08	
	Overall Specificity	.28	
	SSRS-T:		
	Cooperation	.21	
	Assertion	.45	
	Self-control	.51	
Factor et al., 2019	*Emotional Regulation Checklist:* Emotion Regulation subscale	.33	High
	Negativity/Lability subscale	.77	
Lee et al., 2019	*BERS-Chinese-Total*	.96	Medium
	Intrapersonal strength	1.11	
	Affective strength	.58	
	School functioning	1.13	

Scarpa & Reyes, 2011	*Emotional regulation checklist*: Emotion Regulation subscale	.05	Medium
	Negativity/Lability subscale	.15	
	Coping strategies (*Vignettes* Quantity Score)	.65	
	Behaviour monitoring - Duration in minutes per episode	.46	
	Frequency of episodes per hour	.05	
Weiss et al., 2018	*Children's emotion Management scale* (CEM):		High
	Inhibition	.18	
	Dysregulation	.15	
	Coping	.26	
	Emotional regulation checklist:		
	ER	.22	
	Lability/Negativity	.58	
	Emotional Regulation and Social Skills Questionnaire (ERSSQ)	.79	
	BASC-2:		
	Externalising	.08	
	Internalising	.43	
	Adaptive	.71	
	BSI	.52	
	ADIS-P:	.61	

	Total Diagnosis Overall severity *CGI*: Severity Improvement	.42 .60 .57	
Wood et al., 2009	*Social Response Scale* (SRS)	.77	Medium
Wood et al., 2014	*Observed social communication-related autism symptom severity:* Solitary, Any Peer Interaction, Positive or Appropriate Interactions with Peers, and Positive or Appropriate Response to Child by Peers Negative Behaviour	 *d*s ranged from 1.34 to 1.62 .50*	Medium

*Note: although *d*=.50, no significant effect was found.

2.18 Conclusions and Implications for Educational Psychology Practice and Policy

The purpose of this literature review was to evaluate the effectiveness of Cognitive Behavioural Therapy (CBT) interventions at improving emotional regulation outcomes for school aged children with Autism Spectrum Disorder (ASD). The review used an adapted version of the Kratochwill (2003) coding protocols from the APA Task Force on Evidence Based Interventions in School Psychology for group-based designs and Gough's (2007) weight of evidence (WoE) framework to systematically and rigorously evaluate the studies found.

Overall, the various CBT interventions had a wide range of positive outcomes, with small to approaching large effect sizes reported at post-intervention and follow-up stages. This may support other analyses which suggests that the effects of CBT are maintained beyond the termination of the intervention in a variety of disorders including childhood internalising disorders (see Butler, Chapman, Forman & Beck, 2006). However, only four studies measured the long term efficacy of outcomes following CBT (Bauminger, 2007; Factor et al., 2019; Weiss et al., 2018; Wood et al., 2009). Further research investigations are required to explore the maintenance effects of CBT interventions on emotional regulation outcomes for school aged children with ASD following the completion of an intervention. As discussed in the introduction, children with ASD have working memory deficits and difficulties with generalisation of learned strategies to novel situations. Investigating the maintenance of emotional regulation outcomes following CBT intervention may illustrate if the strategies learned during the intervention have been generalised to an individual's natural environment (National Research Council, 2001). This may be further supported by collecting data from multiple sources, such as the school and the home environment, to investigate transferability, if any, across different contexts.

All studies delivered the CBT intervention within a group format, with one study (Lee et al., 2019) delivering an additional four individualised sessions per participant post intervention. The outcomes of a group format were positive. This reflects previous research which highlights that a group structure is an effective and efficient approach for intervention delivery for children with ASD as it provides social opportunities within the therapeutic environment (Shaffer et al., 2019). Three of the studies did not include a comparison group. This can result in expectancy biases within CBT trials and consequently treatment effects need to be interpreted with caution in these studies (Ehrenreich-May et al., 2014; Thomson et al., 2015). Additional research with control groups would supplement the existing evidence of CBT intervention outcomes while also providing social interaction experiences.

2.18.1 Cognitive behaviour therapy interventions and emotional regulation outcomes. CBT interventions demonstrated a particularly positive effect for measures of emotional regulation with evidence demonstrating overall increased scores on emotional regulation measures. This included increases in inhibition,

decreased dysregulation (Thomson et al., 2015; Weiss et al., 2018) and improved self-control (Bauminger, 2007). In particular, significant treatment effects were found on emotional knowledge and emotional recognition (Bauminger, 2007). The evidence also highlights increased coping strategies and reductions on negativity and lability subscales following CBT intervention (Factor et al., 2019; Scarpa & Reyes, 2011). Given this evidence of poor emotional regulation in children with ASD with emotional problems including anger, anxiety and depression (Barnhill et al., 2000; Fujji et al., 2013; Rieffe et al., 2012) the current review demonstrates the feasibility of CBT interventions in addressing emotional regulation difficulties in school aged children with a diagnosis of ASD, despite being an area of limited appraisal. As only four studies implemented a CBT intervention to specifically address emotional regulation outcomes (Lee et al., 2019; Thomson et al., 2015; Weiss et al., 2018), additional research is required to specifically examine the outcomes of CBT on emotional regulation outcomes for individuals with ASD.

In comparison to improvements reported by parents, the trend illustrated that there was no significant improvement post CBT intervention on child reported emotional regulation measures, including emotional regulation knowledge (Thomson et al., 2015) or session helpfulness (Weiss et al., 2018). Parent reports post-intervention may have been influenced by a positive intervention experience while no significant differences on child-reports post-intervention may reflect a similar pattern to that observed in a recent meta-analysis of CBT interventions for children with ASD (Weston et al., 2016). The meta-analysis indicated that individuals with ASD may find self-reported measures difficult. This may be a result of associated communication and perspective taking difficulties (Weston et al., 2016). This highlights the importance of utilising measures which are reliable and have been validated for use with an ASD specific population. The use of a social validity measure with children who have ASD could further assess the acceptability and perceived helpfulness of the CBT intervention. Although one study (Lee et al., 2019) utilised a social validity measure, this was a parent-reported survey. Further research which addresses the perceived effectiveness of a CBT intervention from a child perspective could give insight into the social validity of an intervention and minimize the reported difficulty of completing self-reported measures. Additionally, only one of the eight studies

(Bauminger, 2007) collected data on school reported emotional regulation outcomes. Given that one in every 65 students in an Irish schools population has a diagnosis of ASD (NCSE, 2016), additional investigations are required to establish the efficacy of CBT interventions on emotional regulation outcomes from different system perspectives in order to facilitate a triangulation of findings.

2.18.2 Other observed outcomes. There is also emerging evidence in the current review for a positive effect of CBT interventions on social competence outcomes for school aged children with ASD (Bauminger, 2007; Wood et al., 2014). Large and significant post-intervention improvements were observed in measures of positive and appropriate peer interaction, appropriate response to peers and social problem solving with one study demonstrating that children in the CBT group doubled their rate of positive social interactions (Wood et al., 2014). As social communication and interaction deficits are a core diagnostic criteria for ASD (APA, 2013), having evidence-based interventions to facilitate practical social and emotion knowledge is essential. This may reflect previous research which highlights that social ability incorporates skills such as emotional competence and that emotion regulation skills deficits can impact social competence among children with ASD (Feng, Lo, Tsai, & Cartledge, 2008; Lee et al., 2019). Conceptually, CBT interventions which also address relational skills such as identifying others emotions may complement emotional regulation training (Lee et al., 2019).

2.18.3 Implications of settings. None of the current review studies were located within an Irish or European context. Seven studies were located in America (Fujii et al., 2013; Scarpa & Reyes, 2011;Thomson et al., 2015;Weiss et al., 2018; Wood et al., 2009, 2014), one study was located in Israel (Bauminger, 2007) and one delivered in China (Lee et al., 2019) indicating a level of generalisability across different languages and cultural settings. However, despite these consistent findings, caution must be taken when advising the use of these CBT interventions outside of these locations. Empirical data within an Irish and European context is therefore needed to support Educational Psychologists in selecting, implementing and evaluating CBT interventions in order to improve emotional regulation difficulties among school aged children with ASD.

2.18.4 CBT-based interventions and comorbid anxiety disorders. Investigating intervention effectiveness exclusively on diagnostic-driving methodologies can be problematic in distinguishing CBT interventions which address a combination of anxiety, emotional or behavioural difficulties (Weiss, 2014). Much of the CBT literature on ASD has focused exclusively on anxiety, anger or social skills (Ehrenreich-May et al., 2014; Sze & wood, 2007; Wood et al., 2014). While three studies included participants with a single diagnosis of ASD (Bauminger, 2007; Scarpa & Reyes, 2011), five included participants with a primary diagnosis of ASD and at least one comorbid anxiety disorder (Fujii et al., 2013, Wood et al., 2009, 2014). In some studies, children were included who did not have to reach clinical cut off for comorbid mood or behavioural disorders (Thomson et al., 2015; Weiss et al., 2018). Caution needs to be taken when determining whether improvements post-CBT intervention is due to changes in ASD symptoms or anxiety symptoms. However, evidence reports that up to 45% of children with ASD have a secondary diagnosis of anxiety (Simonoff et al., 2008). As CBT was originally designed to target such disorders, the current review may also highlight the effectiveness of CBT-based interventions for addressing anxiety in children with ASD.

2.18.5 Emotional regulation CBT interventions. Emotional regulation CBT interventions may facilitate improvements across presenting emotional and behavioural problems. Four out of the nine evaluated studies implemented specific emotional regulation CBT interventions (Factor et al., 2019; Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018) and found positive outcomes for school aged children with ASD who presented with emotional and behavioural difficulties. There exists extensive research on behavioural, and indeed social difficulties, in children with ASD but literature with an exclusive focus on emotional regulation is limited with any existing literature having a particular focus on early years (e.g. Jahromi, Meek, & Ober-Reynolds et al., 2012; Yack, 2016). Furthermore, none of the previous studies utilised the Zones of Regulation. Irish studies which utilise emotional regulation specific CBT interventions to address emotional regulation outcomes among school aged children with ASD have not so far been carried out.

Due to school system implementation, two studies did not incorporate a control/treatment as usual group (TAU) (Bauminger, 2007; Thomson et al., 2015),

initial group differences were noted in only two studies (Scarpa &Reyes, 2011; Weiss et al., 2018) and the waitlist condition was not identical to treatment condition in Fujii et al. (2013). Therefore, differences in intervention outcomes need be interpreted with care. Ethically, future studies which adopt a control group should adopt a waitlist control design in comparison to a treatment as usual (TAU) methodology with group differences detailed. A wait-list control design would allow for an examination of differences in emotional regulation between individuals receiving the CBT intervention and those waiting to receive the CBT intervention.

2.18.6 Conclusion. The preceding systematic review presents a critical account of the literature relevant to the topic of 'The effectiveness of cognitive behavioural therapy-based (CBT) interventions on improving emotional regulation outcomes of school aged children with a diagnosis of Autism Spectrum Disorder (ASD)'. The literature review is based on the relevance of CBT interventions on emotional regulation outcomes within a well-being practice and policy framework within an Irish educational and an educational psychology context. As described, emotional regulation is a critical component of well-being and it is associated with positive emotional, social and academic outcomes (Eisenberg, Spinrad, & Eggum, 2010; Nyklíček, Vingerhoets, & Zeelenberg, 2010). The literature review illustrates the factors contributing to emotional regulation difficulties in ASD and how this framework can inform CBT based interventions for treatment of school-aged children with ASD. The importance of adaptations to traditional CBT interventions and the targeting of autism specific deficits when working with children with ASD is explored. This therefore has implications for Educational Psychologists. Educational Psychologists need to consider the emotional, cognitive and language capacities of an individual with ASD when selecting a CBT intervention.

The studies included in the qualitative synthesis were summarised and their methodological quality appraised using Gough's (2007) weight of evidence (WoE) framework. In summary, evidence from the current review suggests that there are promising and beneficial effects for CBT interventions on emotional outcomes for school aged children with ASD and emotional regulation difficulties. Additionally, the current literature review suggests that emotional regulation deficits may help to

explain core emotional and social behavioural difficulties in children with ASD and that adapted CBT interventions can positively enhance emotional outcomes for school aged children. Literature gaps were also addressed.

Supplementary Irish and European studies which focus specifically on emotional regulation outcomes, in comparison to comorbid affective disorder specific interventions are necessary. This would add to the existing literature by extending the research to an Irish educational psychology context. Additionally, further research demonstrating the long-term maintenance effects after formal CBT intervention would additionally inform educational psychology practice by exploring the lasting emotional outcomes and investigating the transferability of learned strategies among this population. The social importance of a group implemented CBT intervention was also addressed. The concluding section describes the importance of adopting measures which are reliable and which have been validated for use with an ASD specific population. As additional outcome research accumulates, future systematic reviews will be required to examine the strength of emotional regulation CBT interventions at addressing core ASD symptoms.

2.19 The Current Study and Overall Aim

In summary, it is clear that there are positive outcomes of CBT-based interventions on emotional regulation outcomes of school-aged children with Autism Spectrum Disorders (ASD), despite being an area of limited evaluation. However, this has almost exclusively focused on anger and anxiety and research has not yet been conducted within an Irish or European context (Ehrenreich-May et al., 2014; Wood, Fujii, Renno & Van Dyke, 2014). Given the emotional regulation challenges among this population, discussed in the previous literature review, there is an increased need to examine the effectiveness of CBT for school-aged children with ASD.

The current study aims to evaluate the effectiveness of an emotional self-regulation intervention ‘The Zones of Regulation’ (Kuypers, 2011) on emotional regulation outcomes for school-aged children with ASD in Ireland. This intervention is based on an adapted Cognitive Behaviour Therapy (CBT). In comparison to interventions outlined in the literature review, the Zones of Regulation does not require

formal training or minimum qualifications and specifically focuses on the development of emotional regulation skills.

The current proposed research will provide empirical data on the efficacy of this intervention within an Irish context and help support Educational Psychologist's in selecting, implementing and evaluating interventions for children with ASD and emotional regulation difficulties.

The following are the main research questions:

- How effective is the Zones of Regulation programme at improving emotional regulation outcomes among school aged children with ASD?
- How effective is the Zones of Regulation programme at improving adaptive and maladaptive emotional regulation among school aged children with ASD?
- How effective is the Zones of Regulation programme at improving coping strategies of school-aged children with ASD?

3.0 Part Three: Empirical Paper

3.1 Introduction

There has been considerable increased interest in childhood mental health and emotional-wellbeing over the past decade (Greenberg, Domitrovich, & Bumbarger, 2001; Public Health England, 2015) with numerous frameworks and policies established at both a national and international level. For example, the 'Joint Action Mental Health and Wellbeing" is an EU Youth Strategy to promote mental health and emotion-wellbeing in schools (Joint Action Mental Health and Wellbeing, 2016) while one of the five national outcomes in the "Better Outcomes, Brighter Futures 2014-2020" (DCYA,2014) explicitly focuses on improving emotional well-being outcomes for children within an Irish context. Of late, the Draft Primary Curriculum Framework (NCCA, 2020), proposes to redevelop the curriculum areas to include well-being and endeavours to foster the holistic development of children by including emotional well-being as a key competency.

The promotion of positive emotional outcomes for children can also be seen in government services such as the Health Service Executive (HSE) and the National Educational Psychological Service (NEPS). Considerable attention has been given to continued professional development, interagency work and the establishment of well-being policies and frameworks including the "Wellbeing Policy Statement and Framework for Practice 2018-2023" (DES, 2019; HSE, 2008).

From an Educational and Child Psychology perspective, it is estimated that eight percent of children in Ireland have mental health and emotional-wellbeing difficulties which require direct interventions and that these children can present with additional educational needs developing from mental health challenges (Irish College of Psychiatrists, 2005, 2013; NCSE, 2014). Recent research also illustrates that children with special educational needs display significantly lower levels of well-being in comparison to peers without additional needs (NCSE, 2018). These groups include children with emotional difficulties such as children with a diagnosis of Autism Spectrum Disorder (ASD).

3.1.1 Autism Spectrum Disorder. Individuals with Autism Spectrum Disorder (ASD) often experience significant mental health and emotional-wellbeing

difficulties (Shaffer et al., 2019; Weiss et al., 2018). Over 40% of children with ASD meet the criteria for two or more psychiatric disorders which include externalising (e.g. ADHD) and internalising problems (e.g. anxiety) (Thomson, Riosa & Weiss, 2015; Simonoff et al., 2008).

ASD is a neurodevelopmental condition which is diagnosed on the basis of marked impairments in social communication and interaction as well as the presence of restricted and repetitive patterns of behaviour (APA, 2013). Symptoms must be present in the early childhood period, evident across multiple contexts and cause significant impairment in areas of adaptive functioning (APA, 2013). Rates of ASD diagnoses are found to be as much as five times higher in males in comparison to female diagnostic rates with transnational epidemiological research indicating that 0.66% of the population have a diagnosis of ASD (Carr, 2016). Within an Irish context, the National Council for Special Education (NCSE) found that 1.5% or 14,000 pupils have a diagnosis of ASD (NCSE, 2016).

In Ireland and the U.K, up to 30% of an Educational Psychologist's caseload comprises of delivering interventions for children with a diagnosis of ASD (Robinson, Bond, & Oldfield, 2018). The special educational needs of children with ASD include categories such as emotional and mental health, social, cognition and learning and sensory needs (DfE, 2015). One of the emotional and mental health needs of children with ASD is the regulation of emotions or *emotional regulation*. Emotional regulation is a critical component of overall well-being and is the focus of the current study.

3.1.2 Emotional regulation and ASD. Individuals with ASD often present with emotional regulation challenges. The previous literature review described the most widely used definition of emotional regulation as 'the intrinsic and extrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions…to accomplish one's goals' (Thompson, Lewis, & Calkins, 2008, pp.27-28). The model of emotional regulation can be described as a transactional process between and individual and their environment and involves controlled or automatic strategies implemented in response to stimuli which generate emotions (Gross & Thompson,2007; Weiss, Thomson, & Chan, 2014). The model looks at adaptive and maladaptive emotional regulation strategies across domains such as attention, cognitive change, situation selection and modification, and response modulation

(Gross & Thompson, 2007). This cognitive model of emotional regulation identifies both antecedent focused and response focused strategies. Antecedent focused emotional regulation strategies involve cognitive reappraisal, situation modification and attention while response focused emotional regulation strategies include the modification or suppression of emotions by changing the resulting behaviour (Gross & John, 2003; Gross & Thompson, 2007).

Emotional regulation is the developmental capacity to modify emotional expression and experiences in a socially adaptive and goal directed way (Eisenberg & Spinrad, 2004). The developmental profile of emotional regulation includes a child engaging in sensorimotor strategies to self-soothe, utilising language strategies to regulate emotional states and using meta-cognitive strategies to reflect on emotional states and express behaviour in a socially acceptable manner (Carr, 2016; Prizant, 2012). Parents play a significant role in this development as early strategies are influenced by observing and interacting with care givers (Kim, Stufter, Philbrook, & Teti, 2014; Morris, Silk, Steinberg, Myers, & Robinson, 2007). Parents use of soothing with young children, acceptance of expressed emotions and the promotion of opportunities for independent problem-solving has been associated with adaptive regulation strategies (Laurent & Gorman, 2018). As they develop, children increase their capacity to self-regulate and begin to depend more on cognitive and internal methods of regulation (Posner & Rothbart, 2000). At this stage children start to internalise social and environmental rules, and develop the ability to inhibit behavioural responses and display signs of strategies such as cognitive reappraisal (Carlson, 2005; Cole, Hall, & Hall, 2008). Adaptive emotional regulation strategies also incorporate assertiveness, problem-solving skills and behavioural activation (Kring & Sloan, 2009; Leahy et al., 2011). These positive emotional regulation strategies are associated with social competence, prosocial behaviour and positive academic outcomes. (Eisenberg, Spinrad,, & Eggum, 2010; Laurent & Gorman, 2018).

Difficulties with the regulation of emotions or emotional dysregulation can be defined as the inability to effectively regulate ones emotions (Samson et al., 2014). This can impact on adaptive functioning with poorer emotional regulation abilities linked to poorer mental health outcomes (Gross & Monoz, 1995). Emotional regulation difficulties are associated with externalising behaviours during childhood

and include increased physiological reactivity, poor impulse control and emotion modulation (Lauret & Gorman, 2018; White, Jarrett, & Ollendick, 2012).

Deficits in emotional regulation among children with ASD are associated with internalising and externalising difficulties (Dapretto et al., 2006; Eisenberg et al., 2001). They can display significant challenges with emotional regulation such as the inhibition of emotions, transitioning, managing emotions and delayed gratification (Baron, Groden, Groden, & Lipsitt, 2006; Laurent & Gorman, 2018). Emotional regulation deficits in ASD can present as significant behavioural outbursts and decreased social behaviour or reduced goal performance (Jahromi, Bryce, & Swanson, 2013; Laurent & Gorman, 2018; Mazefsky et al., 2013). They may also exhibit challenges in recognising and understanding their own and others emotions or mental states when compared to typical peers (Baron-Cohen, 1991; Jahromi, Meek, & Ober-Reynolds, 2012). This, in turn, can result in difficulties with problem-solving when faced with negative emotional experiences. Furthermore, this can regularly result in the use of maladaptive coping strategies (Jahromi, Meek & Ober-Reynolds, 2012; Shaffer et al., 2019).

Impaired emotional regulation among children with ASD may be associated with deficits in executive functioning, socioemotional and information processing, and atypical neuroanatomy (Bachevalier & Loveland, 2006; Mazefsky & Minshaw, 2010; Ni et al., 2018; Ozonoff, 1995). For example, individuals with ASD have been found to have difficulties attending to socioemotional cues such as recognizing emotions from facial expressions and, understanding and differentiating tone of voice or body language (Berggren et al., 2018). Emotional regulation difficulties have also been found to be related to cognitive flexibility, problem solving (Hill, 2008; Scarpa, White, & Attwood, 2013) and differential patterns of activation in the amygdala during the processing of emotions (Ashwin et al., 2007).

Collectively, emotional regulation challenges are often the primary referral reason for intervention and assessment in ASD clinical practice (Mazefsky et al., 2013; Samson, Hardan, Lee, Philips, & Gross, 2015). It is therefore essential that Educational Psychologists are aware of various approaches and interventions to support children with ASD with their emotional regulation needs. One therapeutic

approach which aims to improve these challenges faced by individuals with ASD is Cognitive Behavioural Therapy.

3.1.3 Cognitive Behavioural Therapy and ASD. Cognitive Behavioural Therapy (CBT) is considered an efficacious intervention for addressing affective challenges for children with ASD. Such interventions are based on cognitive models of psychological change and incorporate cognitive, behavioural and affective skill development (Bauminger, 2007; Wood et al., 2009). Cognitive Therapy practices originated from the work of Aaron Beck and are centred on the concept that maladaptive behaviours are a direct result of maladaptive thought patterns (Beck, 1970; McSweeney & Murphy, 2014; Plotnik & Kouyoumdjian, 2010; Rait et al., 2014). Although studies can vary in components, most CBT interventions include the use of cognitive restructuring, social skills, adaptive coping skills and problem solving strategies (Bauminger, 2007; Factor et al., 2019; Lee et al., 2019).

Polices such as "Supporting Students with Autism Spectrum Disorders in Schools" (NCSE, 2015) highlights research on effective interventions for students with ASD including behavioural therapy. CBT has been related to small to medium effect sizes when used to treat affective challenges with individuals with ASD (Weston, Hodgekins, & Langdon, 2016). In general, parental and clinician reports of reduced anxiety in children with ASD has been found following CBT intervention (Wood et al., 2009) as well as a reduction in reported outbursts of behaviours (Scarpa & Reyes, 2011) and improvements in social cognition and interaction (Bauminger, 2007) . In a review of 24 CBT studies exploring affective challenges among individuals with ASD, of which 17 included children or adolescents, few studies included self-reported measures (Weston, Hodgekins, & Langdon, 2016). More research is needed to address the effectiveness of CBT interventions on child reported measures of outcomes. The current study aims to establish the efficacy of a CBT intervention from different system perspectives by including home, school and child-reported measures.

Adaptations have been made to CBT interventions to support children with ASD including the increased use of visual information, explicit direction and use of memory aids, with further studies also utilising the principles of Applied Behavioural Analysis (ABA) and mindfulness techniques (Fujji et al., 2013; Lee et al., 20019;

Scarpa & Reyes, 2011; Shaffer et al., 2019). Additionally, CBT interventions which target autism specific characteristics can complement traditional CBT practices (Moree & Davis, 2010).

The present study utilises The Zones of Regulation CBT-based intervention. This curriculum is designed to focus on autism specific deficits by integrating the neurological processes of executive functioning, sensory supports and emotional regulation (Kuypers, 2011). Furthermore, The Zones of Regulation helps children with ASD to recognise situations when emotional regulation strategies should be implemented. This is important in addition to teaching specific emotional regulation skills with an intervention (Mazefsky et al., 2013). The intervention was developed to explicitly foster the emotional regulation capacities of students with neurobiological impairments including children with ASD (Kuypers, 2008). Results from previous research indicates that the intervention is feasible to implement at a whole class level or with individuals with ASD and it was also found to be effective in improving emotional regulation outcomes of children in terms of emotional expression (Anderson et al., 2017; McQuaid, 2020; Yack, 2016).

3.1.4 CBT-based interventions and emotional regulation: The current climate. Emotional regulation has been relatively neglected in ASD research until recently. Research has almost exclusively focused on anxiety or more on emotional experience as opposed to emotional regulation (Ehrenreich-May et al., 2014; Mazefsky et al., 2013; Sze & Wood, 2007) despite evidence of the aforementioned difficulties. Furthermore, a limited number of studies include the long term efficacy of outcomes following CBT intervention (Bauminger et al., 2007; Factor et al., 2019; Weiss et al., 2018; Wood et al., 2019). The current study was designed to explore the maintenance effects of a CBT-based intervention on emotional regulation outcomes in school aged children with ASD. The study also includes a control (waitlist) group to further supplement the existing evidence of CBT intervention outcomes and treatment effects (Factor et al., 2019; Fujii et al., 2013; Naeeni & Chowdhury, 2018; Wood et al., 2014).

Identifying a reliable link between interventions utilised in professional practice and their research base is a fundamental role for Educational Psychologists (Fox, 2003). The previously discussed model of emotional regulation has also been utilised in the development of CBT interventions for children (Gross & Thompson, 2007; Weiss et al., 2014). The previous systematic review highlights the extensive range of positive outcomes on emotional regulation measures at post-CBT intervention stages, despite being a topic of limited appraisal. Outcomes include improved self-control (Bauminger, 2007), greater inhibition, increased regulation (Thomson et al., 2015; Weiss et al., 2018) and increased coping strategies (Scarpa & Reyes, 2011). Bauminger (2007) also found significant intervention effects on emotional knowledge and recognition while other studies observed reductions on negativity and lability scores following intervention (Factor et al., 2019; Scarpa & Reyes, 2011).

Despite these positive trends of outcomes, recent research in the field of Educational Psychology indicates that psychologists are not regularly involved in delivering several evidence-based interventions including CBT (Robinson & Bond, 2017; Robinson et al., 2018). This paper presents empirical evidence on the effectiveness of a CBT-based interventions on emotional regulation outcomes for school-aged children with ASD. The aim of the study is to inform intervention planning for children with ASD and support the use of CBT-based interventions within an Irish Educational and Psychological context.

Given the previously reviewed literature and the current national climate which aims to address school-aged children's mental health and emotional wellbeing, particularly among those who have additional needs, further exploration of the effectiveness of CBT interventions to address children with ASD's emotional regulation challenges within an Irish context is warranted.

The key questions for this research project were:

- How effective is the Zones of Regulation programme at improving emotional regulation outcomes among school aged children with ASD?
- How effective is the Zones of Regulation programme at improving

adaptive and maladaptive emotional regulation among school aged children with ASD?

- How effective is the Zones of Regulation programme at improving coping strategies of school-aged children with ASD?

3.2 Method

3.2.1 Study design. A quasi-experimental delayed intervention (wait-list control) design was used to explore the effectiveness of the Zones of Regulation (the independent variable) on emotional regulation outcomes (the dependent variable) of school-age children with ASD. A wait-list control design was consistent with the theoretical foundations of the research and therefore, for ethical purposes, the control group were offered the same intervention as the experimental group. Participants were recruited from the 24th January 2019 from three upper primary school classrooms in one school. Informed consent was obtained from the school, parents, three classroom teachers and special needs assistants (SNA's). Informed consent and assent was also obtained from each child participant. These can be found in Appendix L and Appendix H. Participants from the three classrooms were divided into two groups by the classroom teachers.

3.2.2 Participants. Participants included a non-random sample of 12 primary school children with a clinical diagnosis of ASD, their parents/carers and three classroom teachers. The sample was recruited from three ASD classrooms in the Republic of Ireland. Children were predominantly male (male: *n*=9, 75%; female *n*=3, 25%) and ages of participants ranged from 9-12 years of age (*M*= 10.67, *SD*= 1.07). For ethical reasons, the remaining two class pupils, who had a clinical diagnosis of Emotional Behavioural Difficulties (EBD), were also included in the intervention. As per school eligibility criteria, participants demonstrated Low Average or Above Average intellectual functioning (Full Scale IQ 80+). In terms of support levels, the sample fell within Level 2-requiring substantial support (APA, 2013). This criteria of the school enrolment policy can be found in Appendix S. There were no reported language difficulties, as reported by class teachers, and all participants had fluent verbal expression.

3.2.3 Measures and social validity. Emotional regulation was explored using multiple measures and multiple sources. In order to measure the views of

children in the research **the Children's Emotion Management Scales** (CEM; Zeman, Cassano, Suveg, & Shipman, 2010) was used. This child self-reported scale which measures the emotional states of Sadness (12 items), Anger (11 items) and Worry (10 items). Each emotional state is divided further into Inhibition (e.g. "I hold my anger in"), Dysregulation (e.g. "I say mean things to others when I'm mad") and Coping mechanisms (e.g. "I can stop myself from losing my temper"). Children rate the frequency of each item using a 3-point Likert scale ranging from 1= "hardly ever" to 3= "often". Item two on the Worry scale is reverse scored. Higher scores reflect greater levels of inhibition, dysregulation and coping. This scale has previously demonstrated initial validation of reliability and validity. It has also previously shown good internal consistency in the target population (α= .62 - .87) (Thomson et al., 2015; Weiss et al., 2018; Zeman et al., 2010).

A measurement of pre- and post-intervention child emotional regulation was measured using **the Emotional Regulation and Social Skills Questionnair**e (ERSSQ; Beaumont & Sofronoff, 2008). This measure is used to assess emotional regulation processes and social skills of children with ASD. Both the parent (27 items) and teacher (25 items) (ERSSQ-P and ERSSQ-T) versions were adopted in order to facilitate a triangulation of overall findings. Emotional regulation is measured using a 5-point Likert scale ranging from 0= "never" to 4= "always". Two items (six and 15) are reverse scored on the ERSSQ-P and items five and 13 are reverse scored on the ERSSQ-T. After reverse scoring, responses to all items are combined to yield a total score. Higher total scores indicate higher levels of skill. The ERSSQ-P includes statements about emotional regulation such as "Is aware of other people's thoughts and feelings" and "Controls his/her anxiety effectively at home" while the ERSSQ-T includes statements such as "Considers the consequences of his/her behaviour before acting" and "Uses effective strategies to deal with feelings of sadness and disappointment". The ERSSQ-P has demonstrated high internal consistency (α = .89) and concurrent validity among parents of children and young adults with a diagnosis of ASD and the ERSSQ-T has also previously demonstrated good concurrent validity (r = .72) (Einfeld et al., 2017).

Parent reports of child emotional regulation were also assessed pre- and post-intervention using **the Emotional Regulation Checklist** (ERC; Shields & Cicchetti,

1997). The ERC (24 items) explores current frequencies of child behaviours on a scale from 1 (rarely/never) to 4 (almost always). The scale contains two subscales, Lability/Negativity and Emotional Regulation. The Lability/Negativity subscale (ERC-LN) assesses intense and negative emotions, the expression of emotions and lack of flexibility. Items include statements such as "Is easily frustrated" and "Exhibits wide mood swings". Higher scores reflect greater difficulty with regulation. Items 4, 5, 9 and 11 are reverse scored. The Emotional Regulation subscale (ERC-ER) assesses overall mood, measures empathy and assesses a child's understanding of emotions. Items include statements such as "Is a cheerful child" and "Displays appropriate negative affect in response to hostile, aggressive or intrusive play". Items 16 and 18 are reverse scored. The Emotional Regulation Checklist has been previously utilised in the targeted population in several studies (e.g. Berkovits et al., 2017, Scarpa & Reyes, 2011; Weiss et al., 2018). The scale has previously show good internal consistency (ERC-LN: α=0.96; ERC-ER: α=0.83) and validity (Berkovits et al., 2017; Shields & Cicchetti, 1997).

Social validity measures are particularly important in intervention research within special education in order to examine the social importance of intervention outcomes (Horner et al., 2005; Snodgrass, Chung, Meadan, & Halle, 2018). The researcher developed a social validity measure to gain insight into the feasibility of the intervention and qualitatively assess the acceptability and perceived helpfulness of the intervention (see Appendix E). The two class teachers rated statements such as "The intervention would be good to use with other students", "I am pleased that my class participated in the study" and "The strategies in the intervention are easily implemented in a classroom situation". This was measured using a 5-point Likert scale ranging from 1= "Strongly Disagree" to 5= "Strongly agree". In order to include the views of the participating children, they were informally asked about their opinions, likes and dislikes following the intervention. This was completed in a group format within the classroom environment.

3.2.4 Procedure. The Mary Immaculate Research Ethics Committee (MIREC) ethically approved this study on 24th January 2019. Consideration was given to gaining informed consent, confidentiality and the right to withdraw from the

research. Teachers and parents were given information and consent sheets in order to support them in making an informed decision about taking part in the research. Following this, the researcher prepared simplified age-appropriate information and consent forms for the children recruited (see Appendix H). The researcher met the children, in their school environment, prior to the commencement of the intervention in order to establish rapport.

The researcher, a psychology graduate and second year Educational and Child Psychology student, delivered the intervention to the CBT intervention group and Waitlist group between 1st February and 7th June 2019. The intervention was delivered within the classroom environment with their respective teachers and special needs assistants (SNA) present. The student: teacher ratio was 1:6 with six children in each classroom. Every participant had the right to withdraw from the research at any stage. This was checked throughout the process.

After completing baseline measures on the CEM, ERSSQ and ERC, each group were randomly assigned to either the immediate CBT group (*n*=8; 6 ASD, 2 EBD) or the six week Waitlist group (*n*=6). All measures were completed pre- and post-intervention for both groups. The CBT group received the intervention between Time 1 and Time 2. The waitlist-control group received the intervention between Time 2 and Time 3 (see Table 9). A nine week follow-up measure was also administered to the CBT intervention group directly following the completion of the Waitlist intervention. Participants in the Waitlist group did not have a follow-up time point.

All outcome measures were returned by children and teachers in both groups at each of the three time points (*n*=72). Parent outcome measure returns were higher in the intervention group (16/18) than returns from the control/waitlist group (9/18). Participants completed the intervention in five-six weeks. All children received the same intervention and the intervention was delivered within the class environment with the class teacher and SNA's present throughout.

Table 8

Timeline for CBT group and waitlist-control group

	Time 1	**Time 2**	**Time 3**
CBT group	Pre-intervention *ERC* *ERSSQ-T* *ERSSQ-P* *CEM*	Post-intervention *ERC* *ERSSQ-T* *ERSSQ-P* *CEM*	Follow-up *ERC* *ERSSQ-T* *ERSSQ-P* *CEM*
Waitlist-control	Pre-waitlist *ERC* *ERSSQ-T* *ERSSQ-P* *CEM*	Post-waitlist *ERC* *ERSSQ-T* *ERSSQ-P* *CEM*	Post-intervention *ERC* *ERSSQ-T* *ERSSQ-P* *CEM*

3.2.5 Intervention and materials. The researcher implemented *The Zones of Regulation.* The intervention was delivered over a condensed period of time in order to accommodate the school holidays and to deliver the intervention to the control group in a timely manner following their waitlist period. This curriculum is designed to enhance self-regulation and emotional control in children and young adults (Kuypers, 2011). This 18 lesson curriculum is based on a Cognitive Behavioural Therapy (CBT) framework that targets regulation skills which results in increased impulse control and greater problem solving abilities. The lessons in the Zones of Regulation include several instructional strategies such as whole and small group instruction, games, videos, and independent activities to practice self-regulation strategies. The Zones of Regulation also targets autism specific deficits. It integrates three critical neurological processes: executive functioning, emotional regulation, and sensory supports. The intervention is based on evidence such as Michelle Garcia Winner's Social Thinking philosophy and approach to teaching social cognition (Winner, 2000). Theory of Mind, systemising theory (Baron-Cohen, 2006), the Incredible 5-Point Scale (Buron & Curtis, 2012), the Alert Programme (Williams & Shellenberger, 1996) and the central coherence theory (Frith, 1989) also influenced the Zones development. In line with these approaches, the current intervention

provides a concrete way to explore the abstract concepts of emotions by categorising emotions and levels of alertness in a systematic manner to assist understanding and learning for individuals with ASD. Furthermore, the Zones of Regulation expands on the Alert Programme by focusing on teaching skills, social cognition and emotional regulation. It also builds on the Incredible 5-Point Scale by including learning activities to enable children to control their impulses and increase their problem-solving abilities (Kuypers, 2011).

Children learn how to independently self-monitor and reflect on their level of alertness, reflect on how their behaviour affects themselves and those around them while also learning adaptive coping strategies. Children do this by recognising when they are in the four different states or 'Zones'. The four zones are visually categorized into how an individual's body and brain feel (Kuypers, 2011):

- The Blue Zone: When the body is running slow (e.g. sick, tired)
- The Green Zone: A well-regulated state (e.g. happy, calm).
- The Yellow Zone: When an individual starts to lose control (e.g. anxious, worried).
- The Red Zone: A state of extreme emotions (e.g. angry, terrified).

Materials include a detailed manual describing each session, parent information sheets and printable student handouts including calming and cognitive strategies and sensory supports. Each lesson includes details on how to adapt or differentiate the activities for different age groups or developmental levels. Examples of differentiated lesson handouts can be found in Appendix T. Table 8 summarises the format and goals for each of the six sessions and indicates the regulation strategies involved.

No formal training is required to deliver the intervention. The researcher had previous experience of delivering the intervention on several occasions in an individual and group intervention format. The intervention in this study was delivered over six consecutive weeks to the CBT intervention group and delivered over five consecutive weeks for the wait-list control group. Participants in the wait-list control group received their regular lessons during the six-week intervention. Each session consisted of two/three zones lessons over one-and-a-half-hours with a break in

between each lesson. This reflects literature examining adaptations to CBT interventions for children and young adults with ASD (Walters, Loades, & Russell, 2016).

3.2.6 Fidelity. Intervention fidelity to the manual was monitored by the authors' completion of the implementation and fidelity checklist which included session specific components. Intervention fidelity was particularly important due to the shortened time frame of intervention delivery. The form was used to monitor the adherence, quality and level of exposure based on the setting and type of learner. The adherence focused on how the researcher accurately delivered the programme while the quality focused on how competently programme elements were administered. This was further broken down into how the researcher prepared, structured, facilitated and evaluated each lesson. Two teachers also completed the checklist to further address fidelity and implementation while observing the intervention.

Table 9

Overview of the Zones of Regulation sessions and goals

Sessions	Zones Lessons	Goal
1	• Creating wall posters of the zones. • Zones Bingo	Increase emotion vocabulary and recognition of facial expressions.
2	• The Zones in video • The Zones in me	Gain an awareness of other's perspectives, learn how their behaviour can affect other's feelings and identify themselves in the zones.
3	• Understanding different perspectives • Me in my zones • How do I feel	Learn how their behaviour can affect other's feelings, thoughts and zones, reflect on the impacts of regulating their emotions.
4	• My zones across the day • Caution! Triggers ahead • Exploring tools for calming	Recognise their personal triggers, learn and try out calming techniques including breathing strategies.
5	• Exploring sensory support tools • Exploring tools-Thinking strategies	Gain an insight about how sensory supports can help regulate emotions, explore positive and negative self-talk, looking at the size of a problem and looking at thinking patterns.
6 *	• The tool box • When to use yellow zone tools	Understand that they can engage in various strategies to change their zone and self-regulate. Learning to track tools.

*This session included stopping and using tools (lesson 15/16 of manual). Please note that lesson 18 is a progressive lesson which was incorporated within the final sessions as per manual guidelines (Kuyper, 2011)

3.3 Results

3.3.1 Analysis. The data was analysed using the Statistical Package for the Social Sciences Version 26 (SPSS 26). The primary analysis was a mixed analysis of variance (ANOVA) with one between-group factor (intervention (CBT) v Waitlist (WL)) and one within-group factor (time (T); consisting of three time points). Parametric assumptions were met on all parent-, teacher- and child-reported measures as indicated by Mauchly's test of sphericity. The *p* value was considered significant when $p=<.05$. Effect sizes were established using the partial eta-squared.

All outcome measures were returned by children and teachers in both groups at each of the three time points. As parent outcome measure returns were higher in the intervention group (T1 $n=6$; T2 $n=5$; T3 $n=5$) than the waitlist group (T1 $n=2$; T2 $n=3$; T3 $n=4$), inferential statistics could not be completed. Descriptive statistics were therefore used to describe the findings of the parent-reported measures.

3.3.2 Initial Difference. At T1, all intake measures were compared between the CBT group and the Waitlist group. Independent samples *t*-tests were used to investigate any initial mean group differences before intervention on the ERC, CEM and ERSSQ. Results revealed no significant pre-intervention differences on any of the measures at T1 (all p's $> .05$). Table 10 shows the results of the analysis.

Table 10

Initial comparison by group at Time 1

	CBT ***M*** **(SD)**	**WL** ***M*** **(SD)**	***t*** **(df)**	***p*****-value**
ERSSQ-P	64.67 (17.69)	59.50 (10.61)	0.38(6)	0.72
ERSSQ-T	54.00 (10.80)	48.40 (3.36)	1.11(10)	0.29
ERC-LN	33.17 (5.71)	26.50 (9.19)	1.27(6)	0.25
ERC-ER	24.17 (1.17)	25.00 (4.24)	-0.50(6)	0.63
CEM-Coping	23.43 (5.41)	26.80 (2.59)	-1.28(10)	0.23
CEM-Dysregulation	15.43 (2.44)	13.00 (3.32)	1.47(10)	0.17
CEM-Inhibition	23.71 (6.80)	23.80 (5.76)	-0.23(10)	0.98

P=Parent, T=Teacher; LN= Lability/Negativity; ER= Emotional Regulation, WL= Waitlist Group, CBT=Intervention Group

The following sections will address the results from teacher-, parent- and child-reported emotional regulation measures. Each section will firstly examine inferential statistic results (where appropriate). The sections will then report the descriptive statistic trends from the CBT group followed by the Waitlist group findings. The final section will examine the social validity measure outcomes.

3.3.3 Teacher-report measures. A mixed ANOVA was conducted to explore the effect of the intervention on teacher-reported emotional regulation outcomes using the ERSSQ-T. Results showed no statistically significant interaction effect between time and group ($F(2,20)=3.02$, $p=.07$, $\eta p2= .23$). Moreover, no significant difference was found between the CBT and Waitlist groups ($F(1,10)=1.22$, $p=.30$, $\eta p2= .11$). The means and standard deviations are presented in Table 11.

Table 11

Emotional Regulation and Social Skills Questionnaire- Teacher Version (ERSSQ-T) means at Time 1,2 and 3.

	Time 1 Pre-intervention/Pre-waitlist		Time 2 Post-intervention/Post-waitlist		Time 3 Follow-up/Post-intervention	
	CBT ***M (SD)***	**WL** ***M (SD)***	**CBT** ***M (SD)***	**WL** ***M (SD)***	**CBT** ***M (SD)***	**WL** ***M (SD)***
ERSSQ-T	54.00 (10.80)	48.40 (3.36)	52.71 (10.01)	44.20 (5.97)	54.71 (9.32)	53.20 (6.50)

For CBT, *n*=7; for WL, *n*=5. Higher total scores indicate higher levels of skill.

However, the results did find a significant effect over time within groups (ηp2= .43). Follow up analysis looked at the CBT and Waitlist groups separately. No significant difference was found within the CBT group scores across T1 (*M*=54.00, SD=10.80), T2 (*M*=52.71, SD=10.01) or T3 (*M*=54.71, SD=9.32).

However, a significant difference was found within the Waitlist group scores over time ($F(2,20)=7.39$, $p=.004$, ηp2= .43). No significant difference was found between T1 (*M*=48.40, SD=3.36) and T2 (*M*=44.20, SD=5.97) (i.e. during treatment as usual). A significant large effect of time was found between T2 (*M*=44.20, SD=5.97) and T3 (*M*=53.20, SD=6.50). Specifically, these descriptive statistics showed an increase in teacher-reported emotional regulation outcomes for the Waitlist group following intervention (see Figure 4).

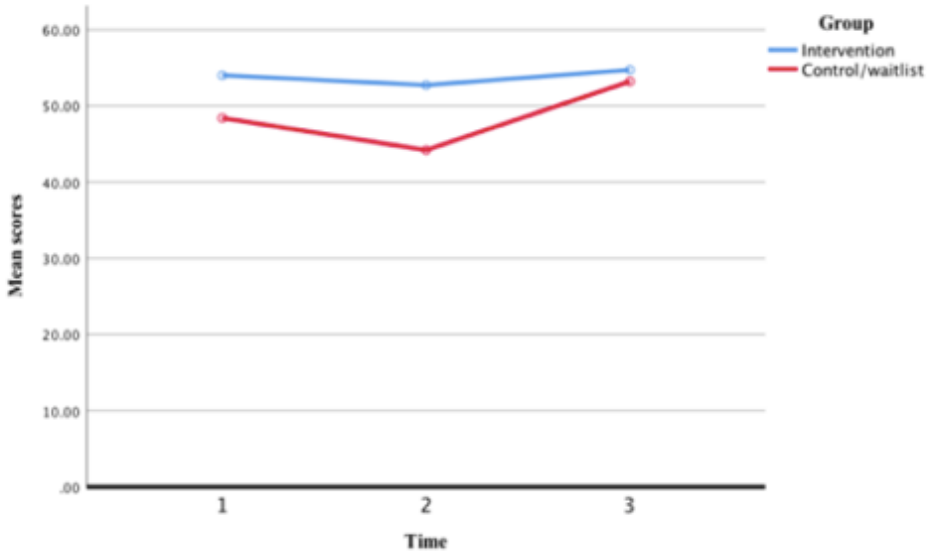

Figure 4. ERSSQ-T means across time

3.3.4 Parent-report measures. The following section examines the effect of the intervention on parent-reported emotional regulation outcomes using the ERSSQ-P and the ERC. The ERSSQ-P was used to explore the effect of the intervention on emotional regulation and social skills outcomes. The ERC subcomponent of *emotional regulation* was used to specifically explore the effect of the intervention on emotional regulation outcomes while the subcomponent of *lability/negativity* was used to explore the effect of the intervention on measures of intense and negative emotions, the expression of emotions and mental flexibility. Parent questionnaire returns were not forthcoming and consequently it was not feasible to compare outcomes on the two parent-reported questionnaires over time using inferential statistics. At T1 eight parent forms were returned (n=8, 66%), at T2 66% of parent forms were returned (n=8) and at T3 only 75% (n=9) of parent forms were returned. Means and standard deviations for all parent-reported measures are presented in Table 12.

Table 12

Parent-reported means at Time 1,2 and 3.

	Time 1 Pre-intervention/Pre-waitlist		Time 2 Post-intervention/Post-waitlist		Time 3 Follow-up/Post-intervention	
	CBT ***M (SD)***	**WL** ***M (SD)****	**CBT** ***M (SD)***	**WL** ***M (SD)***	**CBT** ***M (SD)***	**WL** ***M (SD)***
ERSSQ-P	67.50 (21.89)	67.00 (-)	61.25 (11.36)	59.00 (-)	59.50 (13.53)	62.00 (-)
ERC-LN	33.50 (5.07)	33.00 (-)	29.75 (7.27)	33.00 (-)	28.75 (8.06)	29.00 (-)
ERC-ER	24.50 (1.30)	28.00 (-)	25.50 (2.89)	26.00 (-)	24.00 (5.10)	29.00 (-)

ERSSQ-P= Emotion Regulation and Social Skills Questionnaire Parent, LN= Lability/Negativity; ER= Emotional Regulation. * Standard Deviations not applicable as *n*=1 in Waitlist.

ERSSQ-P. The CBT group's mean scores decreased on parent reported emotional regulation and social skills between T1(*M*=67.59; SD=21.89) and T2 (*M*=61, SD=11.36) (i.e. directly after intervention) and again at follow-up (T3; *M*= 59.50, SD=13.53).

A similar decline was seen in the Waitlist group scores during treatment as usual between T1(*M*=67) and T2 (*M*=59). The parent who completed the questionnaires across all three time points reported an increase in mean scores between T2 (*M*=59) and T3 (*M*=62) (i.e. directly after intervention).

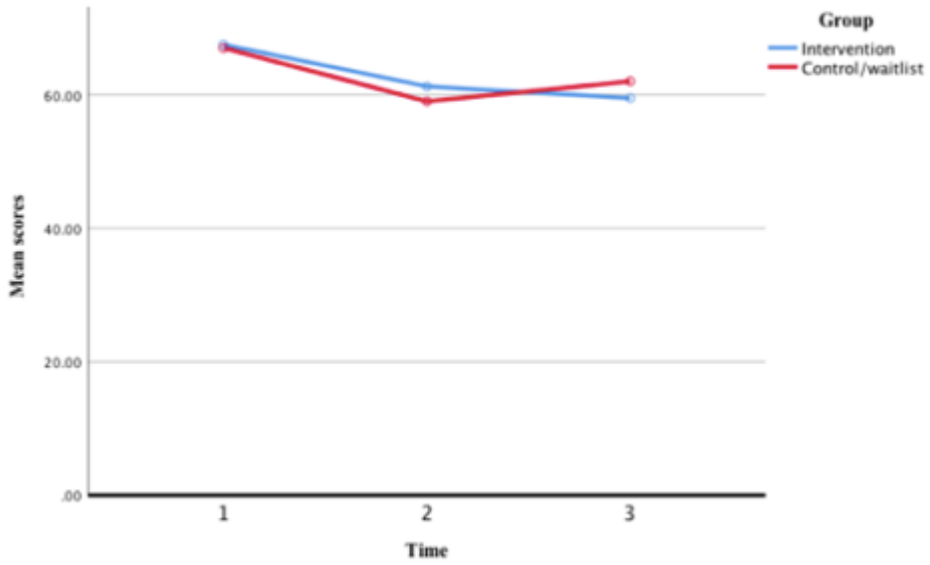

Figure 5. ERSSQ-P means across time

(Lower total scores indicate lower levels of emotional regulation)

ERC-ER. The interaction effect between time and group was approaching significance (p=.05). However, these are not reported in full because of low cell size in the Waitlist group. As depicted in Figure 6, the CBT group scores increased slightly on mean emotional regulation scores following intervention between T1(M=24.50, SD=1.30) and T2 (M=25.50, SD=2.89) but were not maintained at T3 (M=24.00, SD=5.10).

The Waitlist group mean scores decreased between T1 (M=28) and T2 (M=26) (treatment as usual). The Waitlist participant's mean emotional regulation score increased following intervention at T3 (M=29).

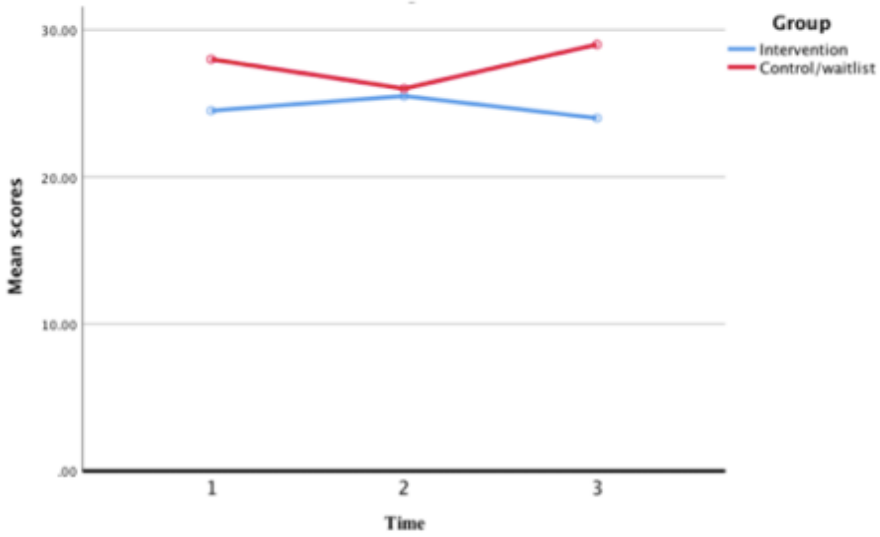

Figure 6. ERC-Emotional Regulation scores across time

(Higher scores reflect higher emotional regulation and understanding of emotions)

ERC-LN. Figure 7 depicts the trends for parent reported measures of lability/negativity. The CBT group mean scores decreased between T1(*M*=33.50, SD=5.07) and T2 (*M*=29.75, SD=7.27) and decreased again at follow-up (T3; *M*= 28.75, SD=8.06).

No change was reported in the Waitlist participant's mean lability/negativity score during treatment as usual between T1 and T2 (*M*=33) but scores did decrease following intervention completion between T2 (*M*=33) and T3 (*M*=29).

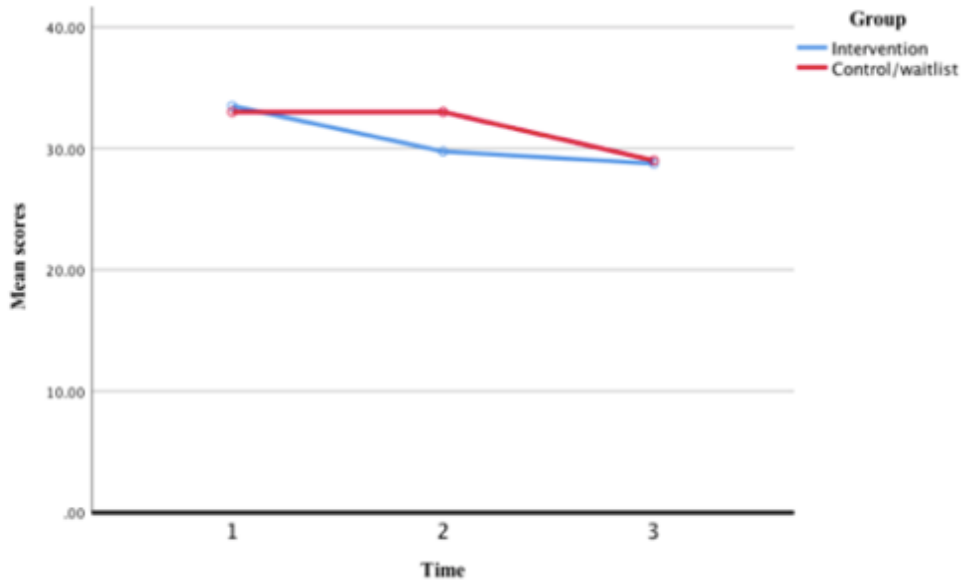

Figure 7. Lability/Negativity scores across time

(Lower scores indicate a reduction in negative emotions and inflexibility)

3.3.5 Children's self-report measures. A mixed ANOVA was conducted to explore the effect of the intervention on children's self-reported emotional regulation outcomes using the CEM subcomponents of Coping, Dysregulation and Inhibition. The means and standard deviations are presented in Table 13.

Table 13

Children's Emotion Management scale (CEM) means at Time 1,2 and 3.

	Time 1 Pre-intervention/Pre-waitlist		Time 2 Post-intervention/Post-waitlist		Time 3 Follow-up/Post-intervention	
	CBT	**WL**	**CBT**	**WL**	**CBT**	**WL**
	M (SD)	***M (SD)***	***M (SD)***	***M (SD)***	***M (SD)***	***M (SD)***
CEM-Coping	23.43 (5.41)	26.80 (2.59)	25.14 (3.53)	26.00 (4.06)	25.29 (5.50)	27.00 (3.39)
CEM-Dysregulation	15.43 (2.44)	13.00 (3.32)	14.43 (4.43)	12.40 (2.19)	13.14 (1.95)	12.60 (2.41)
CEM-Inhibition	23.75 (6.30)	22.17 (6.52)	24.13 (4.52)	21.33 (7.66)	21.75 (5.80)	19.83 (8.89)

For CBT, *n*=7; for WL, *n*=5.

Coping. The results showed no statistically significant interaction effect between time and group (F (2,20)=. 65, p=. 53, ηp2= .06). There was a non-significant main effect of time F (2,20)= .42, p=. 66, ηp2= .04. Moreover, no significant difference was found between the CBT and Waitlist groups (F (1,10)= .81, p= .39, ηp2= .08).

Figure 8 depicts the descriptive statistics trends for self-reported measures of coping. The CBT group mean scores increased between T1 (M=23.43, SD=5.41) and T2 (M=25.14, SD=3.53) (i.e. directly after intervention) and remained stable at follow-up (T3; M= 25.29, SD=5.50).

The Waitlist group mean scores remained relatively stable during treatment as usual between T1(M=26.80, SD= 2.59) and T2 (M=26.00, SD=4.06). The Waitlist group mean scores slightly increased at T3 (M=27.00, SD=3.39).

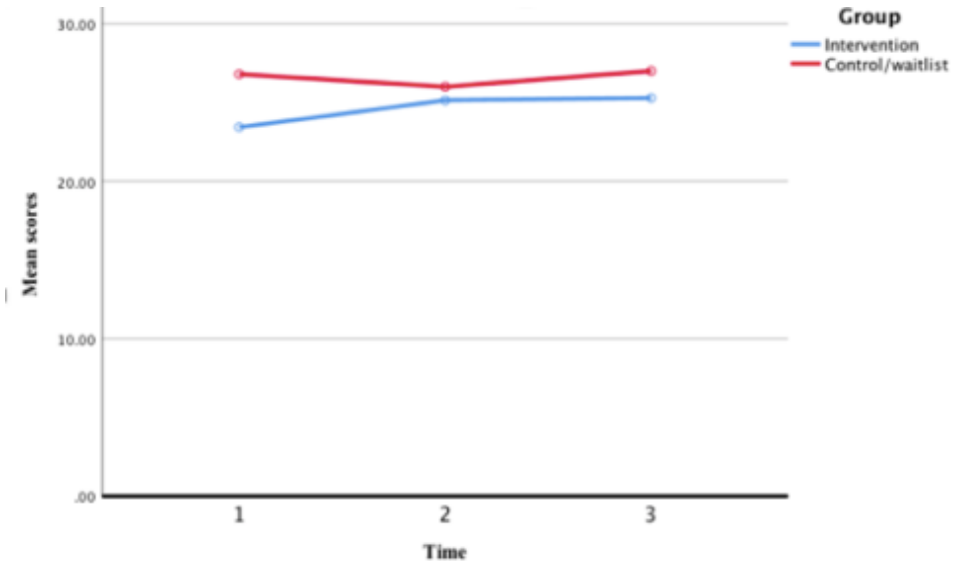

Figure 8. CEM-Coping means across time

(Higher scores reflect greater levels of coping)

Inhibition. The results showed no statistically significant interaction effect between time and group (F (2,20)=. .54, p=. 59, ηp2= .05). There was a non-significant main effect of time (F (2,20)= .75 p=. 48, ηp2= .07). Moreover, no significant difference was found between the CBT and Waitlist group (F (1,10)= .30, p= .60, ηp2= .03).

Figure 9 depicts the descriptive statistics trends for self-reported measures of inhibition. The CBT group mean scores increased between T1 (M=23.75, SD=6.30) and T2 (M=24.13, SD=4.52). The CBT group's mean scores decreased at follow-up (T3; M= 21.75, SD=5.80) indicating a reduction in emotional suppression.

The Waitlist group mean scores decreased on self-reported inhibition skills across T1 (M=22.17, SD= 6.52), T2 (M=21.33, SD=7.66) and T3 (M=19.83, SD=8.89).

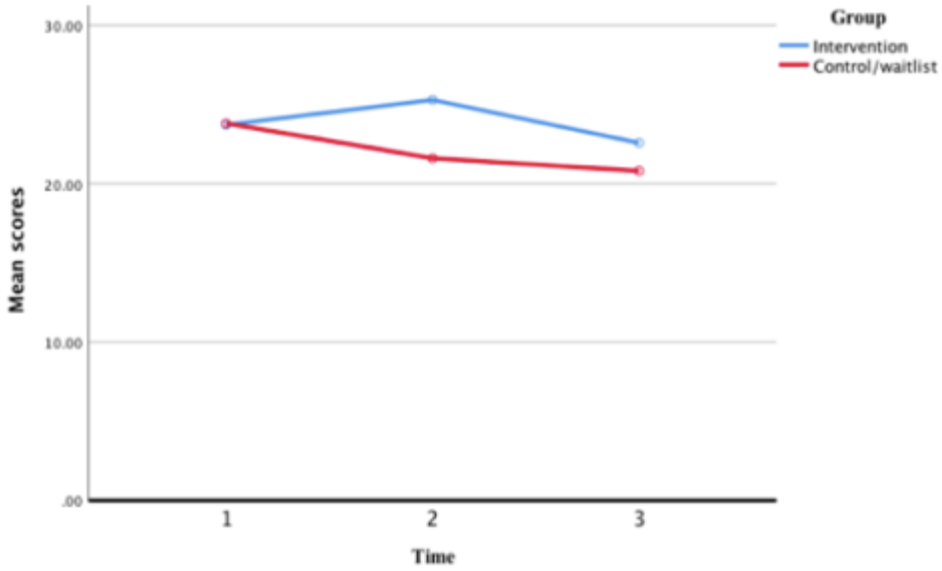

Figure 9. CEM-Inhibition means across time

(Higher scores reflect greater levels of emotional inhibition)

Dysregulation. The results showed no statistically significant interaction effect between time and group (F (2,20)=. 37, p=. 70, ηp2= .04). There was a non-significant main effect of time (F (2,20)= .68, p=. 52, ηp2= .06). Moreover, no significant difference was found between the CBT and Waitlist group (F (1,10)= .2.30, p= .16, ηp2= .19).

Figure 10 depicts the descriptive statistics trends for self-reported measures of dysregulation. The CBT group mean scores marginally decreased between T1 (M=15.43, SD=2.44) and T2 (M=14.43, SD=4.43) and continued to decrease at follow-up (T3; M= 13.14, SD=1.95).

Similarly, the Waitlist group mean scores decreased during treatment as usual between T1 (M=13.00, SD= 3.32) and T2 (M=12.40, SD=2.19). The Waitlist group mean scores remained relatively stable at T3 (M=12.60, SD=2.41).

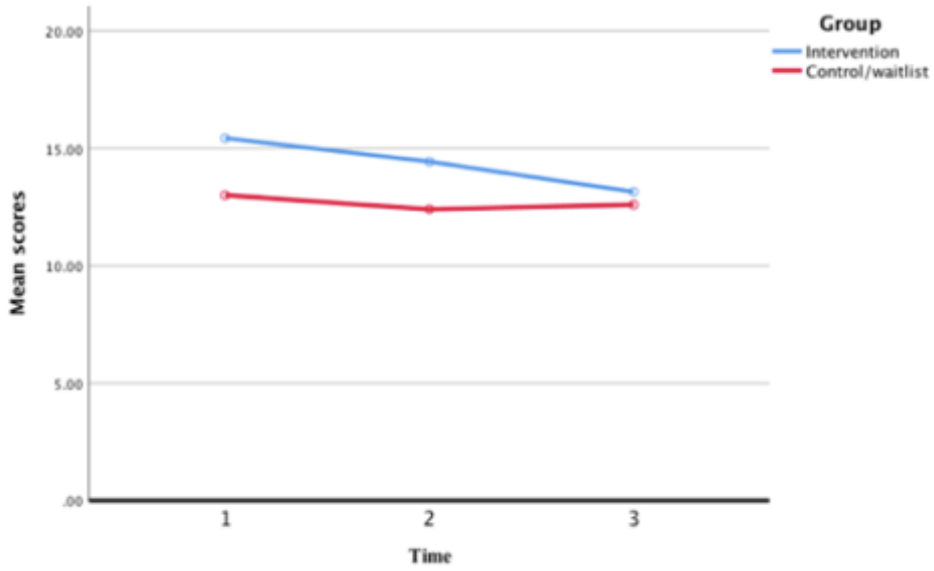

Figure 10. CEM-Dysregulation means across time

(Lower scores reflect lower levels of dysregulation)

3.3.6 Social validity. This section examines the social validity of the intervention. In order to assess overall satisfaction, perceived helpfulness and feasibility of the Zones of Regulation intervention, social validity was measured with the classroom teachers (*n*=2) and children (*n*=14) after both the CBT and Waitlist group completed the intervention.

Teacher information. Means and standard deviations for teachers are reported in Table 14.

Table 14

Social validity of The Zones of Regulation as perceived by teachers post-intervention

	*Mean (*SD)
Usefulness for others	5.00 (.00)
Recommend to colleagues	5.00 (.00)
Continuation of strategies	4.50 (.70)
Implementation feasibility	4.50 (.70)

Teachers *strongly agreed* that they were pleased that their class participated in the intervention, that the intervention would be good to use with other students with ASD and that they would recommend the intervention to colleagues. Perceived implementation feasibility for the intervention and the likelihood of continuing use of the strategies with their pupils was found to be high. Teachers reported that in comparison to pre-intervention, their class appeared to regulate their emotions more and appeared to be more aware of their emotions.

Qualitative information included teachers stating that it was beneficial to have "someone else" deliver the intervention, that individual children were talking more, in comparison to "shutting down", and that they would like to use the programme with next year's class grouping. One teacher also noted that the language of the programme helped an individual child to "overcome his anxiety".

In relation to the specific components of the programme, teachers reported that the visuals were effective to help children with ASD, children are listening more and that they are utilising the posters and coping strategies within the classroom and playground environment.

***Child information*.** Some of the aspects of the programme which the children enjoyed included the breathing techniques, the video clips and the sensory supports including the stress balls. Children reported that "it was fun", "it has helped me" and that they liked picking out the feelings and relaxing during lessons. One child reported that he "struggled to listen to a few things". One child also reported that the programme helped him to express his feelings on a recent bereavement.

3.3.7 Fidelity. The fidelity of the intervention was checked by the researcher using the Implementation and Fidelity Checklist which accompanies the manual. Intervention fidelity was 100% across three inter-rated sessions. The programme elements were delivered with competence and administered with high quality. The minimum sessions per week for specialised classrooms were met and there was high fidelity for student engagement, participation and differentiation.

3.4 Discussion

This section outlines the implications of the findings of the study, in light of the reviewed literature and the identified research questions. The key findings, methodological considerations, key theoretical issues and considerations for future research will be explored.

The paper set out to examine the effectiveness of a CBT-based intervention, The Zones of Regulation, on emotional regulation outcomes of school aged children with ASD. The intervention is grounded in evidence-based CBT practices with additional components addressing autism specific characteristics which have been previously proven to complement traditional CBT practices for children with ASD (Moree & Davis, 2010). This includes integrating the neurological processes of executive functioning, emotional regulation and sensory supports (Kuypers, 2011). An additional aim of the study was to address the maintenance of outcomes and to assess the effectiveness of the intervention from teacher, parent and child perspectives. This paper is one of a limited number of studies to focus on the effectiveness of CBT-based interventions for addressing emotional regulation challenges in school-aged children with ASD, in comparison to anger or anxiety alone (Factor et al., 2019; Scarpa & Reyes, 2011; Weiss et al., 2018).

3.4.1 Summary of key findings. The research aimed to answer the overarching research question of '*How effective is The Zones of Regulation programme at improving emotional regulation outcomes among school aged children with ASD?*". In answering the main research question, what emerges from the findings is an overall mixed result for the effectiveness of The Zones of Regulation at improving emotional regulation outcomes for school-aged children with ASD.

Quantitative results from child- reported measures do not suggest that participants in the CBT group's emotional regulation were significantly impacted by the intervention. However, participants in the CBT group reported an increase in coping skills and a decrease in dysregulation following intervention and at follow-up, which suggests a positive trend.

Quantitative results from teacher-reported measure do not suggest that

participants in the CBT group's emotional regulation were significantly impacted by the intervention. However, there was a significant effect of Time on participants scores. The Waitlist group displayed a significant within-group change between Time 2 and Time 3, directly after intervention completion. Although this was not the target group, the results offer preliminary evidence for the positive impact of The Zones of Regulation as the effect size was found to be large (ηp2= .43). This finding is similar to effect sizes found in a recent CBT study with children with ASD within a school age disability service (Higgins et al., 2019).

Participants in the CBT group showed a decline in lability/negativity as reported by parents following intervention and at follow-up, which suggests a positive trend. In contrast, the CBT group scores decreased in parent reported measures of emotional regulation as reported on the ERSSQ-P following intervention.

The positive trends post CBT were found in both the CBT and the Waitlist group. Additionally, these trends were evident across both measures and informants, adding strength to the growing body of evidence of the effectiveness of CBT-based interventions on emotional regulation outcomes for children with a diagnosis of ASD. This paper also extends the literature by exploring the effectiveness of CBT-based interventions in a population of Irish children with ASD. The following sections explore the findings in more detail and link the results to the reviewed literature and the identified research questions.

3.4.2 Teacher outcomes. This component of the study aimed to examine the effectiveness of the intervention on teacher-reported emotional regulation outcomes. A key finding was that teacher-reported measures on total ERSSQ outcomes significantly increased for the Waitlist group directly after completion of The Zones of Regulation programme. Furthermore, the effect size was found to be large (ηp2= .43). This finding is consistent with previous research where measures of children's emotional regulation improved following CBT intervention (Higgins et al., 2019; Scarpa & Reyes, 2011; Thomson et al., 2015). Interestingly, group means on teacher-reported measures remained relatively constant across all three time points for the CBT group. In comparison, the Waitlist group mean scores decreased between Time

1 and Time 2 (treatment as usual) and increased directly after the six-week intervention. This may suggest that the intervention had a maintaining effect on emotional regulation within the intervention group. Collectively, these findings provide some provisional initial evidence for the Zones of Regulation at improving emotional regulation outcomes within a school context. The outcomes are similar to previous positive findings on the effectiveness of CBT interventions within the school environment (Spence, Sheffield & Donovan, 2003; Durlak et al., 2011).

Unlike the CBT group, follow-up data for the Waitlist group was not available due to the scope of the study. More long-term assessment is required to comment on lasting intervention gains for this group. This should be integrated into future empirical studies.

In the previous systematic review, only one of the included studies (Bauminger, 2007) included data on school-reported emotional regulation outcomes. Given the statistics that one in every 65 children in Irish schools has a diagnosis of ASD (NCSE, 2016), these findings provide additional evidence on the effectiveness of CBT interventions from a school systems perspective.

3.4.3 Parent outcomes. This part of the study was designed to investigate the effect of the intervention on parent-reported measures of their child's challenges with emotional regulation. It aimed to answer the following research question: *How effective is The Zones of Regulation programme at improving adaptive and maladaptive emotional regulation among school aged children with ASD?* Parent completion and return of the questionnaires varied across all three time points. This resulted in a lack of complete data sets, particularly within the Waitlist group, so that it was not possible to compare group changes over time. Low response rates for school-based interventions may be as a result of a lack of a recognised clinical need for intervention and an insignificant home-school component in the programme (Ashburner, Ziviani, & Rodger, 2010; Fujii et al., 2012). Although parents received information and guidance on the language and strategies used in the intervention, monitoring of the use of the Zones strategies within the home context was not within the scope of the present study.

Group means on the ERSSQ-P suggest that the intervention had no effect on emotional regulation outcomes for the intervention group across time. This is demonstrated by a continual decline in scores across all three time points. These findings may provide further support to research which suggests that children with ASD have challenges in generalising new skills learned in CBT therapies to new contexts (Cooper et al., 2018). This finding may also indicate the cognitive and behavioural inflexibilities found among individuals with ASD. This will be explored further in the theoretical implications section. It may be necessary to have a home-school element within CBT-based interventions for children with ASD in order for them to practice and embed the skills learned across contexts. Such multi-systemic interventions have previously been found to develop generalisation of skills and establish effective home-school collaborations (Factor et al., 2019; Fujii et al., 2012; Webster-Stratton & Reid, 2010).

There was an encouraging trend in the statistics on the ER (Emotional Regulation) subscale of the ERC. In comparison to those in the Waitlist group, children in the CBT group scores increased on parent-reported measures of emotional regulation post-intervention. These trends are consistent with previous research which demonstrates increased parental-reported emotional regulation following CBT intervention (Fujii et al., 2012; Weiss et al., 2018; Wood et al, 2014). However, caution must be taken when interpreting this trend as the changes were small. Similarly, the Waitlist group scores increased on the ER subscale directly following intervention. However, this finding is difficult to interpret due to the reduced return rate of parent questionnaires.

Statistics on the ERC-LN (Lability/Negativity) subscale show a trend which may have been significant with a larger sample size. Parents reported positive changes in children's emotionality in the CBT group at both the post-intervention and the follow-up stage. In comparison, parental report on the lability/negativity subscale in the Waitlist group did not change during treatment as usual but decreased following intervention completion. This indicates a positive trend for both groups post CBT. This trend is similar to that of Weiss et al. (2018) who found large changes in children's emotionality on the ERC-LN subscale as reported by parents. This may signify the intervention goals of decreasing negative affectivity.

Overall, larger sample sizes would provide more consistent and reliable statistical evaluations of post-CBT emotional regulation outcomes (Mertens, 2015). Furthermore, the brief intervention period may have also been inadequate to accurately determine change in the intervention groups. This may be a significant limitation. This limitation has also been noted in a recently published short-term CBT study to address emotional regulation deficits in youth with ASD and developmental abilities (Shaffer et al., 2019).

3.4.4 Child-reported outcomes. This part of the study was designed to investigate the effectiveness of the Zones of Regulation programme on self-reported measures of emotional regulation among children with ASD using the CEM scale. Quantitative results suggest that the intervention did not significantly impact self-reported emotional regulation challenges. These results seem to be consistent with other research which found no change between groups post-CBT intervention as reported by self-measures (Thomson et al., 2015; Weiss et al., 2018). As stated previously, larger sample sizes may have provided more reliable statistical evaluations post-CBT.

A fundamental element of CBT involves linking one's thoughts, feelings and behaviours in order to develop increased self-awareness and impulse control. As self-reflection can be difficult for individuals with ASD, due to language difficulties and socioemotional and executive processing deficits (Bachevalier & Loveland, 2006; Ozonoff, 1995), this may have affected self-assessment in the current study. These results are in accord with a previous meta-analysis which indicated that individuals with ASD may find self-report measures difficult as a result of associated perspective taking and communication difficulties (Weston et al., 2016). Despite these findings, a strength of the current study is the use of the CEM scale which has previously been shown to have good reliability and validity in the target population (Thomson et al., 2015; Weiss et al., 2018; Zeman et al., 2010).

In relation to the question of *How effective is the Zones of Regulation programme at improving coping strategies of school-aged children with ASD?*, children in the CBT group reported an increase in coping at both post- intervention

and follow-up stage, which indicated a positive trend. In comparison, the Waitlist group remained relatively stable on self-reported coping strategies during treatment as usual but reported an increase in coping post-intervention. However, due to the lack of significant main effects, it is not possible to draw conclusions that this effect was due to the intervention. Future research which investigate the effects of CBT-based interventions and which incorporate an active psychotherapy control group may help to explain these trends in more detail.

Interestingly, children in the CBT-group reported an increase in the suppression of emotional expression, as measured by the Inhibition subscale, post intervention. A reduction in this suppression of emotions was observed for the group at the follow-up phase. Emotion suppression is a response focused emotional regulation strategy (Gros & Thompson, 2007). This may suggest children changed their outward display of the emotion but not the emotional experience itself. This may reflect similar findings which highlighted that children with ASD use suppression more frequently than typically developing peers (Samson et al., 2012). In contrast, children in the Waitlist group reported a decrease in emotional inhibition across all three time points. Again, this may be a result of difficulties in self-or emotional awareness.

Statistics on the Dysregulation subscale indicate an increase in self-reported regulation post CBT. However, a comparable trend occurred in the wait-list group. This indicates that the intervention did not impact on self-reported ratings of dysregulation.

3.4.5 Social validity findings. Taking into account the challenges associated with obtaining valid information from self-reports among individuals with ASD, the use of a social validity component is a particular strength of the current research. This aspect of the study examined the perceptions and experiences of the participants and aimed to address the questions of *Is the Zones of Regulation an intervention that can be used by schools?* Social validity measures are particularly significant in intervention research within special education with the purpose of examining the

social importance of intervention outcomes (Horner et al., 2005; Snodgrass, Chung, Meadan & Halle, 2018).

Children reportedly enjoyed using the strategies learned within The Zones of Regulation programme, found the programme entertaining and perceived it in a positive manner. These findings can be considered in light of the emotional regulation model discussed in the introduction. Children reported that they enjoyed using the relaxation and breathing strategies and the inner coach/inner critic (cognitive reappraisal). These are antecedent focused emotional regulation strategies (Gross & Thompson, 2007). This qualitative data is constructive as it reflects the participants own views and describes the use of learned emotional regulation strategies which could not be captured using the CEM questionnaire format. In comparison to standardised questionnaires, it may be beneficial to include more open-ended tasks or observations in order to effectively evaluate a child's knowledge of emotional regulation strategies pre and post-CBT intervention. Such tasks have previously been found effective with children with ASD (Scarpa & Reyes, 2011; Weiss et al., 2018).

The data collected through the use of a researcher-created social validity measure provided information on the teachers' perceptions of intervention outcomes and its relevance for their pupils. The teachers' perceptions of the feasibility of The Zones of Regulation programme were overall positive in nature. These findings are similar to previous qualitative studies examining the perceived effectiveness of CBT-based interventions (Lee at al., 2019; Taylor et al., 2014). Teachers reported that their students appeared to be more aware of their emotions, that the intervention would be beneficial to use with other students and that they would recommend the programme to their colleagues in the future. Additional research which examines both qualitative and quantitative data post CBT-intervention is required. The use of individual structured interview formats would give the opportunity for children to describe their use of the learned emotional regulation strategies in an open-ended manner and allow teachers to expand on how the intervention contributed to participant emotional learning and development.

3.4.6 Key theoretical issues. The findings presented in this paper reflect previous highlighted difficulties in adapting CBT therapies for children with ASD. At a cognitive processing level, children with ASD present with rigidity of thinking (APA, 2013). Therefore, cognitive change techniques used in CBT interventions such as The Zones of Regulation may not always be aligned to or compatible with the cognitive processing style of individuals with ASD and this may result in frustration and less significant outcomes (Clark & Well, 1995; Cooper, Loades & Russell, 2018). Furthermore, Theory of Mind deficits, such as labelling emotions and emotional experience, may compromise emotional regulation strategies which require such cognitive processes (Samson et al., 2012). Focusing more on behavioural changes in addition to cognitive methodologies is recommended for future investigations. Combining self- and informant- reported measures of emotional regulation with the use of direct observations would add to the exploration of the generalisation of emotional regulation skills.

CBT principles use a collaborative methodology to develop problem solving skills for intense emotional situations. A strength of the current CBT-based intervention is that it targets specific autism challenges by developing problem solving abilities which can result in increased impulse control (Kuypers, 2011). Additionally, children learn skills to independently self-monitor and reflect on their level of alertness and on the effectiveness of their Zone tools. This aligns itself with the emotional regulation strategies outlined in the emotional regulation model (Gross & Thomspon, 2007). In line with recommended adaptations to CBT practices to improve accessibility for children with ASD (Cooper et al., 2018; NICE, 2012), the current intervention utilised high levels of visuals, incorporated breaks and included real-life practices. Despite these adaptations, given the significant executive functioning and processing deficits associated with ASD, including challenges with focused attention, planning, and mental inflexibility (Bachevalier & Loveland, 2006; Mazefsky & Minshaw, 2010; Ni et al., 2018; Ozonoff, 1995), the pacing of the delivery is worth exploring in further detail.

Although all lessons from the manual were completed with high intervention fidelity (100%), the intervention was delivered to the CBT and Waitlist group over the short-term course of 5-6 weeks. Considering their core difficulties, children with ASD

may require a longer length of intervention delivery to fully experience the benefits of CBT-based interventions in order to utilise and consolidate intervention techniques and coping strategies into their environments.

This paper is one of the few studies which measures the long-term efficacy of emotional regulation outcomes following CBT intervention (Bauminger et al., 2007; Factor et al., 2019; Weiss et al., 2018; Wood et al., 2019). However, given the pervasiveness of ASD and the complex individual profiles, a longer period of intervention and the interval between intervention completion and follow-up may have been more appropriate. Furthermore, follow-up data was collected for the intervention group only. A further study could enhance the findings of the present study by assessing the long-term effects of CBT outcomes on emotional regulation through the use of a longer time span, for example across one academic year.

While the Zones of Regulation programme may address emotional regulation difficulties and related behaviours in school-aged children with ASD, a theoretical implication of this study may be that the programme alone is not sufficient to address the range of cognitive and affective regulation processes that are characteristic of the ASD condition (ldao & Nolen-Hoeksema, 2013). The associated maladaptive emotional regulation strategies of children with ASD may affect their cognitive efforts to employ the new adaptive coping approaches and skills learned during the programme. The discrepancy between cognition and emotional experience has been explored in ASD research and across other conditions such as anxiety disorders, attention deficit-hyperactivity disorder (ADHD) and intellectual disabilities (Blake et al., 2017; Cotton et al., 2016; ldao & Nolen-Hoeksema, 2013; Shaffer et al., 2019). Furthermore, a growing body of research has aimed to address these discrepancy challenges by incorporating mindfulness- and acceptance-based techniques with cognitive behavioural approaches. These approaches are proving to be effective and indicate significant emotional regulation and behavioural improvements (de Bruin, 2015; Shaffer et al., 2019; Vollestad, Nielsen, & Nielsen, 2012). Further large scale randomly controlled studies to investigate the dynamic processes of how children with ASD select and implement emotional regulation strategies following CBT-intervention is required. Additionally, supplementary studies which aim to explore the

effectiveness and efficiency of multi-method approaches to addressing emotion regulation challenges among children with ASD is warranted.

As discussed in the systematic review and introduction, evidence relates emotional regulation difficulties among individuals with ASD with core social communication, interaction and sensory processing challenges (Bachevalier & Loveland, 2006). A strength of The Zones of Regulation programme is that it addresses these sensory processing difficulties associated with ASD (Kuypers, 2013). The focus of the current paper was on emotional regulation outcomes and therefore social skills were not measured in detail or addressed in the programme. It may be necessary to add a social skills component to such interventions, as social competencies include emotional competence and emotional regulation deficits and this can impact a child's capacity to empathise and identify with other's emotions (Feng, Lo, Tsai & Cartledge, 2008; Lee et al., 2019). Thus, comprehensive evaluations of CBT-interventions which also measure and address core social deficits of ASD is warranted.

3.4.7 Conclusion. The aim of this research was to investigate the effectiveness of The Zones of Regulation intervention at improving emotional regulation outcomes among school aged children with ASD. The research examined the effectiveness and feasibility of the intervention for children with ASD within an Irish context by employing a quasi-experimental waitlist control approach.

What emerges from the findings reported in this article is an overall mixed result for the effectiveness of The Zones of Regulation. Inferential results from child and teacher-reported measure do not suggest that participants in the CBT group's emotional regulation were significantly impacted by the intervention. However, the Waitlist group displayed a significant large effect post CBT-intervention. Furthermore, participants in the CBT group showed a decline in lability/negativity as reported by parents following intervention and at follow-up, suggesting a positive trend. Positive trends were reported across measures and informants. The paper adds to the growing body of research which examines the effectiveness of CBT-based interventions at improving emotional regulation outcomes of children with ASD (Lee

et al., 2019; Thomson et al., 2015; Weiss et al., 2018). Theoretical implications of adapting CBT therapies for children with ASD were addressed. Further research is highlighted that may constructively build off this small-scale research in order to further examine the potential effectiveness of The Zones of Regulation for addressing emotional challenges among children with ASD.

4.0 Part Four: Critical Review and Impact Statement

The following section of the thesis is a critical reflection on the presented study. It considers the potential impact of the research both theoretically and in terms of Educational Psychology practice. It addresses the epistemological position adopted in the research and aims to critically appraise the methodological choices used against other alternatives, highlight the implications for the knowledge of the topic and suggest actions for future research. The final section includes a personal reflection on the research process and aims to clarify the impact of the study across educational and child psychological domains.

4.1 Methodological Considerations and Implications

The current research adds to the knowledge about the effectiveness of CBT-based interventions and emotional regulation outcomes of school-aged children with ASD and also to the understanding of methodological issues associated with exploring this area.

4.1.1 Intervention exposure; implications for practice and knowledge. The current study implemented The Zones of Regulation over a condensed period of time. The guidelines within the Implementation and Fidelity Checklist recommend a minimum exposure of one 30-60 minute session per week for small specialised groups. This minimum requirement was reached for both the CBT and the Waitlist group. Each session consisted of delivering lessons over 90 minutes with a break during the session. This reflected previous literature examining adaptations to CBT interventions for children and young adults with ASD (Walters, Loades, & Russell, 2016). However, the overall exposure time to the concepts outlined in the sessions was six weeks. Given the complexity of ASD and the associated executive functioning, informational and socioemotional processing deficits (Bachevalier & Loveland, 2006; Ozonoff, 1995), the pacing of the intervention could therefore be considered as a significant limitation.

Additionally, due to circumstances beyond the authors control, the duration of the Waitlist condition was not identical to the CBT condition (6 weeks V 5 weeks). Interestingly, it was the Waitlist group which showed a significant difference over

time on teacher-reported emotional regulation. Although, the duration for the Waitlist condition was shorter, all lessons were delivered. The Waitlist group received input once a week for four weeks and twice during week five. In comparison, the CBT group received input once a week for six weeks. Future studies of The Zones of Regulation will require a longer period of time to enhance our understanding of the effectiveness of the intervention and our understanding of how CBT-based interventions may assist in addressing emotional regulation challenges among children with ASD. This may present as a barrier to Educational Psychologists' implementation of CBT-based programmes such as The Zones of Regulation.

The high demand for psychological services for children influences the length of time a psychologist may have to implement intensive CBT interventions (Rait et al., 2010). Increasingly long waiting lists may make it less likely that lengthy interventions would be implemented. It may be challenging to address the needs of a child with ASD within services as they tend to have restrictions on the number of sessions they can provide to service users (Cooper et al., 2018). It is recommended that the implementation for The Zones of Regulation for specialised classrooms/individual sessions, where the majority of learners have additional needs, should be spread over six plus months (Kuyper, 2011). This may not be feasible for Educational Psychologists due to factors influencing implementation include staffing, administrative support and capacity to monitor the impact of the intervention (Forman, Fagley, Chu, & Walkup, 2012). This was reflected recently by Educational Psychologist's in the UK and Ireland who reported that resources and time-allocation constraints influenced intervention planning including the use of CBT interventions for supporting children with ASD (Robinson et al., 2018).

Furthermore, it is recommended that the vocabulary, visuals and discussion points are infused into daily routines and across environments (Kuypers, 2011). Although teachers were present during the intervention delivery, and had access to the posters and resources outside of these times, monitoring of the use of the programme elements outside of the sessions was not formally examined. Additionally, parents were given guidance on the language and strategies used within the intervention but no information was gathered on whether these were utilised by parents or children within the home setting. Evidence suggests that the implementation of strategies

outside of sessions can assist in the transfer of behavioural and cognitive skills to more naturalistic settings (Forman et al., 2012; Kaslow, Clark, & Sirian, 2008). This may have impacted on the effectiveness of the intervention as children may not have had adequate opportunities to practice and implement the strategies and skills learned during their everyday settings.

As stated in the discussion section of the empirical paper, a home-school component may be required within CBT-based interventions in order for children with ASD to imbed and generalise the skills learned across contexts. This is important as evidence suggests that parental involvement can improve generalisability of skills learned post-intervention (Burrell & Borrego, 2012). Furthermore, National Institute for Health and Care Excellence (NICE) guidelines on recommended adaptations to CBT for young people with ASD advise the involvement of parent/carers to support the implementation of the intervention (NICE, 2013). Given the critical role parents have in the development of adaptive emotional regulation strategies among children (Laurent & Gorman, 2018), more explicit psychoeducation on emotional regulation and strategies for parents of children with ASD could be beneficial. This has recently been found to be an effective approach to implementing CBT as evident in a randomly controlled CBT study (Factor et al., 2019). Educational psychologists working within school systems can support parents and school staff in establishing effective multi-systemic collaboration in order to support children with ASD with their emotional regulation needs.

Given the barriers to implementation for Education Psychologists, having teachers run such an intervention may possibly be more efficient. Schools can provide ideal settings for addressing emotional regulation difficulties among children with ASD. A significant direction for future research is to evaluate the effectiveness of The Zones of Regulation for children with ASD as delivered by a classroom teacher. The intervention is very accessible to school personnel as is it does not require formal training and is therefore cost-efficient. Direct teacher involvement may enhance and support intervention impact. Future research may establish whether school personnel can implement the CBT-based intervention and maintain intervention fidelity. Educational Psychologists can support the schools in evaluating such interventions. By working collaboratively, Educational Psychologists can establish a deeper

exploration of school personnel's perceptions of an intervention. This is a key role of an Educational Psychologist in bridging the gap between research and practice and would help develop a schools capacity for delivering CBT interventions for children with ASD (Keith, 2008; Rait et al., 2010; Robinson et al., 2018).

4.1.2 Research design. A number of previous studies exploring the effectiveness of CBT-based interventions on emotional regulation outcomes for children with ASD did not include a control group (Bauminger, 2007; Lee et al., 2019; Thomson et al., 2015). Evidence suggests that the exclusion of a control group from CBT trials results in expectancy biases, regression to the mean and reduces the generalisability of findings (Carlson & Schmidt, 1999; Ehrenreich-May et al., 2014; Thomson et al., 2015). Furthermore, initial group differences were examined in only two identified studies (Scarpa & Reyes, 2011; Weiss et al., 2018). In contrast, the current study allows for a thorough examination of the effectiveness of the independent variable (The Zones of Regulation) on the dependent variable (emotional regulation) by examining initial group differences and by randomly assigning children to the CBT or Waitlist group. There were no initial differences on teacher-, parent- or self-reported measures of emotional regulation. Accordingly, the significant outcome observed on the ERSSQ-T measure and the positive trends observed on the Emotional Regulation and Lability/ Negativity parent subscale and the self-reported Dysregulation of the ERC are likely to be a direct result of the intervention. However, findings are limited by the small sample size of the intervention groups (N= 12). Larger sample sizes may have provided more consistent and reliable estimates of post-CBT emotional regulation outcomes (Mertens, 2015). Future large scale research would also allow for further subgroup analysis and an exploration of mediators and predictors of intervention outcomes.

The use of a follow-up measure has implications for the understanding and knowledge of the topic in psychology. This research is one in a limited number of studies which explored the long-term maintenance effects of emotional regulation outcomes following CBT intervention among children with ASD. There were mixed results across measures and informants on the maintenance of outcomes in this study. For example, the trends on teacher-reported measures of emotional regulation remained relatively constant between intervention completion and follow-up for the

CBT group and parents reported continual decreases in children's emotionality in the CBT-group at follow-up. This indicates at least some maintenance of learned skills across time. In contrast, trends showed an increase in scores on the *emotional regulation* subscale of the ERC post-intervention but a decrease at follow-up. Although some variability is expected, the collective findings may indicated the need for ongoing support for children with ASD following CBT completion (Weiss et al., 2018).

4.1.3 Analysis. The main research question of "*How effective is The Zones of Regulation at improving emotional regulation outcomes among school-aged children with ASD*" guided not only the research design but also the statistical analysis. At first the use of Mann-Whitney U test/ *t*-test was considered, similar to a previous study which examined the effectiveness of The Zones of Regulation (SAED, 2016). However, the use of multiple comparisons increases the potential for Type 1 errors or familywise errors. On reflection, the use of an ANOVA was considered more robust and allowed for the computing of variance that was caused by the intervention (experimental manipulation) versus variance caused by individual differences or experimental error. Operating an analysis of variance (ANOVA) was congruent with both the research design and research question. The analysis was used to determine whether mean emotional regulation scores differed between groups and across times. From a scientist-practitioner view point, the process of this research allowed the researcher to design and conduct a study that answered the research question (Keith, 2008) which is of interest to Educational Psychologists, school personnel and parents of children with ASD who have emotional regulation challenges.

4.1.4 Measures. The use of multiple measures and multiple sources to evaluate emotional regulation outcomes following CBT intervention is a strength of the study. Of the previous reviewed studies, only one included evidence of the effectiveness of CBT interventions from a schools perspective (Bauminger, 2007). Additionally, to date, a limited number of studies include self-reported measures for examining CBT effectiveness for addressing affective challenges among individuals with ASD (Weston, Hodgekins, & Langdon, 2016). The current research adds to the research field as it explores the effectiveness of CBT interventions from multi-systemic perspectives by including parent-, school- and child-reported measures. The

teacher and parent measures (ERSSQ-P, ERSSQ-T and ERC) utilised in the study were chosen as they have previously demonstrated good reliability and validity in the target population (Berkovits et al., 2017; Butterworth et al., 2014; Scarpa & Reyes, 2011). Additionally, the positive trends post-CBT were evident across both measures and informants, adding strength to the effectiveness of the intervention.

Given that individuals with ASD find self-reflection and the assessing of one's own emotional states difficult, due to associated communication and perspective taking difficulties (Frith, 1929; Samson et al., 2012; Weston et al., 2016), the use of the CEM scale is a particular strength. This scale has previously been utilised in CBT studies with children who have ASD with positive results (Weiss et al., 2018; Zeman et al., 2010). Although between-groups effects were non-significant it may be that the questionnaire lacked sensitivity to identify emotional regulation changes over the short intervention period or may not have reflected the full impact of the children's experience with The Zones of Regulation. The non-significant findings may also reflect previous research which indicates that children with ASD have challenges in assessing and labelling their emotions (Berthoz & Hill, 2005; Samson et al., 2012). On reflection, the use of more open-ended tasks may have been more effective in evaluating the children's knowledge of emotional regulation tasks pre and post-CBT intervention. Open-ended tasks have been previously used to examine a child's capacity to utilise suitable emotional regulation strategies in hypothetical situations (Scarpa & Reyes, 2011; Thomson et al., 2015; Weiss et al., 2018). Future explorations of the effectiveness of The Zones of Regulation could adopt such measures.

4.1.5 Direct observations. Similar to a previous study (Fujji et al., 2013), the researcher informally recorded behavioural observations during the intervention. Observations of particular note included children reflecting on an issue which happened during the previous week's lesson and comparing it to the "Size of the problem" scale during the following weeks discussion. Others included observing a child using the inner coach self-talk tool and seeing the effectiveness of using the breathing strategies with a child during a period of heightened emotion. As emotional regulation was measured using self- and informant report, the use of formal measures of direct observation could have added to the examination of the generalisation of emotional regulation skills. It may be possible that the self-reported CEM scale

examined the participants performance in comparison to their competence in using the learned strategies and skills. Direct observation is important when assessing emotional regulation but this method has not been regularly used in research (Weiss et al., 2014). Taken together, a multi-methodological approach to evaluating emotional regulation following CBT is warranted. This could include a direct measure of emotional regulation in addition to self- and informant-report.

It was not deemed appropriate to select target behaviours to observe in the study. The questionnaires used were chosen as they were aligned with both the theoretical assumptions of the research and, more specifically, the research questions. Furthermore, the measures described previously are consistent with the cognitive model of emotional regulation which has been previously used in the examination of emotional regulation and CBT (Gross & Thompson, 2007).

4.1.6 Representativeness of the sample; external validity. A limitation of the current study was the restriction of diagnosis amongst the sample. The present study used a non-random, convenience sample. Children in the current study demonstrated Low Average or Above Average intellectual functioning as per school enrolment criteria. Caution is therefore needed when generalising results to children with ASD who have lower intellectual functioning as additional challenges with language or intelligence may affect the regulation of emotions. Furthermore, although the groups were randomised to either the CBT or Waitlist group, classroom teachers initially created the two groupings.

Although the sample in the study would previously have met the criteria of Asperger's Disorder, ASD is now seen a single disorder with various levels of severity (APA, 2013). As 63% of children with ASD are enrolled in mainstream schools (NCSE, 2016), this research may help inform those working within the educational system about evidence-informed interventions for supporting children with ASD who display emotional regulation challenges. Despite this, the phenotypic symptoms of ASD is significantly different across the spectrum. Supplementary research is therefore required to determine the effectiveness and generalisability of results with a more representative sample of the ASD spectrum.

An additional factor which may limit the external validity of the study is that of multiple-treatment interference. Specific demographics including information on history of intervention or whether children were receiving additional therapies are not reported. If participants were accessing other interventions it may not be possible to say that the positive trends reported post-CBT were due to the effects of the programme alone (Mertens, 2015).

4.2 A Group Delivery Setting

The current study and the previously reviewed studies in the systematic review provide initial evidence for group delivery of CBT-based interventions to address emotion regulation difficulties for children with ASD within a school context. A group structure to addressing emotional regulation difficulties in children with ASD was employed in the current study. This approach was taken as it has been found previously to be an efficient and effective methodology for delivering CBT-based interventions for children with ASD and also provides authentic opportunities for social interactions within a therapeutic environment (Bauminger, 2007; Scarpa & Reyes, 2011; Shaffer et al., 2018; Weiss et al., 2018). In this study it was noticed that the group structure created a supportive and comfortable setting for the children to practice the behavioural strategies. It may also have lessened the processing difficulties associated with ASD. By being in a group setting the children were able to openly discuss their emotions and triggers with their peers and gain an awareness of how their peers perceive people in different zones. This may have implications for future delivery of The Zones of Regulation in profession practice in educational psychology and schools.

4.2.1 Implications for schools and educational and child psychology services. A fundamental component of the programme is that all team members who support the individual receiving the intervention are aware of and understand the language of the programme (Kuypers, 2011). Although the programme can be administered in a one-to-one setting, this may reduce the likelihood of a child generalising the language and strategies outside of the individual sessions. For example, if a child individually partakes in the programme during their allotted Special Education Teaching time but their classroom teacher and/or Special Needs Assistant

is not aware of the programme elements, the programme may have significantly reduced effectiveness as the student may not have the opportunities to practice the regulation skills outside of the individual sessions. In comparison, a group approach can provide genuine opportunities to develop the common language of The Zones of Regulation among a group of children with ASD. This positive outcome was observed by one classroom teacher following intervention completion. The teacher reported that the children in her class used the language of the programme during break times and frequently discussed which Zones they were in with their peers, by using The Zones of Regulation poster which was erected in the classroom. This may reflect evidence which suggests group CBT can normalise emotional regulation difficulties such as anxiety, provide peer modelling and reinforce relationships (Fujii et al., 2013; Naeeni & Chowdhury, 2018; Wood et al., 2014).

Within a clinical service, a group based approach to delivering CBT-based programmes such as The Zones of Regulation would be both cost and resource efficient. It would allow Educational Psychologists to address the emotional regulation needs of a large number of children with ASD while also giving them the opportunities to engage in social interactions. However, little is known about the feasibility or effectiveness of The Zones of Regulation in health or clinic settings. Supplementary research is needed to examine the implementation of The Zones of Regulation in such settings. It may also be beneficial to explore other factors such as the therapeutic alliance, group dynamics and climate of the clinic settings as these factors have been linked to children's engagement in the therapeutic process (Chu, Suveg, Creed, & Kendall, 2010).

4.3 Epistemological Position

A paradigm provides a framework for contemplating complex constructs such as emotional regulation and guided the researcher's thinking and actions to address the research questions. As discussed in the introduction to the thesis, the philosophical foundations of the research were grounded within post-positivism. The quasi-experimental design is commonly associated with the post-positivist paradigm. The groups were randomised to conditions but classroom teachers primarily created the

two groupings. This reflects the intricate dynamics found among children with ASD and exhibits the devised modifications to experimental methodologies in real world settings which are frequently found in the post-positivism approach to systematic inquiry (Mertens, 2015).

The researcher was competent in conducting the intervention due to previous experience in delivering the intervention across contexts and through the use of the implementation and fidelity checklist. In order for the researcher to remain neutral and prevent previous experience of the intervention influencing the study, the standardised response format of the four measures adopted in the study ensured procedure fidelity. However, the researchers experience with the intervention and working with children with ASD may have also positively influenced the trend of improved outcomes. Limited studies have focused on the implementor's competence within the area of CBT and emotional regulation for children with ASD (Haug et al., 2016; Weston et al., 2016). Further research is required which examines the implementor's style and experience and whether it facilitates improved outcomes.

The post-positivism stance allowed the researcher to conduct the research within a child's naturalistic setting. It gave the researcher more scope to interact with the participants and their environment (Ryan, 2006). This is important for educational psychology practice as Educational Psychologists do not work in isolation and aim to take a holistic systematic perspective to supporting children. The use of multiple measures and multiple sources facilitated a triangulation of findings. This gives the research a more precise view of reality (Maxwell, 2012; Ryan, 2006) and is consistent with the ontological assumption of the post-positivist paradigm.

4.3.1 Ethical considerations within the post-positivist paradigm. Ethics were also highly connected within the methodology. This process is an integral part of postpositivism influenced by the three ethical principles of The Belmont Report; *Beneficence, Respect and Justice* (Mertens, 2015; National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978). Figure 11 illustrates these ethical principles.

Working as an Educational Psychologist and as a conductor of research, the present study aimed to maximise positive emotional regulation outcomes among

school-aged children with ASD (i.e. axiology). Children in both the CBT and Waitlist group received the intervention, therefore maximising the beneficence of all participants. The current study is also beneficial to the field of psychology as it generates scientifically valid knowledge on the effectiveness of a CBT-based intervention on emotional regulation outcomes for children with ASD. Informed consent from all participants was central to the axiology of the thesis and addresses the ethical issue of Respect. Informed consent was obtained from the school personnel, parents and special needs assistants (SNA's). Informed consent and assent was also obtained from each child participant using a child friendly information sheet. The researcher also met with the children as a group, prior to beginning the intervention, to establish rapport and to reiterate voluntary participation. The ethical principle of Justice ensures that participants benefit from the research and that procedures are fair and nonexploitative (Mertens, 2015). The implementation of the intervention was carefully considered and aimed to equip children with skills in self-regulation and emotional control. There was also an equitable distribution of benefits as the intervention was administered to both groups.

In hindsight, a pragmatic approach to addressing the research may have been useful. This epistemological stance is concerned with finding out what works and is designed and is conducted by considering what would best suit the particular study or research question (Johnson & Christensen, 2019; Mertens, 2015). A pragmatic viewpoint would allow the researcher to choose a combination of methods that would best answer the posed research question. This kind of research could use a mixed methods approach to a complete examination of The Zones of Regulation's effectiveness. Although the present study utilised a social validity measure, additional semi-structured interviews would have added to the understanding of the perceived helpfulness and feasibility of the CBT-based intervention.

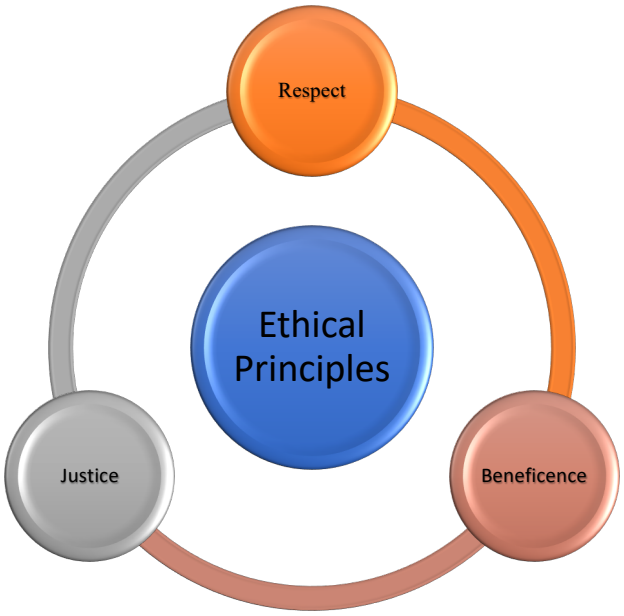

Figure 11. Research integrity principles

4.3.2 Intervention led research and intervention choice. A post-positivist methodological approach is primarily quantitative and interventionist. The evaluation of the Zones of Regulation CBT-based intervention was central to the present research. Educational psychologists have a key role in the dissemination and implementation of evidence-based interventions. An Educational Psychologist's training, such as the current Doctorate in Educational and Child Psychology, provides an understanding of scientifically researched evidence-based practices which aim to address social-emotional functioning, well-being and enhance mental health (Forman 2012; Sheridan & Gutkin, 2000). Despite this, research on the implementation of such interventions within a school context has been found to be low. This indicates a gap between the science and service (Forman, 2012; Fixen et al., 2010). Furthermore, there is limited information in the UK and Ireland examining which types of ASD interventions are being implemented (Robinson et al., 2018). As discussed in detail in the systematic review, children with ASD are at high risk for emotional and mental health difficulties including externalising (e.g. ADHD) and internalising problems (e.g. anxiety) (Thomson, Riosa & Weiss, 2015; Simonoff et al., 2008). Given the complexity of working with children with ASD, Educational Psychologists need to ensure they are familiar with evidence-based interventions, such as CBT, in order to meet the needs

of those who work with children with ASD and the children themselves. The current research was intervention led and aimed to address this science to service gap. It provides initial evidence for the effectiveness of The Zones of Regulation at improving emotional regulation outcomes of school-aged children with ASD within a school context. It also adds to the knowledge of research exploring adapted interventions for use with children with ASD among Educational Psychologists in Ireland.

The Zones of Regulation was chosen as the CBT-based intervention for the current study due to a number of factors. The authors previous experience with the programme was a key influential factor. The main influencing factor was that The Zones of Regulation is very accessible to school personnel and Educational Psychologists alike as is it does not require formal training. This may increase implementation potential in school settings. The other CBT-based interventions discussed in the literature review had several barriers to implementation. The Secret Agent Society requires full training and addresses social skills and emotional resilience as opposed to emotional regulation. The Building Confidence programme has minimum provider qualifications (at least a masters level) and addresses the needs of individuals diagnosed with anxiety disorders. Two studies (Lee et al., 2019; Scarpa & Reyes, 2011) implemented a modified version of an unnamed CBT programme while Factor et al. (2019) implemented STAMP, a modified version of the Exploring Feelings programme (Attwood, 2004). The Zones of Regulation was deemed appropriate as it addresses self-regulation and emotional control and was therefore aligned to the specific research topic. The programme also targets autism specific challenges which have previously been found to complement traditional CBT practices (Moree & Davis, 2010).

4.4 Social Validity and CBT Based Interventions

A strength of the current study is the use of a social validity measure. Previous research has indicated that Educational Psychologists may consider the social value and utility of their practice as well as the evidence-base of that practice (Burnham, 2012; Robinson et al., 2018). School personnel's attitudes and beliefs, resources and organisational factors may also pose as a barrier/facilitator to CBT implementation

(Forman et al., 2012; Robinson et al., 2018). As a result, researchers examining emotional and behavioural difficulties need to balance scientific rigour with appropriate external and social feasibility and utility (Conroy et al., 2008). In combination with the scientific design of the current study, the social validity measure facilitated an insight into the value of the intervention and allowed the researcher to qualitatively assess the acceptability and perceived helpfulness of the intervention. Given the complexity of ASD classrooms, it was important to include both the teachers and the children in this validation process. The overall positive perceptions of the CBT-based intervention from both the teachers and the children suggest that the intervention has high social validity in a complex classroom environment.

On the other hand, it is essential to highlight the limitations to this Likert-type scale. This type of measure can be limited by informant biases (Conroy et al., 2008). As the researcher implemented the intervention and the social validity scale, the teachers may have been less likely to answer accurately. Additionally, the teachers may not have responded accurately as they would have been easily identifiable (n=2). Further large-scale research could address these limitations by providing more accurate feedback. The present research explored the children's perceptions on the intervention in an informal manner. Supplementary research is required to determine a more meticulous measure of child perceptions following CBT intervention.

4.5 Implications For Policy

The findings of this research have key implications for policy. The 'Better Outcomes, Brighter Futures 2014-2020' highlights the need to improve the emotional wellbeing of children (DYCA, 2014). Additionally, the Task Force on Autism (2001) and subsequent " Supporting Students with Autism Disorders in Schools" policy (NCSE, 2015) made specific suggestions regarding polices for children with ASD in relation to staff training, cooperative approaches and evaluating provision effectiveness. Furthermore, a key recommendation from the NCSE Autism press release (NCSE, 2016) was the development of teacher knowledge and understanding of ASD. The findings of this research can play a role in building on such strategies. It may be necessary that personnel across both educational and health settings, who work

with children with ASD, need to be made aware of and supported in developing their knowledge and competencies of interventions which aim to address the complex emotional regulation needs of children with ASD. Additionally, these approaches are likely to require a multi-systemic approach. This may include effective home-school collaborations or increased interagency work at a health, community and educational level.

This study and previously reviewed research provide promising results for CBT-based interventions in enhancing the capacity of school-aged children with ASD to regulate their emotions within a school environment (Factor et al., 2019; Weiss et al., 2018). It is suggested that policy should advocate for the importance of enhancing the emotional regulation abilities of school-aged children with ASD and indicate that CBT approaches may help in this respect. This will be important given that the new draft curriculum includes the attribute of "Being self-aware and resilient" under the key competency of "Fostering Wellbeing" (NCCA,2020). From an educational perspective, specific guidelines on how to address the emotional needs of children with ASD via the national curriculum is imperative.

As discussed in the thesis, up to 30% of Educational Psychologist's total caseload consists of implementing interventions for children with ASD. The needs of these children include categories such as emotional and mental health, social, cognition and learning and sensory needs (DfE, 2015). Consequently, emotional regulation challenges are often the primary referral reason for intervention and assessment (Mazefsky et al., 2013; Robinson, Bond, & Oldfield, 2018). This study describes evidence which suggests that there are several evidence-based interventions including CBT which Educational Psychologists in the UK and Ireland are not regularly involved in (Robinson & Bond, 2017; Robinson et al., 2018). This has an implication for policies on training and development. Educational Psychologists need to be aware of and competent in using evidence-based practices such as CBT for addressing the emotional regulation needs of school-aged children with ASD. Furthermore, Educational Psychologist's need to be supported in developing their competence in tailoring CBT interventions for children with ASD who present with different levels of severity and individuals with ASD with and without intellectual disabilities or associated language difficulties (APA, 2013; Cooper at al., 2018).

Additionally, developing knowledge of adaptations to CBT interventions to target autism specific characteristics would be very important. This would improve access to evidence-based interventions for children with ASD and could potentially improve intervention outcomes. In relation to the initial training of Educational Psychologists, programmes need to ensure that trainees have knowledge of evidence-based approaches, including CBT, in order to enhance the emotional well-being of future service users (Forman et al., 2012). This would also facilitate the promotion of services which aim to enhance learning, mental health and emotional well-being of school-aged children with ASD.

In relation to evaluations, assessments which distinguish between various types of emotional regulation may be required. This could include differentiating between cognitive reappraisal and expressive suppression (Gross & Thompson, 2007; Samson et al., 2012). This may be important as evidence suggests that the presentation of emotional regulation difficulties in individuals with ASD may be distinct from non-ASD individuals (Mazefsky et al., 2013; Samson et al., 2012). This may be a result of Theory of Mind deficits which are associated with challenges in assessing and labelling one's individual emotional state (Berthoz & Hill, 2005; Frith, 1989; Samson et al., 2012).

4.6 Key Messages For Educational Psychologists

Given the complexity of supporting school-age children with ASD who display emotional regulation challenges, the following sections summarises key points from the literature review and empirical study.

- Recent policy, practice and research in psychology and education have outlined the significance of promoting emotional outcomes and the mental health of school-aged children including children with ASD (DYCA, 2014; Greenberg et al., 2001; HSE, 2008). Research outlines that emotional-regulation is a critical component of well-being and has demonstrated that CBT-based interventions can promote emotional regulation and coping capacities among school-aged children with ASD (Fujii et al., 2019; Thomson et al., 2015; Weiss et al., 2018).

- This study suggests that The Zones of Regulation positively improved, to a large effect (ηp2= .43), emotional regulation outcomes for students in the Waitlist group post-CBT as reported by classroom teachers. Additionally, though not significant, the positive trends on child- and parent-reported measures of coping, dysregulation and emotionality post-CBT provide initial evidence that the intervention improved emotional regulation difficulties. These trends were evident across both measures and informants. However, to enhance this, more research is required using larger sample sizes, a longer intervention period and more open-ended tasks to effectively evaluate children's knowledge of emotional regulation post-CBT.
- In contrast to emotionality, parents reported a decrease in mean emotional regulation scores on the ERSSQ-P post-intervention. The mixed results may add to research which suggest that children with ASD have challenges generalizing new skills learned in CBT therapy to new contexts and that the cognitive change techniques used in CBT may not always be accessible with the processing style of individuals with ASD (Cooper et al., 2018; Clark & Well, 1995). The Educational Psychologist's role in this instance could involve the promotion of CBT-based interventions in a more multi-systemic manner by establishing effective home-school collaborations. This would provide children with the ongoing support necessary for the maintenance of outcomes post-CBT (Burrell & Borrego, 2012; Factor et al., 2019). The mixed results could also have theoretical implications as CBT-interventions alone may not completely address the emotional regulation difficulties associated with ASD (ldao & Nolen-Hoeksema, 2013).
- With regard to interventions for school-aged children with ASD, the literature review and empirical study highlights several CBT strategies which may improve affective functioning. Cognitive strategies, such as the inner coach/inner critic (self-talk) focus directly on teaching and implementing reappraisal strategies. Thinking strategies can also

enhance cognitive flexibility and increase emotional regulation (Samson et al., 2012). An example of this is the process of having individuals identify rigid and flexible thinking patterns. Furthermore, discriminating emotions using the four Zones of Regulations colours can enhance the ability of individuals with ASD to attend to and label emotions while relaxation techniques, such a breathing, can develop antecedent emotion regulation strategies.

- Given the processing deficits associated with ASD (Bachevalier & Loveland, 2006; Ozonoff, 1995), the pacing of the intervention is significant. This may pose as a barrier to Educational Psychologists' implementation of CBT-based programmes as many services have restrictions on the number of sessions provided to clients (Cooper et al., 2918). Supporting teachers to implement the intervention over a longer period of time may increase the transfer of behavioural and cognitive skills to more naturalistic settings while also developing a schools capacity for delivering interventions (Forman et al., 2012; Keith, 2008; Robinson et al., 2018).
- The current study and previous studies examined in the literature review, indicate the benefits of delivering CBT-based interventions within a group setting. Group delivery is time and resource efficient for services and provides authentic opportunities for children with ASD to engage in social interactions within a therapeutic environment (Bauminger, 2007; Scarpa & Reyes, 2011; Shaffer et al., 2018; Weiss et al., 2018).
- Educational Psychologists can bridge the gap between science and service delivery for evidence-based CBT-practices. This can include engagement in continuous professional development, dissemination of research, and direct involvement in the implementation of CBT interventions. This is particularly important given the recent changes to the eligibility requirements for psychology posts in the Health Service Executive (HSE) as Educational Psychologist are required to be competent in a range of therapeutic approaches.

4.7 Dissemination of Findings

This paper explored issues relating to outcome evaluation and contributes to the developing evidence-base of effective CBT-based interventions for school-aged children with ASD. Therefore, dissemination of the research findings is imperative. Dissemination of research is a key role for an Educational Psychologist (Keith, 2008). The author conducted the research in order to increase the understanding of the topic and to share the findings with Educational Psychologists, schools and services. Preliminary findings of the research were presented at The Psychological Society of Ireland's annual conference (2019). The empirical paper will be submitted to journals who have previously published similar projects. This includes journals such as *Journal of Autism and Developmental Disorders*, *Behavioural and Cognitive Psychotherapy, Educational Psychology in Practice* and *The Journal of Educational Research*. The participating school will be provided with an overview of the findings in order to inform them for future planning when considering implementation of CBT-based interventions. The author will also be available to discuss the findings with the school and parents. This is significant for Educational Psychology practice. Presenting an opportunity for the exploration of new research findings may help to ensure the future implementation of such findings. Creating this space for dialogue between stakeholders is imperative in order for practitioners to consider employing new knowledge or interventions into their practice (Dunsmuir & Kratochwill, 2013; Lomas, 1993). In summary, through the process of dissemination, the author aims to bring an awareness to and demonstrate the effectiveness of CBT-based intervention practices and highlight the need for modifications for children with ASD.

The purpose of the study was to explore the effectiveness of CBT-based interventions in promoting emotional regulation outcomes of school-aged children with ASD. This area has been relatively neglected in ASD research until recently (Mazefsky, 2013). This preliminary investigation of the effectiveness of The Zones of Regulation focused on this research gap and on the understanding of the topic within an Irish context. The study highlights the many challenges involved in researching emotional regulation in ASD. The cognitive and affective processes of emotional regulation are complex (Idao & Nolen-Hoeksema, 2013). Given the significant

executive and socio-emotional processing deficits among individuals with ASD, it may be difficult for children with ASD to effectively employ new adaptive approaches learned during CBT-based programmes. However, the significant finding and observed trends provide initial evidence for the effectiveness of The Zones of Regulation. The findings of the research adds to evidence of 'what works' in relation to interventions for children with ASD. It provides empirical data to support the use of this practice within an Irish context and may help to support Educational Psychologists, schools and services in selecting, implementing and evaluating interventions for children with ASD who present with emotional regulation challenges.

4.8 Personal Reflection On The Process Of The Research

This reflection will critically discuss my involvement in the research process. It will also explore the implications of this process on my future Educational Psychology practice. The reflection is based on Rolfe, Freshwater and Jasper's reflective cycle (2001).

From the outset of the doctorate I had always planned to focus my research on the topic of emotional regulation. My previous experience of working with children with an acquired brain injury and their families demonstrated the importance of the role of emotional regulation on well-being. Further work in ASD specific schools emphasized how the concept of emotional regulation may help in the understanding of the observed emotional and behavioural challenges among children and youth with ASD. Having previously used CBT-based interventions with service users, I subsequently wanted to empirically examine the effectiveness and feasibility of such programmes within an Irish context. Having engaged with the process of delivering the intervention for the thesis, I now have a deeper understanding of the complexity of the construct of emotional regulation in ASD. I envisage advocating the promotion of emotional regulation in my role as a future Educational Psychologist while also promoting evidence-based interventions. This is essential as it would help bridge the gap between science and service delivery for such interventions.

Early on in the research project I considered the methodology. From examining

the previous research, one of the aims was to include systemic perspectives of the effectiveness of the intervention. This research explores the effectiveness of CBT interventions from multi-systemic perspectives. Although all teacher and child measures were returned across all three time points, parent returns varied. I did not anticipate this and this subsequently impacted on the analysis as two of the four measures were parent-reported scales. This reflects the challenges to educational and psychological research (Mertens, 2015). However, this challenge gave me the opportunity to learn more about the issues of context and the overall implementation processes (Christenson, Carlson, & Valdez, 2002). On reflection, I now wonder if I personally met with parents and discussed the aims of the intervention, in comparison to sending them information, would returns have been more forthcoming. I would suggest that future research considers the contextual factors, such as parent involvement, to enhance intervention effectiveness. As discussed previously, direct parental involvement may also enhance generalisability of skills learned post-intervention (Burrell & Borrego, 2012).

The research and literature review highlight the effectiveness of CBT-based interventions in enhancing emotional regulation outcomes for school-aged children with ASD (Factor et al., 2019; Scarpa & Reyes, 2011, Weiss et al., 2018). However, through the process of undertaking the intervention myself, I learned about the importance of adapting CBT-interventions to suit the needs of each participant. The children in the groups displayed different regulation difficulties throughout the implementation. The Zones of Regulation was helpful in this regard as each lesson had information on differentiating the sessions. This is important when working with children with ASD as the associated characteristics, such as executive processing and social cognition deficits, require adaptations to standard CBT practices (Cooper et al., 2018; NICE, 2012). My previous experience helped me to handle situations where individual children became dysregulated. However, the Zones of Regulation tools, such as the breathing exercises, supplemented this. For example, when a child became very dysregulated during a session, he was able to pick out one of the relaxation strategies from his “Toolbox” and use it with me to regulate his emotions. This demonstrates the utility of such strategies. In my future practice it will be important to disseminate knowledge on CBT-based interventions through workshops for schools

and psychology services. As many Educational Psychologists in Ireland are not regularly involved in using CBT practices for clients with ASD (Robinson et al., 2018), disseminating this research may increase the likelihood of others adopting CBT approaches into their applied practice.

4.9 Concluding Statement

Emotional regulation is a complex construct and children with ASD often exhibit emotional problems which are associated with emotional regulation challenges (Ting & Weiss, 2017). The systematically reviewed research indicated the efficacy of CBT-based interventions on improving emotional regulation outcomes of school-aged children with ASD, despite being a subject of limited appraisal. This study aimed to build on this research by implementing the Zones of Regulation within an Irish context. To the authors knowledge, this is the first study to include teacher-, parent- and child- reported emotional regulation outcomes following CBT-intervention. What emerges from the findings is an overall mixed result for the effectiveness of The Zones of Regulation. The evidence indicates positive emotional regulation outcomes following CBT intervention within a school context. Parent findings on the ERRSQ may reflect the difficulties children with ASD have in generalising skills to new contexts (Cooper et al., 2019). Promising evidence suggests that the intervention had a positive effect on parent-reported child emotionality and child reported coping post-intervention. Future longitudinal research with larger sample sizes would provide more reliable statistical evaluations. This research also contributes to the knowledge of the subject by including a social validity measure. The positive perceptions of the intervention, from both the teachers and the children, suggest that the intervention was perceived as helpful and feasible. The final section, the critical review, explored the potential impact of the research, addressed the epistemological position adopted and critically appraised the methodological choices used in the study.

4.10 Impact statement

This research highlights the significant difficulties school-aged children with ASD have with emotional regulation and suggests that CBT-based interventions can

improve their abilities to regulate emotions. Therefore, the findings have implications for policy. Educational, health and psychology policies need to advocate for the importance of enhancing the emotional regulation abilities of children with ASD. Building on polices such as The 'Better Outcomes, Brighter Futures 2014-2020' (DYCA, 2014), the Task Force on Autism (2001) and "Supporting Students with Autism Spectrum Disorder in Schools (NCSE, 2015), it is essential that all key personnel, across educational and psychology settings, are supported in developing their knowledge and competencies in interventions which target the complex emotional regulation needs of children with ASD. This research also indicates that these approaches necessitate a multi-systemic approach in the form of home-school collaborations or increased interagency work at a health, community and educational level. From an educational psychology perspective, this research demonstrates evidence for the effectiveness of CBT interventions in applied settings, despite the fact that Educational Psychologists in Ireland are not regularly involved in such interventions (Robinson et al., 2018). In relation to training and development, Educational Psychologists need to have knowledge and competence in using evidence-based practices such as CBT in order to enhance the emotional well-being of future service users (Forman et al., 2012).

This research has the potential to benefit the current theoretical knowledge of CBT interventions for children with ASD. The cognitive and affective regulation processes of emotions are multifaceted. The associated maladaptive emotional regulation strategies among individuals with ASD may affect their cognitive efforts to imbed adaptive coping strategies learned during intervention. This highlights the importance of adapting psychological therapies for children with ASD as traditional CBT approaches may not completely address these emotional regulation difficulties. A strength of the Zones of Regulation is that it targets autism specific challenges. With the purpose of improving access to such interventions, psychologists must be experienced in adapting their practice consistent with the needs of children with ASD (Cooper et al., 2018). This knowledge can be imparted by engaging in continuous professional development and through distributing the acquired knowledge.

The study can support Educational Psychologists, schools and services in selecting, implementing and evaluating CBT-based interventions for children with

ASD who present with emotional regulation difficulties. The project also adds to the limited empirical research in Ireland which examines Educational Psychologists use of interventions for children with ASD. This research is important as 30% of Educational Psychologist's total caseload consists of implementing interventions for children with ASD. Furthermore, emotional regulation challenges often the primary referral reason for intervention and assessment (Mazefsky et al., 2013; Robinson, Bond, & Oldfield, 2018). Consequently, dissemination of the findings are essential and this is a key role of an Educational Psychologist (Keith, 2008). Academically, this impact can be presented through the dissemination of the research in scholarly journals. At a regional and national level, the impact of the research can be disseminated through public engagements such as presentations at conferences in the educational and psychology fields.

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Appendices

Appendix A: Excluded Articles

Articles excluded at full text screening from database searches

Excluded studies	Rational for exclusion
1. Edgington, L., Hill, V., & Pellicano, E. (2016). The design and implementation of a CBT-based intervention for sensory processing difficulties in adolescents on the autism spectrum. *Research in developmental disabilities, 59*, 221-233	Criteria 4
2. Nadeau, J. M., Arnold, E. B., Storch, E. A., & Lewin, A. B. (2014). Family cognitive-behavioral treatment for a child with autism and comorbid obsessive compulsive disorder. *Clinical Case Studies*, *13*(1), 22-36. doi:10.1177/1534650113504488	Criteria 3
3. Shaffer, R. C., Wink, L. K., Ruberg, J., Pittenger, A., Adams, R., Sorter, M., … Erickson, C. A. (2019). Emotion regulation intensive outpatient programming: Development, feasibility, and acceptability. *Journal of Autism and Developmental Disorders*, *49*(2), 495–508. https://doi-org.libraryproxy.mic.ul.ie/10.1007/s10803-018-3727-2	Criteria 3 (b)
4. Yack, L. (2016). *Intervention to Increase Self-Regulation in Kindergarten Students*. (Post	

	Masters dissertation). Retrieved from http://www.zonesofregulation.com/research.html.	Criteria 1; Criteria 4

Appendix B: Mapping the Field

Mapping the field

Study	Participants	Intervention	Design	Control	Measure	Outcomes
Baumin ger, 2007	N=19 HFASD children aged 7-11in mainstream Israeli schools Asd only	Individual Cognitive behavioural ecological (CB-E) intervention for HFASD Delivered by teacher (3hr per week over 7 months), older peer (x2 per week) and parents (social tasks) No training noted	Utilised blind observe rs and unconn ected teacher report Pre/pos t and follow up measur es	No control group	7 total Social interactio n measure Problem-solving measure SSRS-T Self-reports (x2) Emotion al recogniti on measure	Improved social behaviours at post and follow up Significant decrease in low level behaviours (p<.001) Significant effect of time on problem solving, emotional knowledge and emotional recognition No significant time effect on self-

						perception or loneliness
Factor et al., 2019	23 children aged 4-7 and their parents	The Stress and Anger Management Programme (STAMP) 9 sessions Parent ER sessions (psychoeducation). Implemented by researchers no information on fidelity	A RCT	Random assignment to treatment or waitlist Follow-up measures included	ERC Strengths and Difficulties questionnaire Parent confidence ratings	Significant difference in parent confidence ratings for pre-treatment versus posttreatment significant change in total internalising and externalizing behaviours on the SDQ No significant changes were noted in ER for either group.

Fujii et al., 2013	12 children aged 7-11 greater LA ASD clinic ASD and at least one anxiety disorder IQ>70	5 graduate students and 5 postdoctoral students 8hr training, manual and weekly supervision Building confidence CBT-32 sessions	A control study design Bock-randomised by sex and age Assessment by independent evaluators blind to treatment condition	Control treatment as usual (TAU) (receiving at least one service)	CRS anxiety rating –at least moderate severe anxiety	71.4% in IT no longer met diagnostic criteria for primary anxiety disorder, all TAU still met criteria Three case study examples
Lee et al., 2018	Eight children IQ>70 General education	Small group-format once a week x10 weeks and one individual session	Pre and post-test design Independent treatme	No control-3 independent groups	Emotional skills assessment BERS-Chinese VABS-Chinese	Children's emotional skills (*d*= 4.55), total behavioural strength (*d*= 0.96) and emotional

		Three graduate students - prior training and delivery	nt fidelity by graduate/supervisor		Parent reported Social validity	competence and adaptive functioning in communication (d=1.07) sig improved Affective strength (Z=-1.49,p=0.14, d=0.58)
Scarpa & Reyes, 2011	Eleven 5-7 year olds, European American and their mothers ASD	Children: One hour sessions over 9 weeks Parent group meetings Treatment manual and adherence followed Therapists trained and supervised by a clinical psychologist	Pre-post-test design	Randomly assigned to experimental or delayed treatment control	Emotional regulation checklist Behavioural monitoring sheet Self-confidence parent and child scale	Parents: observed a trend for shorter duration per episode after treatment; significantly higher levels of confidence in their own and child's emotional regulation (p<.05)

					Reading groups vignettes quantity scores	Significantly > average number of strategies than delayed group Reduction in Negativity/ Lability subscale and increased scores on ER checklist after treatment on whole sample
Thomson et al., 2015	13 male children with ASD aged 8-12 years and their parents (USA) IQ>80	Modified version of SAS Jr Detective program-group intervention 10 weeks	Blind rater outcome measure Pre-post	No control	Parent: ERC, ADIS-P-IV, BASC-2 Child: CEM	Parents: less lability and negativity on ERC, less internalising and behaviour symptoms

	Did not need to meet clinical cut offs for mood, anxiety or behavioural disorders	Therapists received training and supervised; mock sessions			scale and scenarios Blind rater: Clinical global Impressions scale Weekly feasibility measure	and more adaptive behaviours on the BASC-2 Child: decrease in dysregulation Blind rater: decrease in overall pathology on CGI-I and CGI-S
Weiss et al., 2018	68 children with ASD (8-12 years)and their parents in Toronto Did not need to have co-morbidity- 88% emotional problems, 93% anxiety or mood disorder	SAS (jr detective) 10 sessions over 10-14 weeks Clinical psychology graduates and postdoctoral fellows –one day training, manual, weekly supervision	Random assignment to IT or waitlist Pre, post and follow up. Blind evaluator	Waitlist control	*Primary outcomes:* Child: CEM Dylan being teased, James and the ,maths test (scenarios)	Significant difference between groups posttreatment (p=.003) Treatment gains maintained at follow-up No change on child report Parent: improveme

		and mock sessions			Parent: ERC ERSSQ *Secondary outcomes:* BASC-2 CGI-S and CGI-I	nt in internalising and externalising behaviours and overall symptom severity
Wood et al., 2009	19 ASD and anxiety 7-11 years and parents in USA.	16 sessions Clinical or educational psychology students-8hr training, manual and weekly supervision Building confidence CBT modified	Random assignment to IT or waitlist Pre ,post and follow-up Assessment conducted by independent evaluat	Waitlist control	SRS ADIS-C/P (parent and child)	IT outperformed waitlist group at posttreatment on total parent report on autism symptoms (Cohen's *d* .77). maintained at follow-up

			ors-blind			
Wood et al., 2014	13 children ASD and comorbid anxiety IQ>70 Mixture of mainstream, special school an special class	Community based psychosocial treatment-32 sessions CBT) 16 (TAU) Clinical or educational psychology students-8hr training, manual and weekly supervision Building confidence CBT modified	Random assignment Pre-post	CBT and TAU	Observed social communication-Related Autism Symptom Severity Psychiatric services assessment (SACA)	Significant differences between groups on solitary, Any peer interaction, positive or appropriate interaction with peers and positive or appropriate response to child by peers (*ps*<.05). Posttreatment CBT over TAU large effect sixes (*ds*= 1.34-1.62)

Appendix C: Weight of Evidence Ratings

WoE A weighting criteria: Measurement

Weighting	Criteria
High (3)	Study used multiple measures and multiple sources to measure outcomes. Validity of measures reported for specific target group Most of the measures used have a reliability coefficient >0.85.
Medium (2)	Study used multiple methods OR multiple sources to measure outcomes. Validity of measures reported for general population Most of the measures used have a reliability >0.7
Low (1)	No multiple methods used to measure outcomes. Validity of measures unknown/unable to code. Reliability coefficient of at least 0.5
(0)	Measures used in study have poor reliability scores and are the only source/measure.

WoE A weighting criteria: Comparison

Weighting	Criteria
High (3)	An active comparison group was used Group equivalence established (through random assignment/post hoc match set/statistical matching) Change agents counter balanced and low attrition rates reported at post or (and follow up if appropriate)
Medium (2)	No intervention group type (e.g. waitlist or no intervention). At least 2 of the following: • Change agents counter balanced • Group equivalence established • Low attrition rates
Low (1)	A comparison group was included in the study At least 1 of the following: • Change agents counter balanced • Group equivalence established • Low attrition rates
(0)	No attempt to establish group equivalence. High attrition rates >30%.

WoE A weighting criteria: Fidelity

Weighting	Criteria
High (3)	Evidence of adherence through ongoing supervision and/or coding sessions and/or audio/video tapes implementation Use of a manual containing detailed accounts of the exact procedures and sequence of sessions OR delivery of formal training. Procedures for adaptation given
Medium (2)	Use of a manual containing a broad overview of the intervention and a description of different phases OR delivery of formal training. At least one of the following: • ongoing supervision/consultation • coding sessions/lessons • audio/video tapes implementation
Low(1)	Use of a manual stated At least one of the following: • ongoing supervision/consultation • coding sessions/lessons • audio/video tapes implementation
(0)	Little/No evidence of suitable approaches/measures to ensure implementation fidelity. Adaptation procedures are not specified.

WoE B weighting criteria

Weighting	Criteria
High (3)	The study includes an active control group. Have completed pre-intervention and post-intervention assessment on the primary outcome measure of emotional regulation Follow-up measurement Random allocation of participants to the intervention or control group.
Medium (2)	The study includes a waitlist/treatment as usual group Have completed pre-intervention and post-intervention assessment on the primary outcome measure of emotional regulation Have used non-random allocation to the intervention and comparison group.
Low(1)	Have completed pre-intervention and post-intervention assessments for an emotional skill outcome Has no comparison group.

WoE C weighting criteria

Weighting	Criteria
High (3)	A CBT-based emotional regulation intervention which lasted > 8 sessions. Emotional regulation outcomes are measured for all groups. The intervention is delivered by a trained professional Intervention is implemented with children with an ASD diagnosis only
Medium (2)	A CBT-based intervention for emotional regulation and lasted > 8 sessions Emotional regulation outcomes are measured for intervention group. The intervention is delivered by a trained person (e.g. teacher, assistant psychologist). Intervention is implemented with children with an ASD and co-morbid diagnosis (e.g. anxiety disorder)
Low(1)	A CBT-based intervention which measures some emotional regulation outcome and lasted at least 8 sessions. Some emotional skill outcome is measured for the CBT-based intervention group. Intervention is delivered by a person with minimal training Co-morbidity not stated

Summary of Weight of Evidence Ratings A

Studies	Measurement	Comparison	Fidelity	WoE A
Bauminger, 2007	2	0	0	Low
Factor et al., 2019	2.5	2.5	0	Medium
Fujii et al., 2013	2	2	3	Medium
Lee et al., 2019	2.5	0	3	Medium
Scarpa & Reyes, 2011*	2	1	3	Medium
Thomson et al., 2015	3	0	3	Medium
Weiss et al., 2018	3	2	3	High
Wood et al., 2009	1.5	2	3	Medium
Wood et al., 2014	2	2	3	Medium

Summary of Weight of Evidence Ratings B

Studies	Active Control/ Waitlist	Follow-up data and/or pre and post data collected	Random allocation	WoE B
Bauminger, 2007		✓		Medium
Factor et al., 2019	✓	✓	✓	High
Fujii et al., 2013	✓	✓	✓	Medium
Lee et al., 2019		✓		Low
Scarpa & Reyes, 2011*	✓	✓	✓	High
Thomson et al., 2015		✓		Low
Weiss et al., 2018	✓	✓	✓	High
Wood et al., 2009	✓	✓	✓	Low
Wood et al., 2014	✓	✓	✓	Low

Summary of Weight of Evidence Ratings C

Studies	Emotional Regulation outcomes measured for all groups	CBT-based emotional regulation intervention	Intervention >8 sessions	Intervention delivered by trained person/fidelity	WoE C
Bauminger, 2007		✓	✓		Low
Factor et al., 2019	✓	✓	✓	✓	High
Fujii et al., 2013			✓	✓	Medium
Lee et al., 2019	✓	✓	✓	✓	Low
Scarpa & Reyes, 2011*	✓	✓	✓	✓	Medium
Thomson et al., 2015	✓	✓	✓	✓	Medium
Weiss et al., 2018	✓	✓	✓	✓	High
Wood et al., 2009			✓	✓	Low
Wood et al., 2014			✓	✓	Low

Appendix D: Completed Protocol Example

For Thomson et al., 2015

WoE A weighting criteria: Measurement

Weighting	Criteria
High (3)	Study used multiple measures and multiple sources to measure outcomes. Validity of measures reported for specific target group Most of the measures used have a reliability coefficient >0.85.
Medium (2)	Study used multiple methods OR multiple sources to measure outcomes. Validity of measures reported for general population Most of the measures used have a reliability >0.7
Low (1)	No multiple methods used to measure outcomes. Validity of measures unknown/unable to code. Reliability coefficient of at least 0.5
(0)	Measures used in study have poor reliability scores and are the only source/measure.

WoE A weighting criteria: Comparison

Weighting	Criteria
High (3)	An active comparison group was used Group equivalence established (through random assignment/post hoc match set/statistical matching) Change agents counter balanced and low attrition rates reported at post or (and follow up if appropriate)
Medium (2)	No intervention group type (e.g. waitlist or no intervention). At least 2 of the following: • Change agents counter balanced • Group equivalence established • Low attrition rates
Low (1)	A comparison group was included in the study At least 1 of the following: • Change agents counter balanced • Group equivalence established • Low attrition rates

(0)	No attempt to establish group equivalence. *No control group* High attrition rates >30%.

WoE A weighting criteria: Fidelity

Weighting	Criteria
High (3)	Evidence of adherence through ongoing supervision and/or coding sessions and/or audio/video tapes implementation Use of a manual containing detailed accounts of the exact procedures and sequence of sessions OR delivery of formal training. Procedures for adaptation given
Medium (2)	Use of a manual containing a broad overview of the intervention and a description of different phases OR delivery of formal training. At least one of the following: • ongoing supervision/consultation • coding sessions/lessons • audio/video tapes implementation
Low(1)	Use of a manual stated At least one of the following: • ongoing supervision/consultation

	• coding sessions/lessons • audio/video tapes implementation
(0)	Little/No evidence of suitable approaches/measures to ensure implementation fidelity. Adaptation procedures are not specified.

WoE B weighting criteria

Weighting	Criteria
High (3)	The study includes an active control group. Have completed pre-intervention and post-intervention assessment on the primary outcome measures of emotional regulation Follow-up measurement Random allocation of participants to the intervention or control group.
Medium (2)	The study includes a waitlist/treatment as usual group Have completed pre-intervention and post-intervention assessment on the primary outcome measure of emotional regulation

	Have used non-random allocation to the intervention and comparison group.
Low(1)	Have completed pre-intervention and post-intervention assessments for an emotional skill outcome Has no comparison group.

WoE C weighting criteria

Weighting	Criteria
High (3)	A CBT-based emotional regulation intervention which lasted > 8 sessions. Emotional regulation outcomes are measured for all groups The intervention is delivered by a trained professional Intervention is implemented with children with an ASD diagnosis only
Medium (2)	A CBT-based intervention for emotional regulation and lasted > 8 sessions Emotional regulation outcomes are measured for intervention group

	The intervention is delivered by a trained person (e.g. teacher, assistant psychologist). Intervention is implemented with children with an ASD and co-morbid diagnosis (e.g. anxiety disorder)
Low(1)	A CBT-based intervention which measures some emotional regulation outcome and lasted at least 8 sessions. Some emotional skill outcome is measured for the CBT-based intervention group. Intervention is delivered by a person with minimal training Co-morbidity not stated

Appendix E: Social Validity

How pleased are you that your class participated in the intervention?

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Compared to before the intervention, my class appears to regulate their emotions more?

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Compared to before the intervention, my class appears to be more aware of their emotions more.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

The intervention would be good to use with other students.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

I would recommend the intervention to my colleagues.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

I will continue using the strategies of the intervention with my class.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

The strategies in the intervention are easily implemented in a classroom situation.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Any other comments?

_____

_____

_____

_____

_____

Appendix F: Parent Consent Form

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD).

Informed consent form for parents

- I have read and understood the Participant Information Letter
- I understand what the project is about.
- I know that my child's participation is voluntary and that he/she can withdraw from the project at any stage without giving any reason and without consequence.
- I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason and without consequence.
- I am aware that the results will be kept confidential.
- I have read this form completely, I am 18 years of age or older and I am happy to take part in the study and I am happy to give permission for my child to take part in the Zones of Reguation intervention.

Signed:_____ Date:_____

Appendix G: Staff Consent Form

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD).

Informed consent form for school staff

- I have read and understood the Participant Information Letter
- I understand what the project is about.
- I know that my students participation is voluntary and that he/she can withdraw from the project at any stage without giving any reason and without consequence.
- I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason and without consequence.
- I am aware that the results will be kept confidential.
- I have read this form completely, I am 18 years of age or older and I am happy to take part in the study.
- I am happy for my class/students to take part in the study.

Signed:_____ Date:_____

Appendix H: Child Consent Form

Looking at how the Zones of Regulation intervention can help me to manage my emotions

Please circle <u>yes</u> or <u>no</u>

My name is_____ **I am going to do lessons each week that involve talking and learning about my feelings and emotions.**	**Yes**	**No**
I know that I don't have to do the lessons if I don't want to.	Yes	No
I know that whenever I feel like stopping that's okay, I won't get into trouble and I don't have to say why I feel like stopping.	Yes	No
I know this isn't a test and by doing the lessons and activities I am just helping out Aoife with her project	Yes	No

Signed:_____ Date:_____

Appendix I: Letter to The Principal

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD).

My name is Aoife Lalor and I am currently completing a doctorate in Educational and Child Psychology at Mary Immaculate College under the supervision of Dr Margaret Farrelly. As part of my doctoral research, I aim to evaluate the effectiveness of the Zones of Regulation cognitive behavioural intervention programme. The Zones of Regulation® curriculum (or "The Zones" for short), is an intervention programme designed to teach skills in the area of self-regulation. Self-regulation can go by many names, such as self-control, self-management, and impulse control. The current study will focus on the effectiveness of the Zones of Regulation on emotional regulation outcomes of children with Autism Spectrum Disorder within an Irish context. I am writing to invite you and your school to participate in the research.

What will teachers have to do?

I am writing to ask permission to deliver the intervention within the classroom environment. Teachers will be given a short questionnaire to complete before and after the intervention. The questionnaire is designed to measure how often the student displays certain skills and behaviours.

What will my students have to do?

Your students/classes will be asked to participate in lessons from the Zones programme over the course of six weeks. The students will be asked to complete one questionnaire on managing emotions before and after the intervention. Their parents will also be asked to complete two questionnaires. The children will be randomised into one of two groups/classes; intervention group or delayed intervention group. Both groups will receive the intervention over 6-8 weeks. The lessons are between one and one and half hours in length.

What are the benefits and risks of this research?

While there are no obvious risks associated with the research, the researcher will consider unforeseen risks and weigh these against the benefits of the study. The lessons are designed to help children recognise when they are in the different zones as well as learn how to use strategies to change or stay in the zone they are in. In addition to addressing self-regulation, your students will gain an increased vocabulary of emotional terms, skills in reading other people's facial expressions, perspective about how others see and react to their behaviour, insight into events that trigger their behaviour, calming and alerting strategies, and problem-solving skills. A critical aspect of this curriculum is that all team members (parents/guardians/teachers) know and understand The Zones language. This creates a comfortable and supportive environment. You can support your students during this process by using the language and the concepts of the Zones.

What happens if I want to withdraw from the project or intervention?

You have the right to withdraw your school from the project at any stage without giving a reason and without consequence. You have the right to withdraw a student/class from the intervention at any stage.

Anonymity and confidentiality

All information and data collected will be anonymised, stored securely and will not be released to any third party. A random ID number will be generated for each participant and it is this number rather than the participants name which will be held with the data to maintain anonymity.

How will the information be used / disseminated?

Results from the combined questionnaires will be used in the results section of my thesis project. Only summary and anonymised data will be shown.

What happens to this information?

Paper data will be stored in a locked filing cabinet and soft data on a password protected computer file. In accordance with the MIC Record Retention Schedule all anonymised data will be stored indefinitely.

Thank you for taking the time to read this. I would be most grateful if you would consider taking part in the project and allowing your school to take part in the intervention. Please do not hesitate to contact me or my supervisor if you have any further questions at:

0869961research@gmail.com Aoife Lalor (Principal Researcher)

Margaret.Farrelly@mic.ul.ie Margaret Farrelly (Project Supervisor)

If you have concerns about this study and wish to contact someone independent, you may also contact:

MIREC Administrator, Research and Graduate School, Mary Immaculate College, South Circular Road, Limerick. Telephone 061-204980/ E-mail: mirec@mic.ul.ie

Yours Sincerely,

_____

Aoife Lalor (Trainee Educational Psychologist).

Appendix J: Letter to Guardians

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD)

Information Sheet for Parents/Guardians

Dear parent/guardian,

My name is Aoife Lalor and I am currently completing a doctorate in Educational and Child Psychology at Mary Immaculate College under the supervision of Dr Margaret Farrelly. As part of my doctoral research, I aim to evaluate the effectiveness of the Zones of Regulation cognitive behavioural intervention programme. The Zones of Regulation® curriculum (or "The Zones" for short), is an intervention programme designed to teach skills in the area of self-regulation. Self-regulation can go by many names, such as self-control, self-management, and impulse control. The current study will focus on the effectiveness of the Zones of Regulation on emotional regulation outcomes of children with Autism Spectrum Disorder within an Irish context. I am writing to invite you and your child to participate in the research

What will I have to do?

You will be given two short questionnaires before and after the delivery of the Zones. The questionnaires are designed to measure how often your child displays certain skills and behaviours. The questionnaires will look at how your child manages their emotions. You can support your child during this process by using the language and

talk about the concepts of the Zones. A sheet with the Zones vocabulary will be given to the children to bring home during the first lesson.

What will my child have to do?

Your child will be asked to participate in activities and games from the Zones programme over the course of six weeks. Your child will also be asked to complete one questionnaire on managing emotions before and after the intervention. The children will be randomised into one of two groups; intervention group or delayed intervention group. Both groups will receive the intervention over 6-8 weeks.

What is involved for the teacher?

The lessons will take place in the classroom with the class teacher present (and Special Needs Assistant present where appropriate). The class teacher will complete one questionnaire, before and after the intervention. This includes information on how your child is managing his/her emotions.

What are the benefits and risks of this research?

While there are no obvious risks associated with the research, the researcher will consider unforeseen risks and weigh these against the benefits of the study. The lessons are designed to help children recognise when they are in the different zones as well as learn how to use strategies to change or stay in the zone they are in. In addition to addressing self-regulation, your child will gain an increased vocabulary of emotional terms, skills in reading other people's facial expressions, perspective about how others see and react to their behaviour, insight into events that trigger their behaviour, calming and alerting strategies, and problem-solving skills.

What if I do not want my child to take part?

Participation in the Zones intervention is voluntary. If you do not wish your child to take part in the group intervention you can sign the attached parent opt-out form.

What happens if we want to withdraw from the project or intervention?

You and your child have the right to withdraw from the project at any stage without giving a reason and without consequence. You also have the right to withdraw your child from the group intervention at any stage. You and your child will be informed of this before completion of the questionnaires at each stage of the project.

Anonymity and confidentiality

All information and data collected will be anonymised, stored securely and will not be released to any third party. A random ID number will be generated for each participant and it is this number rather than the participants name which will be held with the data to maintain anonymity.

How will the information be used / disseminated?

Results from the combined questionnaires will be used in the results section of my thesis project. Only summary and anonymised data will be shown.

What happens to this information?

Paper data will be stored in a locked filing cabinet and soft data on a password protected computer file. In accordance with the MIC Record Retention Schedule all anonymised data will be stored indefinitely.

Thank you for taking the time to read this. I would be most grateful if you would consider taking part in the project and allowing your child to take part in the intervention. Please do not hesitate to contact me or my supervisor if you have any further questions at:

0869961research@gmail.com Aoife Lalor (Principal Researcher)

Margaret.Farrelly@mic.ul.ie Margaret Farrelly (Project Supervisor)

If you have concerns about this study and wish to contact someone independent, you may also contact:

MIREC Administrator, Research and Graduate School, Mary Immaculate College, South Circular Road, Limerick. Telephone 061-204980/ E-mail: mirec@mic.ul.ie

Yours Sincerely,

_____

Aoife Lalor (Trainee Educational Psychologist).

Appendix K: Letter to Teachers

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD)

Information Sheet for teachers

Dear teacher,

My name is Aoife Lalor and I am currently completing a doctorate in Educational and Child Psychology at Mary Immaculate College under the supervision of Dr Margaret Farrelly. As part of my doctoral research, I aim to evaluate the effectiveness of the Zones of Regulation cognitive behavioural intervention programme. The Zones of Regulation® curriculum (or "The Zones" for short), is an intervention programme designed to teach skills in the area of self-regulation. Self-regulation can go by many names, such as self-control, self-management, and impulse control. The current study will focus on the effectiveness of the Zones of Regulation on emotional regulation outcomes of children with Autism Spectrum Disorder within an Irish context. I am writing to invite you and your class to participate in the research.

What will I have to do?

I am writing to ask permission to deliver the intervention within your classroom environment. You will be given a short questionnaire to complete before and after the intervention. The questionnaire is designed to measure how often your student displays certain skills and behaviours.

What will my students have to do?

Your student/class will be asked to participate in lessons from the Zones programme over the course of six weeks. The students will be asked to complete one questionnaire on managing emotions before and after the intervention. Their parents will also be asked to complete two questionnaires. The children will be randomised into one of two groups/classes; intervention group or delayed intervention group. Both groups will receive the intervention over 6-8 weeks. The lessons are between one and one and half hours in length.

What are the benefits and risks of this research?

While there are no obvious risks associated with the research, the researcher will consider unforeseen risks and weigh these against the benefits of the study. The lessons are designed to help children recognise when they are in the different zones as well as learn how to use strategies to change or stay in the zone they are in. In addition to addressing self-regulation, your students will gain an increased vocabulary of emotional terms, skills in reading other people's facial expressions, perspective about how others see and react to their behaviour, insight into events that trigger their behaviour, calming and alerting strategies, and problem-solving skills. A critical aspect of this curriculum is that all team members (parents/guardians/teachers) know and understand The Zones language. This creates a comfortable and supportive environment. You can support your student during this process by using the language and the concepts of the Zones.

What happens if I want to withdraw from the project or intervention?

You have the right to withdraw yourself or your class from the project or intervention at any stage without giving a reason and without consequence. You will be informed of this before completion of the questionnaires at each stage of the project.

Anonymity and confidentiality

All information and data collected will be anonymised, stored securely and will not be released to any third party. A random ID number will be generated for each participant and it is this number rather than the participants name which will be held with the data to maintain anonymity.

How will the information be used / disseminated?

Results from the combined questionnaires will be used in the results section of my thesis project. Only summary and anonymised data will be shown.

What happens to this information?

Paper data will be stored in a locked filing cabinet and soft data on a password protected computer file. In accordance with the MIC Record Retention Schedule all anonymised data will be stored indefinitely.

Thank you for taking the time to read this. I would be most grateful if you would consider taking part in the project and allowing your class to take part in the intervention. Please do not hesitate to contact me or my supervisor if you have any further questions at:

0869961research@gmail.com Aoife Lalor (Principal Researcher)

Margaret.Farrelly@mic.ul.ie Margaret Farrelly (Project Supervisor)

If you have concerns about this study and wish to contact someone independent, you may also contact:

MIREC Administrator, Research and Graduate School, Mary Immaculate College, South Circular Road, Limerick. Telephone 061-204980/ E-mail: mirec@mic.ul.ie

Yours Sincerely, _____

Aoife Lalor (Trainee Educational Psychologist).

Appendix L: Letter to Children

Looking at how the Zones can help me to manage my emotions.

I want to tell you about a research project I am doing. A research project is a way to learn more about something. I would like to find out more about how the **Zones** programme could help children like you to manage their emotions. The Zones of Regualtion can help you become more aware of your emotions and show you how to use strategies to help you feel calm when you may feel angry, anxious or worried.

If you agree to join this study, you will be asked to be involved in different activties in your classroom. These include watching video clips, making posters, talking in small groups and doing some role play.

We may learn something that will help other children. This study will help us learn more about managing emotions. This is often called *emotional regulation*.

You do not have to join this study. It is up to you. You can say okay now. You can also say no. You can say okay now and then you can change your mind later. If you want to stop, then all you have to do is to tell me or your teacher/parent/guardian that you want to stop. No one will be mad at you if you don't want to be in the study or if you join the study and then change your mind later.

Before you say yes or no to being in this study, I will answer any questions you have. If you join the study, you can ask questions at any time. Just tell me or your teacher/parent/guardian that you have a question.

I will also talk to your teacher, parents or guardians about this study. You can talk this over with them before you decide.

Aoife Lalor (Trainee Educational Psychologist).

Appendix M: Opt-out Form

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD) in Ireland.

Parent Opt-out form

I have read the information about the study and talked about this with my child.

I am not willing for my child to take part in the study.

Please tick the box below.

☐

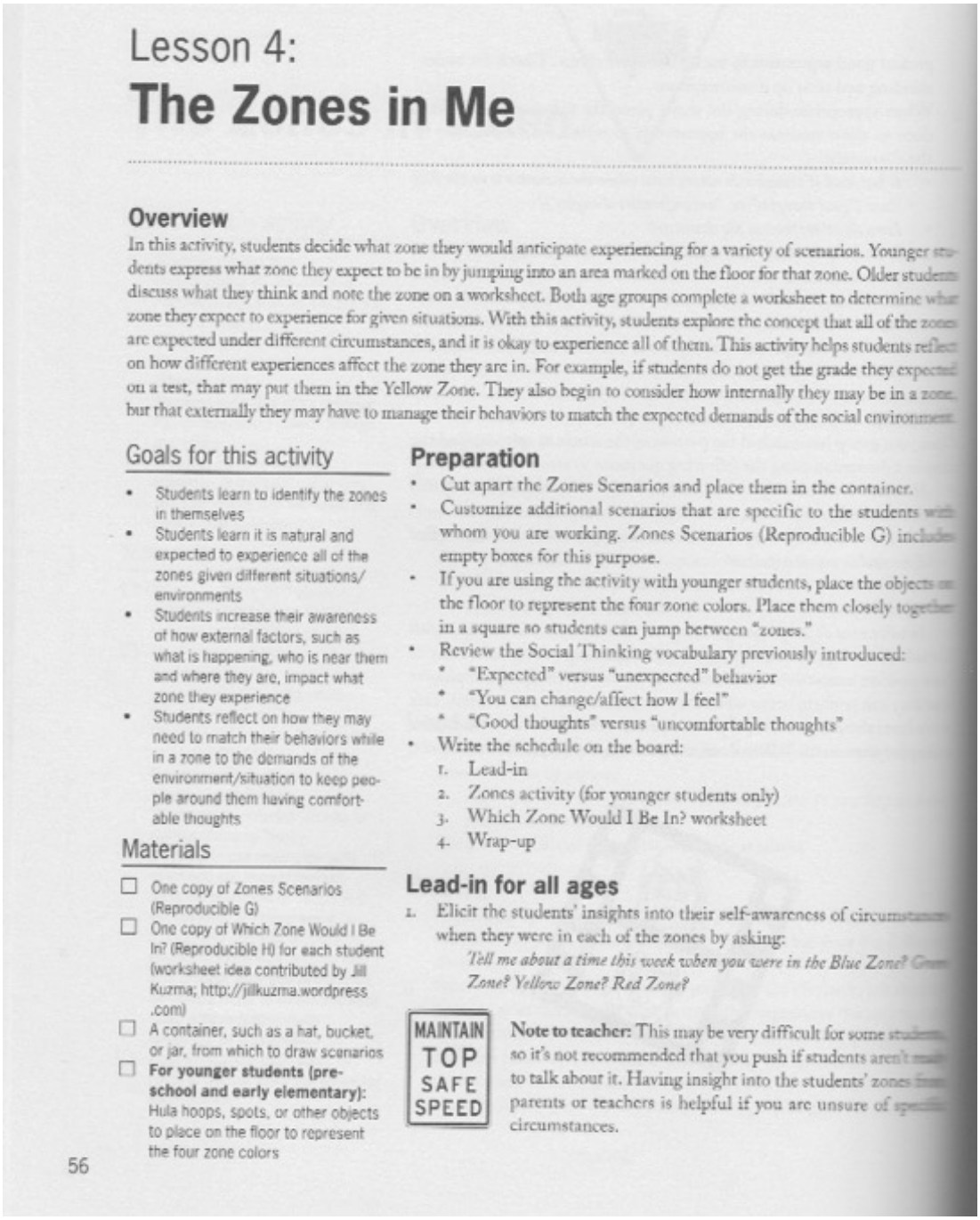
Name of child: ……

Class: ……..

Signature of parent/guardian: ……

Date: ……..

Appendix N: Sample Lesson Plan



Lesson 4:

The Zones in Me

Overview

In this activity, students decide what zone they would anticipate experiencing for a variety of scenarios. Younger students express what zone they expect to be in by jumping into an area marked on the floor for that zone. Older students discuss what they think and note the zone on a worksheet. Both age groups complete a worksheet to determine what zone they expect to experience for given situations. With this activity, students explore the concept that all of the zones are expected under different circumstances, and it is okay to experience all of them. This activity helps students reflect on how different experiences affect the zone they are in. For example, if students do not get the grade they expected on a test, that may put them in the Yellow Zone. They also begin to consider how internally they may be in a zone, but that externally they may have to manage their behaviors to match the expected demands of the social environment.

Goals for this activity

- Students learn to identify the zones in themselves
- Students learn it is natural and expected to experience all of the zones given different situations/environments
- Students increase their awareness of how external factors, such as what is happening, who is near them and where they are, impact what zone they experience
- Students reflect on how they may need to match their behaviors while in a zone to the demands of the environment/situation to keep people around them having comfortable thoughts

Materials

- ☐ One copy of Zones Scenarios (Reproducible G)
- ☐ One copy of Which Zone Would I Be In? (Reproducible H) for each student (worksheet idea contributed by Jill Kuzma; http://jillkuzma.wordpress.com)
- ☐ A container, such as a hat, bucket, or jar, from which to draw scenarios
- ☐ **For younger students (preschool and early elementary):** Hula hoops, spots, or other objects to place on the floor to represent the four zone colors

Preparation

- Cut apart the Zones Scenarios and place them in the container.
- Customize additional scenarios that are specific to the students with whom you are working. Zones Scenarios (Reproducible G) includes empty boxes for this purpose.
- If you are using the activity with younger students, place the objects on the floor to represent the four zone colors. Place them closely together in a square so students can jump between "zones."
- Review the Social Thinking vocabulary previously introduced:
  - "Expected" versus "unexpected" behavior
  - "You can change/affect how I feel"
  - "Good thoughts" versus "uncomfortable thoughts"
- Write the schedule on the board:
  1. Lead-in
  2. Zones activity (for younger students only)
  3. Which Zone Would I Be In? worksheet
  4. Wrap-up

Lead-in for all ages

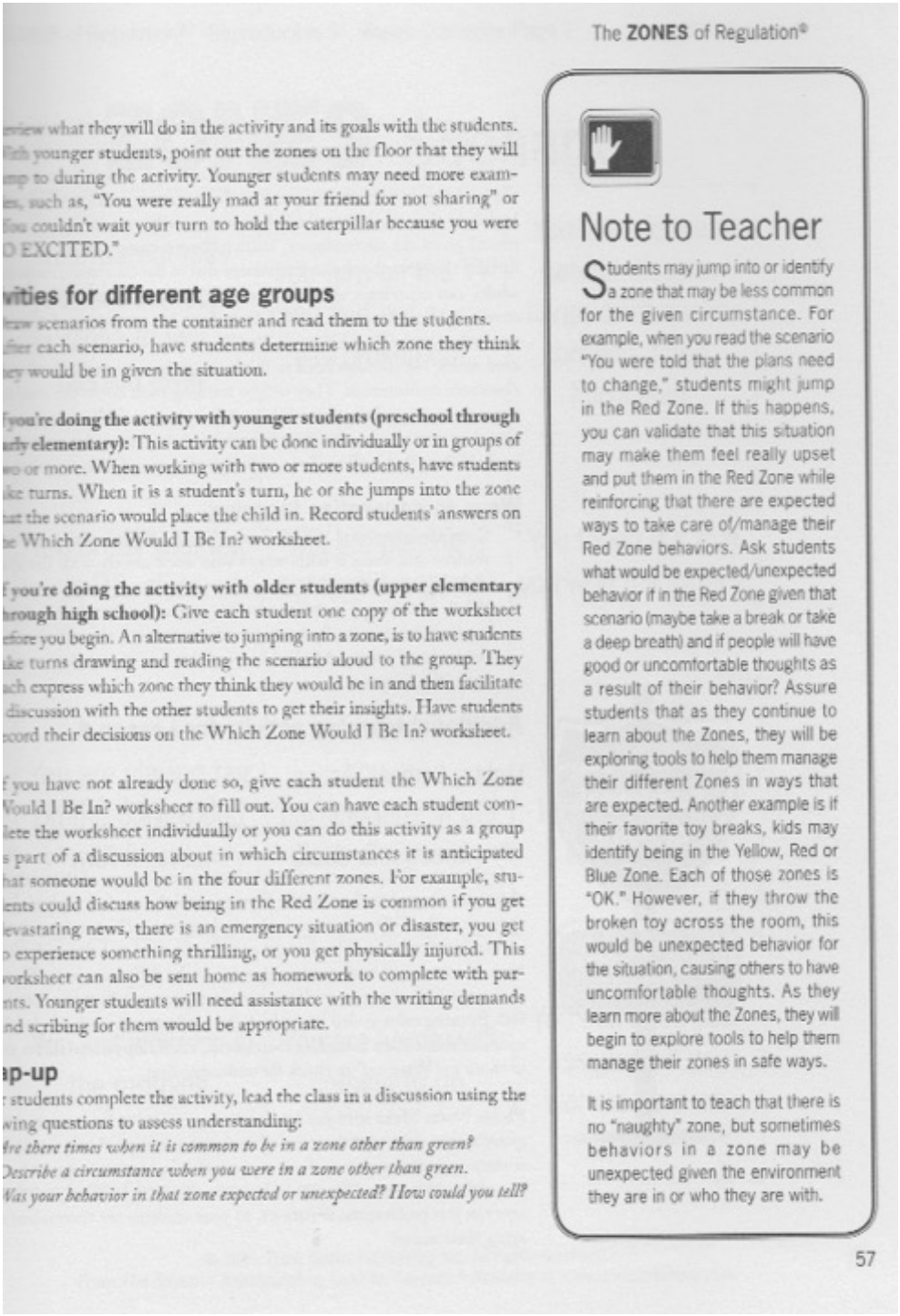
1. Elicit the students' insights into their self-awareness of circumstances when they were in each of the zones by asking:

   Tell me about a time this week when you were in the Blue Zone? Green Zone? Yellow Zone? Red Zone?

MAINTAIN TOP SAFE SPEED

Note to teacher: This may be very difficult for some students, so it's not recommended that you push if students aren't ready to talk about it. Having insight into the students' zones from parents or teachers is helpful if you are unsure of specific circumstances.

56



…view what they will do in the activity and its goals with the students. …ith younger students, point out the zones on the floor that they will …mp to during the activity. Younger students may need more exam…es, such as, "You were really mad at your friend for not sharing" or …ou couldn't wait your turn to hold the caterpillar because you were …O EXCITED."

…vities for different age groups

…aw scenarios from the container and read them to the students. …fter each scenario, have students determine which zone they think …ey would be in given the situation.

…you're doing the activity with younger students (preschool through …rly elementary): This activity can be done individually or in groups of …o or more. When working with two or more students, have students …ke turns. When it is a student's turn, he or she jumps into the zone …at the scenario would place the child in. Record students' answers on …e Which Zone Would I Be In? worksheet.

…you're doing the activity with older students (upper elementary …rough high school): Give each student one copy of the worksheet …efore you begin. An alternative to jumping into a zone, is to have students …ke turns drawing and reading the scenario aloud to the group. They …ch express which zone they think they would be in and then facilitate … discussion with the other students to get their insights. Have students …cord their decisions on the Which Zone Would I Be In? worksheet.

…f you have not already done so, give each student the Which Zone …Would I Be In? worksheet to fill out. You can have each student com…lete the worksheet individually or you can do this activity as a group …s part of a discussion about in which circumstances it is anticipated …hat someone would be in the four different zones. For example, stu…ents could discuss how being in the Red Zone is common if you get …evastating news, there is an emergency situation or disaster, you get …o experience something thrilling, or you get physically injured. This …orksheet can also be sent home as homework to complete with par…nts. Younger students will need assistance with the writing demands …nd scribing for them would be appropriate.

…p-up

…students complete the activity, lead the class in a discussion using the …wing questions to assess understanding:

…re there times when it is common to be in a zone other than green?
…Describe a circumstance when you were in a zone other than green.
…Was your behavior in that zone expected or unexpected? How could you tell?

Note to Teacher

Students may jump into or identify a zone that may be less common for the given circumstance. For example, when you read the scenario "You were told that the plans need to change," students might jump in the Red Zone. If this happens, you can validate that this situation may make them feel really upset and put them in the Red Zone while reinforcing that there are expected ways to take care of/manage their Red Zone behaviors. Ask students what would be expected/unexpected behavior if in the Red Zone given that scenario (maybe take a break or take a deep breath) and if people will have good or uncomfortable thoughts as a result of their behavior? Assure students that as they continue to learn about the Zones, they will be exploring tools to help them manage their different Zones in ways that are expected. Another example is if their favorite toy breaks, kids may identify being in the Yellow, Red or Blue Zone. Each of those zones is "OK." However, if they throw the broken toy across the room, this would be unexpected behavior for the situation, causing others to have uncomfortable thoughts. As they learn more about the Zones, they will begin to explore tools to help them manage their zones in safe ways.

It is important to teach that there is no "naughty" zone, but sometimes behaviors in a zone may be unexpected given the environment they are in or who they are with.

Appendix O: Teacher Questionnaire

ERSSQ - TEACHER VERSION

Directions: This questionnaire is designed to measure **how often** your student displays certain skills and behaviours. Read each question and answer it in terms of your student's behaviour **at the moment**. Consider how often your student does each of the behaviours described?

- If your student **never** does the behaviour, circle the 0
- If your student **rarely** does the behaviour, circle the 1
- If your student **sometimes** does the behaviour, circle the 2
- If your student **often** does the behaviour, circle the 3
- If your student **always** does the behaviour, circle the 4

There are no right or wrong answers. Please **do not skip any items** when completing the questionnaire. Thank you.

Child's name: _____ **Date:** _____

Teacher's name: _____

SKILL/BEHAVIOUR	HOW OFTEN? Never	Rarely	Some-times	Often	Always
1. **Is aware of other people's thoughts and feelings**	0	1	2	3	4
2. **Is able to correctly identify other people's feelings from their facial expression, voice tone and/or body posture**	0	1	2	3	4
3. **Is aware of his/her own thoughts and feelings**	0	1	2	3	4
4. **Controls his/her anger effectively at school**	0	1	2	3	4
5. **Has temper tantrums**	0	1	2	3	4
6. **Controls his/her anxiety effectively at school**	0	1	2	3	4
7. **Uses effective strategies to deal with feelings of sadness and disappointment**	0	1	2	3	4
8. **Thinks about different ways of responding to a problem before reacting**	0	1	2	3	4
9. **Considers the consequences of his/her behaviour before acting**	0	1	2	3	4
10. **Chooses appropriate solutions to social problems**	0	1	2	3	4

SKILL/BEHAVIOUR	HOW OFTEN?				
	Never	Rarely	Some-times	Often	Always
11. Deals with social problems successfully	0	1	2	3	4
12. Recognises when other people are bored by his/her conversation and changes the topic	0	1	2	3	4
13. Makes comments that embarrass others	0	1	2	3	4
14. Invites others to play with him/her in a friendly way	0	1	2	3	4
15. Asks other children if s/he can play with them in a friendly way	0	1	2	3	4
16. Starts conversations with other children in an appropriate way	0	1	2	3	4
17. Is able to maintain a conversation with other children	0	1	2	3	4
18. Talks to other children about topics that they are interested in	0	1	2	3	4
19. Deals effectively with bullying and teasing	0	1	2	3	4
20. Recognises when other people are being sarcastic or teasing	0	1	2	3	4
21. Copes well when s/he makes a mistake	0	1	2	3	4
22. Copes well when s/he loses a game	0	1	2	3	4
23. Apologises when s/he has done something wrong, or hurt someone's feelings	0	1	2	3	4
24. Asks for help when s/he needs it	0	1	2	3	4
25. Tries new tasks or activities	0	1	2	3	4

Appendix P: Parent Questionnaires

ERSSQ

ERSSQ
PARENT VERSION

Directions: This questionnaire is designed to measure **how often** your child displays certain skills and behaviours. Read each question and answer it in terms of your child's behaviour **at the moment**. Consider how often your child does each of the behaviours described:

- If your child **never** does the behaviour, circle the 0
- If your child **rarely** does the behaviour, circle the 1
- If your child **sometimes** does the behaviour, circle the 2
- If your child **often** does the behaviour, circle the 3
- If your child **always** does the behaviour, circle the 4

There are no right or wrong answers. Please **do not skip any items** when completing the questionnaire. Thank you.

Your child's name: _____

Child's date of birth: _____ **Date:** _____

How are you related to the child? *(Please circle)*

Mother Father Guardian Other *(Please specify):* _____

	SKILL/BEHAVIOUR	HOW OFTEN? Never	Rarely	Some-times	Often	Always
1.	Is aware of other people's thoughts and feelings	0	1	2	3	4
2.	Is able to correctly identify other people's feelings from their facial expression, voice tone and/or body posture	0	1	2	3	4
3.	Is aware of his/her own thoughts and feelings	0	1	2	3	4
4.	Controls his/her anger effectively at school	0	1	2	3	4
5.	Controls his/her anger effectively at home	0	1	2	3	4
6.	Has temper tantrums	0	1	2	3	4
7.	Controls his/her anxiety effectively at school	0	1	2	3	4
8.	Controls his/her anxiety effectively at home	0	1	2	3	4
9.	Uses effective strategies to deal with feelings of sadness or disappointment	0	1	2	3	4

	SKILL/BEHAVIOUR	HOW OFTEN? Never	Rarely	Some-times	Often	Always
10.	Thinks about different ways of responding to a problem situation before reacting	0	1	2	3	4
11.	Considers the consequences of his/her behaviour before acting	0	1	2	3	4
12.	Chooses appropriate solutions to social problems	0	1	2	3	4
13.	Deals with social problems successfully	0	1	2	3	4
14.	Recognises when other people are bored by his/her conversation, and changes the topic	0	1	2	3	4
15.	Makes comments that embarrass others	0	1	2	3	4
16.	Invites others to play with him/her in a friendly manner	0	1	2	3	4
17.	Asks other children if s/he can play with them in a friendly manner	0	1	2	3	4
18.	Starts conversations with other children in a socially appropriate way	0	1	2	3	4
19.	Is able to maintain a conversation with other children	0	1	2	3	4
20.	Talks to other children about topics that they are interested in	0	1	2	3	4
21.	Deals effectively with bullying and teasing	0	1	2	3	4
22.	Recognises when other people are being sarcastic or teasing	0	1	2	3	4
23.	Copes effectively when s/he makes a mistake	0	1	2	3	4
24.	Copes effectively when s/he loses a game	0	1	2	3	4
25.	Apologises when s/he has done something wrong, or hurt someone's feelings	0	1	2	3	4
26.	Asks for help when s/he needs it	0	1	2	3	4
27.	Tries new tasks or activities	0	1	2	3	4

Social Skills Training Institute

ERC

ERC

Please rate how often this child exhibits the following behaviors or emotional states.

Never	Sometimes	Often	Always	THIS CHILD:
1	2	3	4	1. Is a cheerful child.
1	2	3	4	2. Exhibits wide mood swings (for example, the child's emotional state is difficult to anticipate because s/he moves quickly from very positive to very negative emotional states).
1	2	3	4	3. Responds positively to neutral or friendly overtures by adults.
1	2	3	4	4. Transitions well from one activity to another (for example, does not become anxious, angry, distressed, or overly excited when moving from one activity to another).
1	2	3	4	5. Can recover quickly from episodes of upset or distress (for example, does not pout or remain sullen, anxious or sad after emotionally distressing events).
1	2	3	4	6. Is easily frustrated.
1	2	3	4	7. Responds positively to neutral or friendly overtures by peers.
1	2	3	4	8. Tantrums easily.
1	2	3	4	9. Is able to delay gratification.
1	2	3	4	10. Takes pleasure in the distress of others (for example, laughs when another person gets hurt or punished; enjoys teasing others).
1	2	3	4	11. Can modulate excitement in emotionally arousing situations (for example, does not get 'carried away' in high-energy play situations, or overly excited in inappropriate contexts).
1	2	3	4	12. Is whiny or clingy with teachers.
1	2	3	4	13. Is prone to disruptive outbursts of energy and exuberance.
1	2	3	4	14. Responds angrily to limit-setting by adults.
1	2	3	4	15. Can say when s/he is feeling sad, angry or mad, fearful or afraid.
1	2	3	4	16. Seems sad or listless.
1	2	3	4	17. Is overly exuberant when attempting to engage others in play.
1	2	3	4	18. Displays flat affect (for example, expression is vacant and unexpressive; child seems emotionally absent).
1	2	3	4	19. Responds negatively to neutral or friendly overtures by peers (for example, speaks in an angry tone of voice; or responds angrily and aggressively).
1	2	3	4	20. Is impulsive.
1	2	3	4	21. Is empathic toward others; shows concern or sadness when others are upset or distressed.
1	2	3	4	22. Displays exuberance that others find intrusive or disruptive.
1	2	3	4	23. Displays appropriate negative affect (for example, anger, fear, frustration, distress) in response to hostile, aggressive or intrusive acts by peers.
1	2	3	4	24. Displays negative affect when attempting to engage others in play.

Appendix Q: Child Questionnaire

ID Number: _____

Children's Emotion Management Scale: **ANGER**

Instructions: Please circle the response that best describes your behavior when you are feeling **mad**.

- Circle 1 if you **hardly-ever** feel this way
- Circle 2 if you **sometimes** feel this way
- Circle 3 if you **often** feel this way

1. When I am feeling mad, I control my temper.	Hardly-Ever **1**	Sometimes **2**	Often **3**
2. I hold my anger in.	Hardly-Ever **1**	Sometimes **2**	Often **3**
3. I stay calm and keep my cool when I am feeling mad.	Hardly-Ever **1**	Sometimes **2**	Often **3**
4. I do things like slam doors when I am mad.	Hardly-Ever **1**	Sometimes **2**	Often **3**
5. I hide my anger.	Hardly-Ever **1**	Sometimes **2**	Often **3**
6. I attack whatever it is that makes me mad.	Hardly-Ever **1**	Sometimes **2**	Often **3**
7. I get mad inside but I don't show it.	Hardly-Ever **1**	Sometimes **2**	Often **3**
8. I can stop myself from losing my temper.	Hardly-Ever **1**	Sometimes **2**	Often **3**
9. I say mean things to others when I am mad.	Hardly-Ever **1**	Sometimes **2**	Often **3**
10. I try to calmly deal with what is making me feel mad.	Hardly-Ever **1**	Sometimes **2**	Often **3**
11. I'm afraid to show my anger.	Hardly-Ever **1**	Sometimes **2**	Often **3**

Children's Emotion Management Scale: **SADNESS**

1. When I'm feeling sad, I can control my crying and carrying on.	Hardly Ever **1**	Sometimes **2**	Often **3**
2. I hold my sad feelings in.	Hardly Ever **1**	Sometimes **2**	Often **3**
3. I stay calm and don't let sad things get to me.	Hardly Ever **1**	Sometimes **2**	Often **3**
4. I whine/fuss about what's making me sad.	Hardly Ever **1**	Sometimes **2**	Often **3**
5. I hide my sadness.	Hardly Ever **1**	Sometimes **2**	Often **3**
6. When I'm sad, I do something totally different until I calm down.	Hardly Ever **1**	Sometimes **2**	Often **3**
7. I get sad inside but don't show it.	Hardly Ever **1**	Sometimes **2**	Often **3**
8. I can stop myself from losing control of my sad feelings.	Hardly Ever **1**	Sometimes **2**	Often **3**
9. I cry and carry on when I'm sad.	Hardly Ever **1**	Sometimes **2**	Often **3**
10. I try to calmly deal with what is making me sad.	Hardly Ever **1**	Sometimes **2**	Often **3**
11. I do things like mope around when I'm sad.	Hardly Ever **1**	Sometimes **2**	Often **3**
12. I'm afraid to show my sadness.	Hardly Ever **1**	Sometimes **2**	Often **3**

Children's Emotion Management Scale: **WORRY**

Instructions: Please circle the response that best describes your behavior when you are feeling **worried.**

- Circle 1 if you **hardly-ever** feel this way
- Circle 2 if you **sometimes** feel this way
- Circle 3 if you **often** feel this way

• 1. I keep myself from losing control of my worried feelings.	Hardly-Ever **1**	Sometimes **2**	Often **3**
2. I show my worried feelings.	Hardly-Ever **1**	Sometimes **2**	Often **3**
3. I hold my worried feelings in.	Hardly-Ever **1**	Sometimes **2**	Often **3**
4. I talk to someone until I feel better when I'm worried.	Hardly-Ever **1**	Sometimes **2**	Often **3**
5. I do things like cry and carry on when I'm worried.	Hardly-Ever **1**	Sometimes **2**	Often **3**
6. I hide my worried feelings.	Hardly-Ever **1**	Sometimes **2**	Often **3**
7. I keep whining about how worried I am.	Hardly-Ever **1**	Sometimes **2**	Often **3**
8. I get worried inside by don't show it.	Hardly-Ever **1**	Sometimes **2**	Often **3**
9. I can't stop myself from acting really worried.	Hardly-Ever **1**	Sometimes **2**	Often **3**
10. I try to calmly settle the problem when I feel worried.	Hardly-Ever **1**	Sometimes **2**	Often **3**

Appendix R: Ethical Approval

Mary Immaculate College Research Ethics Committee

MIREC-4: MIREC Chair Decision Form

APPLICATION NUMBER:	A18-056 FINAL

1. PROJECT TITLE

An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD) in Ireland

2. APPLICANT

Name:	Aoife Lalor
Department / Centre / Other:	Educational Psychology, Inclusive and Special Education
Position:	Postgraduate Researcher

3. DECISION OF MIREC CHAIR

	Ethical clearance through MIREC is required.
	Ethical clearance through MIREC is not required and therefore the researcher need take no further action in this regard.
✓	Ethical clearance is required and granted. Referral to MIREC is not necessary.
	Ethical clearance is required but the full MIREC process is not. Ethical clearance is therefore granted if required for external funding applications and the researcher need take no further action in this regard.
	Insufficient information provided by applicant / Amendments required.

4. REASON(S) FOR DECISION

A18-056 - Aoife Lalor - ***An evaluation of the effectiveness of the Zones of Regulation cognitive behavioural intervention on emotional regulation outcomes for school aged children with Autism Spectrum Disorders (ASD) in Ireland.***

I have reviewed this application and I believe it satisfies MIREC requirements and it therefore approved.

5. DECLARATION (MIREC CHAIR)

Name (Print):	Dr Áine Lawlor
Signature:	Áine Lawlor
Date:	24th January 2019

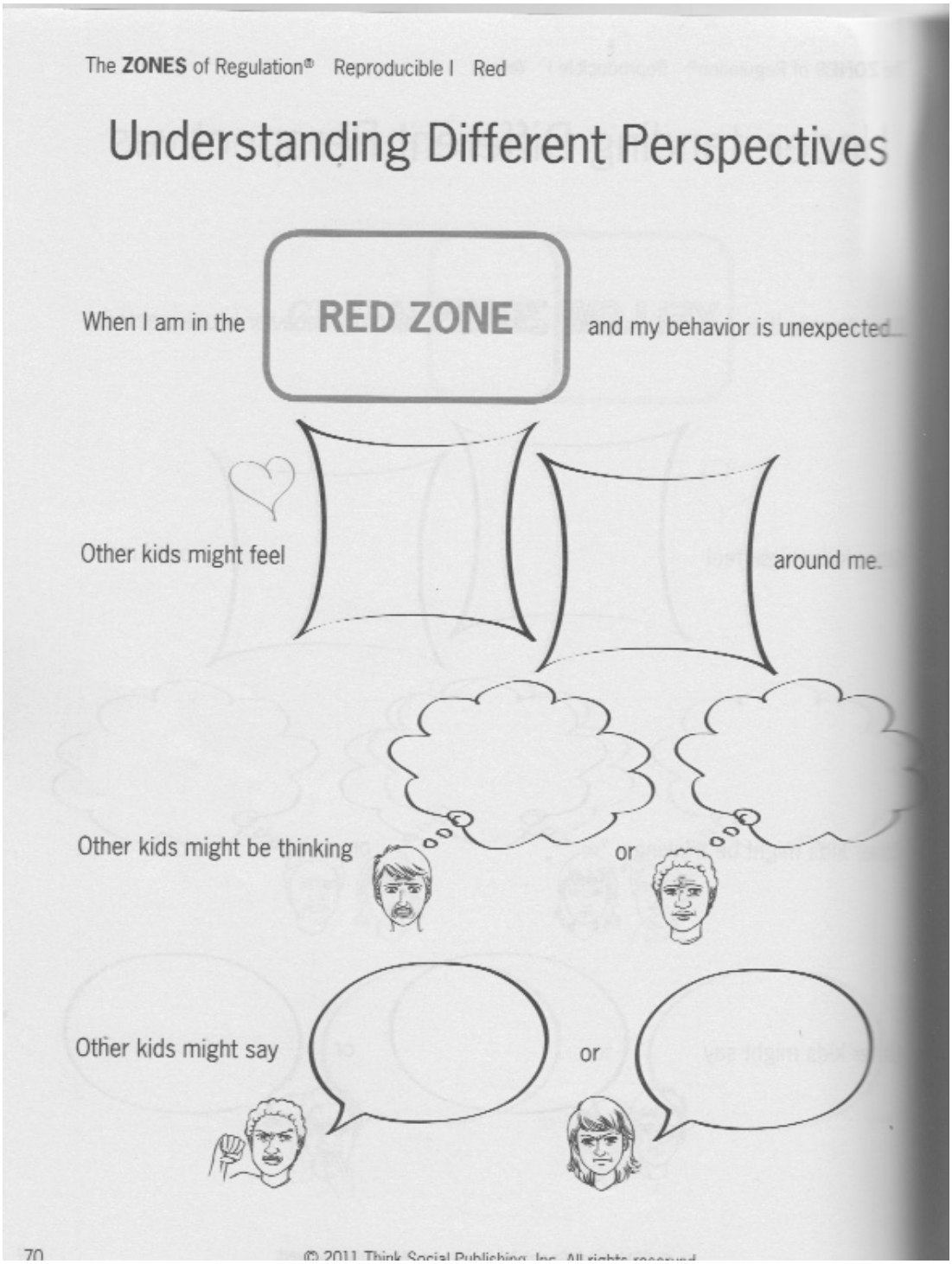
Appendix S: School Enrolment Criteria

Criteria for Enrolment

School X is a special co-educational Catholic Primary School with second level provision.

- The Primary School caters for the educational needs of students diagnosed with Autism / Aspergers Syndrome / Emotional Disturbance. Second Level provision is specifically for students with a primary diagnosis of Autism / Aspergers Syndrome.
- The school caters for students with an I.Q. of Low Average or above (Full Scale IQ 80+) which has to be confirmed by a current (within two years) and conclusive professionals report / psycho-educational assessment.

Appendix T: Examples of Differentiated Instructions



The **ZONES** of Regulation® Reproducible K[1]

Social Behavior Mapping

What's Unexpected for:

Unexpected behaviors	How your behaviors make people FEEL	How people react to how THEY FEEL about your behavior	How YOU FEEL about yourself based on how people react to you
1.			
2.			
3.			
4.			
5.			

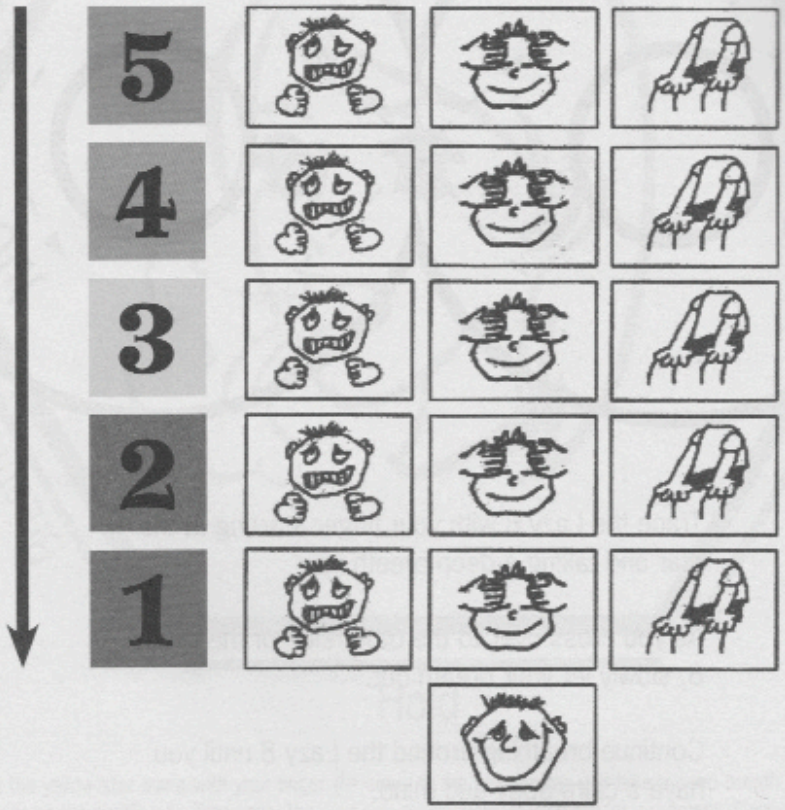
1 Social Behavior Mapping is the original work of Michelle Garcia Winner, *Thinking About YOU, Thinking About ME* (2007), pages 156–157 (www.socialthinking.com). Permission to reproduce Social Behavior Maps was granted by Michelle Garcia Winner.

The **ZONES** of Regulation® Reproducible U

My **Calming** Sequence Visu

Activity: Try this calming sequence. Does it feel good and calming? How can you change it so that it works for you?

This calming sequence goes like this: Squeeze your hands together; close your eyes and rub your head; then rub your legs. Repeat the sequence five times, bringing your stress down.



Buron, Manns, Schultz & Thomas, 2004, From *When My Worries Get Too Big!* K. D. Buron, 2006. Swawnee Mission, KS: AAPC, Reprinted with permission.

120