Support and Space: Exploring the Implementation of a Neuroaffirmative Self-Regulation Framework for Autistic Children Encompassing Environmental, Social and Cognitive Supports

Cora Howe

Supervised by Dr. Claire Griffin

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Abstract

The United Nations Convention on the Rights of Persons with Disabilities (United Nations, 2006) has called for a global human rights approach to remove barriers to enable the full participation of people with disabilities in society. This includes developing environments suitable for autistic people, and evidence-based supports for self-regulation. Self-regulation is necessary to return to a calm state and choose strategies to calm oneself down when experiencing sensory overload (Binns, 2019). Guided by a neuroaffirmative lens, the current study sought to explore environmental, social and cognitive supports for self-regulation for autistic children in a special class setting in Ireland. Firstly, environmental supports were identified and modifications were made to the classroom environment to support regulation. Secondly, social supports were provided through co-regulation, where social partners supported regulation by validating emotions and offering calming strategies (Binns, 2019). Thereafter, the study explored the implementation and effectiveness of an individualised cognitive-based self-regulation intervention using an adapted version of the Zones of Regulation Curriculum (Kuypers, 2011).

The current study adopted a case study design within a reflexive qualitative paradigm (Braun & Clarke, 2022). Participants included six autistic children, their class teacher and parents. Mixed-methods data were collected. Qualitative data included the Sensory Audit for Schools and Classrooms (Middletown Centre for Autism, n.d) and an individual Positive Sensory Profile (Positive About Autism, n.d.) for each child. Semi-structured interviews were also conducted with the class teacher and parents. Quantitative data included teacher- and parent-reported measures of child self-regulation using the Emotion Regulation and Social Skills Questionnaire, at pre-intervention, post-intervention and at a 12-week follow-up (Beaumont & Sofronoff, 2009).

The results of the study provide preliminary support for an environmental, social and cognitive-based self-regulation intervention, with both qualitative and quantitative results observing an improvement in children's self-regulation skills. The results also revealed challenges in implementing this intervention, including a lack of parental engagement, which was related to the need for in-person parental training. The results of the study have significant implications for educational policy and practice, including developing an understanding of suitable environmental, social and cognitive supports to maximise the self-regulation development of autistic people. In light of these findings, implications for policy and practice along with recommendations for future research are explored.

Declaration

I hereby declare that this thesis is entirely my own work and has not been submitted, in whole or in part, for any other awards at this or at any other academic establishment. Where use has been made of the work of other people, it has been fully acknowledged and referenced.

I understand that this thesis will be available to MIC staff and students in paper or electronic form for viewing and for possible research.

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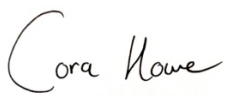
Signature: 

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Glossary

Autism: Autism is a life-long developmental condition that can be described as a different way of perceiving and processing the world (Government of Ireland, 2018; Harvey, 2018).

Co-Regulation: Co-regulation is a symbiotic process, where social partners support each other by being attuned to each other's emotions and helping their social partner to attain goals, and meet the demands of the environment or situation (Kuypers, 2023a).

Dysregulation: States where there is a mismatch between the person's current levels of arousal and the optimal level of arousal for a particular situation (Wass, 2023).

Emotional Regulation: Emotional regulation can be described as processes that influence the magnitude and duration of emotional responses (Scianti et al., 2023).

Self-Regulation: Self-regulation is a dynamic process of coping with stressors and returning to homeostasis where the person is calm and alert (Shanker, 2013; Inzlicht, Werner, Briskin & Roberts, 2023). Self-regulation may also be thought of as the overall regulation of behaviour, thoughts and emotions (Cole, Rom & English, 2019; Inzlicht et al., 2021).

Stress: Something that can threaten homeostasis and result in increased energy expenditure (Binns et al., 2019)

Abbreviations

ADHD-Attention Deficit Hyperactivity Disorder

ANOVA-Analysis of Variance

APA-American Psychological Association

ASD-Autism Spectrum Disorder

CBT-Cognitive Behavioural Therapy

CEM-Children's Emotion Management

COP-Child Observation Protocol

CPD-Continuing Professional Development

DE-Department of Education

DES-Department of Education and Skills

DSM-Diagnostic and Statistical Manual of Mental Disorders

ERSSQ-Emotion Regulation and Social Skills Questionnaire

GLP-Gestalt Language Processing

GOI-Government of Ireland

GoriLLA-Growing, Learning, and Living with Autism Group

HSE-Health Service Executive

ICD-International Classification of Diseases

ICF-International Classification of Functioning

IHREC-Irish Human Rights and Equality Commission

INTO-Irish National Teachers' Organisation

MIREC-Mary Immaculate Research Ethics Committee

NCSE-National Council for Special Education

NEPS-National Educational Psychology Services

OECD-Organisation for Economic Co-Operation and Development

PROGO-Parent Report of Group Outcomes

PSP-Positive Sensory Profile

RET-Robot-Enhanced Therapy

SAS-Secret Agent Society

SASC-Sensory Audit for Schools and Classrooms

SEN-Special Educational Needs

SERC-Special Education Review Committee

SNA-Special Needs Assistants

SSC-Stress, Self-Regulation and Communication Framework

UNCPRD-United Nations Convention on the Rights of Persons with Disabilities

UNESCO-United Nations Education Scientific and Cultural Organisation

WASI-Wechsler Abbreviated Scale of Intelligence

WHO-World Health Organisation

WOE-Weight of Evidence

ZOR-Zones of Regulation

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Introduction

1.1 Chapter Introduction

The current research study focuses on self-regulation, a topic that is widely acknowledged in its importance for autistic people (Inzlicht, Werner, Briskin & Roberts, 2021; Scionti, Luzi, Zampini & Marzocchi, 2023). This study offers a multi-faced approach to supporting self-regulation for autistic people, considering environmental, social and cognitive supports for regulation. Autistic people can experience the world in a different way (Doherty, McCowan & Shaw, 2023). Sensory sensitivities and differences in perceiving the social world can make environments, such as schools, a challenging place for many autistic children (Delimata & Bryne, 2023). Research reveals that autistic children can experience reduced social engagement, academic underachievement, and increased levels of anxiety as a result (Ashburner, Rodger & Ziviani, 2010; Berkovits, Eisenhower & Blacher, 2017; Nuske et al., 2021; Sofronoff, Attwood, Hinton & Levin, 2017). Self-regulation is necessary to return to a calm state and choose strategies to calm oneself down when experiencing sensory overload (Binns, 2019). Due to differences in executive functioning related to social situations, and related differences in communication, autistic children may have reduced levels of self-regulation (Berkovits et al., 2017; Jahromi, Byrce & Swanson, 2013). Additionally, self-regulatory behaviours used by autistic people are often misunderstood and viewed as 'problem behaviours' (Prizant, 2012).

Therefore, this study draws upon a neuroaffirmative lens that considers how the environment can first be modified to support autistic people. Thereafter, social support for regulation is offered through co-regulation, along with cognitive supports, as based on the Zones of Regulation ([ZOR], Kuypers, 2011) Curriculum. Stemming from this three-way approach to self-regulation, this study sought to advance knowledge on self-regulation for autistic children by adopting a case study design to explore the responses of autistic children, their parents and the class teacher to an individualised self-regulation intervention. This chapter begins by presenting the policy and legislative context of inclusive education as a rationale for the current research study. This chapter further outlines the research aims and research questions which guide this study.

1.2 Inclusive Education Policy: Setting the Context

Both international and national educational policies reflect a drive towards inclusive education for autistic students and students with Special Educational Needs (SEN). This mirrors a movement away from a medical lens of disability towards a rights-based philosophy that upholds the right to equal participation in education, and society. These policies further reveal the challenges in defining inclusive education (Florian, 2014). Tiernan (2022) argues that a dichotomy presents in policy between 'inclusion' and 'full inclusion', and argues that distinguishing between the two is essential to realise the vision of a truly inclusive society. Inclusion can sometimes be misrepresented as integration, whereby students with SEN have access to a mainstream environment but the inherent structures and attitudes of that environment may not be suitable for every child (Rose & Shevlin, 2020). The concept of 'full inclusion' may involve a broader interpretation of inclusion, and a significant movement away from integration (Rose & Shevlin, 2020). Tiernan (2022) argues that for 'full inclusion' to be realised, societies must move away from deficit-based models of disability, towards a recognition of neurodiversity and the rights of each person to a life of dignity and self-fulfilment. A neuroaffirmative perspective on autism seeks to provide environments and supports that are individualised for autistic people and recognises that diversity is inherent to human life (Botha & Cage, 2022; Chellapa, 2023).

1.2.1 International Policy

International policies such as the Salamanca Statement (United Nations Education Scientific and Cultural Organisation [UNESCO], 1994) and the United Nations Convention on the Rights of Persons with Disabilities ([UNCPRD], United Nations, 2006) were primary drivers of inclusive education at a national level, through mandating inclusive education for students with SEN. The Salamanca Statement (UNESCO, 1994) was a key stepping stone in developing inclusive policies and was followed by the UNCRPD, which set legal obligations on states to uphold inclusive education promises (United Nations, 2006). Drawing upon a human rights perspective, the UNCRPD calls upon governments to remove barriers to enable the full participation of people with disabilities and SEN in society. This includes moving away from care and academic needs alone towards promoting well-being and support for people with disabilities and SEN to fully participate in society. Additionally, the Organisation for Economic Co-Operation and Development ([OECD], 2018) highlights the critical role social-emotional skills play "in an increasingly fast-changing and diverse world" (p. 4). This

policy sets a vision for the educational provision for students with SEN, encompassing support for students to self-regulate, express their needs, and participate in society.

1.2.2 National Policy

Ireland's history of education has been marked by the marginalisation of autistic students and those with SEN, as espoused by a relatively late engagement with the principles of inclusive education, in comparison to other European countries (Howe & Griffin, 2020; Murphy, 2023). Following international policies that advocated for the rights of people with disabilities, Ireland responded with a variety of reports including the Special Education Review Committee (SERC) Report (Department of Education and Skills [DES], 1993) and the 1998 Education Act (Government of Ireland [GOI], 1998). The SERC report recognised the right of students with SEN to an appropriate education and argued for a continuum of provision for students with SEN (MacGiolla Phádraig, 2007). The continuum of educational provision for autistic students ranges from full-time enrolment in a special school to full-time enrolment in a special class or mainstream class (Murphy, 2023). However, the role of special classes and special schools in the Continuum of Support remains contentious (Travers, 2023).

1.2.2.1 Role of Special Classes and Schools. Ireland's ratification of the UNCRPD has led to a re-evaluation of the role of special classes and schools which is juxtaposed with increased investment in special classes (DES, 2020; National Council for Special Education [NCSE], 2024). While the most recent report by the NCSE (2024) situated the vision for the future Irish education to become " a fully inclusive system" (p. 15) where all students would be educated together, tension remains between "striving to be inclusive and ensuring all needs are met" (Travers, 2023, p. 1). The NCSE (2024) contends that the journey to 'full inclusion' will require careful implementation over many years. Therefore, investment in special classes and schools continues, as reflected in the recent invocation of Section 37A of the Education Act 2022 which allows the Minister of State to compel schools to open a special class for autistic students when needed (Oireachtas, 2023). Similarly, most recent budget measures outlined increased funding and staffing for special classes. This includes a significant increase in the number of special classes, and additional teaching and Special Needs Assistants (SNA) posts for supporting autistic students (GOI, 2022a). Recent figures also reported a growing number of educational staff working in special education, with

18,617 teachers and 19,213 SNAs working with students with SEN (Department of Education [DE], 2023). As of 2023, there are 128 special schools in Ireland, and 2,544 special classes (DE, 2023). The majority of special classes are in primary school (69.8%, n = 746) in contrast to 30.1% (n = 321) in post-primary (DES, 2020). Most of these special classes cater for autistic students and are referred to as autism classes, reflecting a system of parallel education for autistic students, where separate systems of general and special education developed (Sweeney & Fitzgerald, 2023). Autism classes are designed to provide an appropriate learning environment for autistic students that is cognisant of the unique learning profiles of autistic people and sensory sensitivities (Sweeney & Fitzgerald, 2023). For primary-aged children, the continuum of support envisions that the periods of integration into mainstream from a special class setting would progressively increase as the school years progress, in accord with a child's self-regulation skills (DES, 2020).

However, research indicates that a minority of students may be inappropriately placed in autism classes (DES, 2020; NCSE, 2024), and some students placed in autism classes may experience micro-exclusion and reduced access to the curriculum (Sweeney & Fitzgerald, 2023). Arguably, this is reflected in language such as 'unit' used to describe these classes (Sweeney & Fitzgerald, 2023). Similarly, the flexibility of placement envisioned in the continuum of educational provision for students with SEN is oftentimes not translated into practice (Travers, 2023). Nonetheless, substantial research indicates that these classes are invaluable to autistic students and their families (Delimata & Bryne, 2023; NCSE, 2019; Oireachtas, 2023). Autism classes can facilitate students accessing a mainstream school, while also providing individual support (Sweeney & Fitzgerald, 2023). Additionally, research indicated that special class teachers had a greater understanding of autism and autism-specific teaching methodologies than mainstream class teachers (Daly et al., 2016). Similarly, the Oireachtas (2023) committee argued that full placement in a mainstream setting is not feasible without accompanying structural change, and argued for the continued provision of special classes for autistic students in Ireland. Therefore, special classes in Ireland remain an important support for autistic children and may remain so until the appropriate adaptations and supports are available in mainstream settings. The current research study was situated in a special class setting for autistic children. At this time of reflection on the role of special classes in Irish society, this research study provides an additional perspective with a focus on supporting children's development of self-regulation in one special class in Ireland.

1.2.2.2 Report of the Task Force on Autism. Notably, the Report of the Task Force on Autism (GOI, 2001) was the first comprehensive report that examined the educational provision for autistic students in Ireland. The landmark 2001 report highlighted the lack of services for autistic people and their families, coupled with broader societal misunderstandings of autism and the needs of autistic people (GOI, 2001). Over two decades later, the Oireachtas published the 2023 Report of the Task Force on Autism. The committee heard from autistic self-advocates and other stakeholders supporting autistic people in Ireland. Similar to the 2001 report, the committee reported that a lack of access to services combined with a lack of understanding of autism in society impeded the life-long well-being of autistic people (Oireachtas, 2023). At the same time, a participatory study with autistic young people and their families by Delimata and Bryne (2023) noted that many autistic young people spoke of 'masking' their autistic traits in school settings to fit in. This is reflected in the voice of one young autistic person who described "Going into school... I was acting like everything was alright, in fact, when I was kind of crumbling inside and it was all too much, I felt as if everything was going too fast" (p. 5). Parents and autistic children noted sensory distress, communication challenges and negative academic experiences as significant obstacles in their daily lives (Delimata & Bryne, 2023). These reports underpin the need for self-regulation support for autistic children, which respects the need for sensory accommodations and autism-friendly environments.

Looking forward, the Report of the Task Force on Autism (Oireachtas, 2023) outlined several recommendations to support autistic people in Irish society. These recommendations included establishing a national autism acceptance campaign and enacting a national autism strategy that is regularly reviewed to monitor key issues that affect the lives of autistic people. The committee further endorsed funding for schools to undertake audits to make their buildings autism-friendly to accommodate sensory sensitivities. Based on Ireland's ratification of the UNCRPD, the government prioritises that "Reasonable accommodation of the individual's requirement is provided" and that "Persons with disabilities receive the support required, within the general education system, to facilitate their effective education" (Oireachtas, 2023, pp. 61). These recommendations pose several implications for current classroom practices in Ireland, notably including the need for environments and supports that meet the self-regulatory needs of autistic people.

1.3 Neuroaffirmative Autism Research and Language

1.3.1 Autism Research

As the current study conducted research with autistic people, it is necessary to situate this research within a broader understanding of pertinent issues in autism research. Notably, recent years have seen a growing conversation amongst autism researchers and autism advocates about the role research plays in both supporting autistic people and perpetuating negative stereotypes and ableist views (Botha & Cage, 2022). The American Psychological Association ([APA] 2021) defines ableism as "stereotyping, prejudicial attitudes, discriminatory behaviour, and social oppression toward people with disabilities to inhibit the rights and well-being of people with disabilities" (p. 8). Research can perpetuate stereotypes and marginalisation through the dehumanisation and objectification of autistic people in research (Botha & Cage, 2022). Autism research is complex, as reflected in the complexity of autism itself. For instance, researchers disagree about the ontology of autism and adopt varying research perspectives, ranging from a medical model which tends to view autism as a disorder towards the more recent autistic rights movement that views autism as a disability and adopts a social approach that aims to reduce barriers to inclusion (Botha & Cage, 2022). A growth in participatory research methods seeks to bridge the gap between autism research and the impact on the daily lives of autistic people. This includes prioritising the voices of autistic people in research and reducing the research-to-practice gap (Brock, Dynia, Dueker & Barczak, 2020; Delimata & Bryne, 2023).

1.3.2 Language of Autism

Drawing on the APA's (2021) guidelines, autism researchers are called upon to acknowledge the power of language in furthering inclusion and avoid using language that perpetuates stereotypes or marginalisation. Neuroaffirmative language has been endorsed as a way to describe autism as another way of experiencing the world which may differ from how neurotypical people experience the world (GOI, 2022b). This encompasses a move away from historically 'pathologising' and 'stigmatising' language of 'deficits' and 'disorders' associated with autism (Delimata & Bryne, 2023).

The terminology used to describe autism can also vary between person-first and identify-first language (GOI, 2022b). Person-first language emphasises the person rather than their disability. In contrast, identity-first language puts the focus on the disability as a way to claim their disability themselves (APA, 2021). While either language choice is accepted

generally, the guidelines stipulate that researchers should take into consideration the expressed preferred terms of a group. For this research study, identity-first language is used in line with the expressed preferences of the autistic community in Ireland (AsIAm, 2019; GOI, 2023). It should be noted that Irish educational policies use the term 'special' to identify students who require additional support in the education system. This terminology does not reflect the most recent understanding of inclusive terminology, as per UNCRPD (Irish Human Rights and Equality Commission [IHREC], 2023). However, the language of 'special schools', 'SNAs', 'special classes' and students with 'Special Educational Needs' may be used in this thesis, for the purpose of reflecting the current language used in Irish educational documents.

1.4 Rationale for the Current Research Study

The primary rationale for the current study was to develop environmental, social and cognitive supports for self-regulation within a neuroaffirmative lens. Self-regulation supports are central to this study, as self-regulation can help to create a paradigm shift in educational settings and wider society, leading to an understanding of appropriate environments and social-communication supports to meet the needs of autistic people (Binns, 2019; Raghunthan, Musci, Knudsen & Johnson, 2023; Shanker, 2013).

Firstly, the need to create environments that support self-regulation was outlined in research with autistic people (Delimata & Byrne, 2023) and key government reports, including the 'Autism Good Practice' Document (GOI, 2022b) and the 'Report on the Task Force on Autism' (Oireachtas, 2023). While numerous research studies have outlined the sensory differences autistic people experience, few studies have considered how to translate this knowledge into the design of classroom environments and everyday classroom practices (Brown, 2020; Noddings, 2017a). Additionally, a neuroaffirmative lens of autism considers how the environment can first be modified to include autistic people (Doherty et al., 2023).

Secondly, the need for high-quality individualised interventions to support social communication skills was espoused in research by the NCSE (2015). Previous research explored cognitive-based interventions to support self-regulation in autistic children, however, this research was limited due to resource constraints, training requirements for teachers, and lack of research with minimally speaking autistic children (e.g. Berkovits et al., 2017; Scarpa & Reyes, 2011; Weiss et al., 2018). The NCSE (2015) also argued that consideration must be taken into the training needs of teachers. The current study developed

an intervention that does not require any formal training for teachers and responds to the individual needs of autistic students. Therefore, the current study responds to a need for individualised and inclusive interventions to support self-regulation (Binns, 2019).

Additionally, the current research sought to expand on previous self-regulation interventions by adopting a mixed-methods case-study design. When first studying autism, Kanner (1943) reported that "Since 1938, there have come to our attention a number of children whose condition differs so markedly and uniquely from anything reported so far, that each case merits - and, I hope, will eventually receive a detailed consideration" (p. 217). The past 80 years have seen conflicting perspectives of autism, and an increase in diagnoses juxtaposed with a homogenisation of autistic people, leading to stereotyping and unequal access to services. This research study circled back to Kanner's (1943) original case-study methodology, with a renewed understanding of the role the environment plays in supporting autistic people, and sought to explore the individual response of students to a self-regulation intervention.

1.4.1 Researcher's Positionality

My interest in this area developed during my first year teaching in an autism class. I saw the importance of teaching social communication skills and emotional literacy, while also experiencing the difficulty of accessing appropriate evidence-based programmes that were suitable for neurodivergent learners. This was also met by challenges the students' families faced in accessing therapeutic services. I discovered the ZOR (Kuypers, 2011) Curriculum which was designed to meet the self-regulation needs of neurodivergent learners. Through Continuing Professional Development (CPD) with the Middletown Centre for Autism, I also learnt about the importance of autism-friendly schools and providing environmental adaptations to meet students' needs. I decided that I would like to expand on this work by conducting an exploratory research study to consider how to support the self-regulation needs of autistic students. My research is guided by a neuroaffirmative lens that considers how to support the autistic children in the study through both environmental and individualised support based on their unique profiles.

1.5 Research Aims and Questions

Guided by a neuroaffirmative perspective, this study adopted a three-way approach to supporting the self-regulation of autistic children. Firstly, the study sought to explore

environmental supports for self-regulation, through identifying stressors in the classroom environment and modifying the environment accordingly. Secondly, the study sought to develop strategies for co-regulation. Thereafter, the study sought to explore the implementation and effectiveness of an individualised cognitive-based self-regulation intervention for autistic children.

Specific questions of interest for the current study were:

1. How does the class teacher modify the classroom environment to support co-regulation for her students?
2. What are the primary co-regulation strategies used by the class teacher and parents to support the children's self-regulation?
3. What are the responses of the participants to an individualised cognitive-based self-regulation intervention?
4. What are the enablers and barriers to the effective implementation of the self-regulation intervention?

1.6 Thesis Structure

Chapter One introduced the study, by outlining the background to the current research and presenting the key international and national policies that underpinned the current research, along with a consideration of autism research and language. This chapter also presented the rationale for the current study, which informed the overall research aims and research questions.

Chapter Two presents a literature review in three stages. *Stage One* presents literature on autism, including historical, diagnostic and research issues affecting autism research. *Stage Two* analyses the theoretical perspectives on self-regulation, along with the models of self-regulation and interventions used to support self-regulation for autistic children. *Stage Two* further presents the Stress, Self-Regulation and Communication Framework which underpinned this study. *Stage Three* provides a systematic literature review of the self-regulation interventions available in empirical research for autistic children. The implications of these interventions are also critically analysed in this chapter.

Chapter Three presents the methodological approaches used in this research to explore an individualised case study of a self-regulation intervention in Ireland. This chapter

provides a rationale for adopting a qualitative paradigm and offers an in-depth discussion of the procedures undertaken by the researcher and the ethical considerations of this research.

Chapter Four outlines the results of this case study, including an analysis of qualitative documents and a thematic analysis of semi-structured interviews with the class teacher and parents. This chapter also presents results from quantitative measures of self-regulation.

Chapter Five offers a discussion of the findings of this case study, and links the findings to the research literature and theories presented in Chapter Two.

The final chapter, Chapter Six concludes this study. This chapter presents a summary of the research and recommendations for future policy, practice and research. The chapter also analyses the strengths and limitations of the study, along with the theoretical implications of this research.

1.7 Chapter Conclusion

This chapter contextualised the research aims and research questions by providing a background to self-regulation and presenting the neuroaffirmative lens that guided this research. Additionally, the chapter considered the policy and legislative context for inclusive education, ranging from the Salamanca Statement (UNESCO, 1994) to Ireland's ratification of the UNCRPD (United Nations, 2006) and the recent Report of the Task Force on Autism (Oireachtas, 2023) and the Policy Advice Paper on Special Schools and Classes (NCSE, 2024). These policies formed a primary rationale for the current research study which seeks to explore environmental and individual supports for self-regulation in autistic children.

Chapter Two

Literature Review

2.1 Introduction

This chapter aims to provide an in-depth analysis of the development of self-regulation and interventions available for autistic children. This chapter also seeks to develop a contextual understanding of the importance of self-regulation to autistic people. To achieve this aim, this literature review is divided into three stages. *Stage One* presents the historical and epistemological background of autism and autism research to contextualise self-regulation supports for autistic children. *Stage Two* outlines theoretical perspectives on the development of self-regulation and current models of self-regulation and interventions available for autistic children. Finally, *Stage Three* presents the findings of a systematic literature review to explore the array of self-regulation interventions available in empirical research for autistic children and their findings. Thereafter, the results of the systematic review are critically explored and future directions for research are outlined.

2.2 Stage One: Literature Review on Autism

2.2.1 Introduction to Autism

Autism is a life-long developmental condition (GOI, 2018). Autism can be described as a different way of perceiving and processing the world (Harvey, 2018). Autistic people may experience the world differently, and have differences in social communication and social interactions, along with restricted and repetitive patterns of behaviour (APA, 2013; Doherty et al., 2023). Some autistic people experience sensory sensitivity and may prefer to engage in solitary interests and activities (World Health Organisation [WHO], 2019). Autism can be viewed as a spectrum, which means that autistic people may share common difficulties with social communication and restricted patterns of behaviour or interests, however, the levels of needs across these domains will vary between individuals (Middletown Centre for Autism, 2023). Autistic people may also present with co-occurring difficulties, including anxiety disorders, attention difficulties and general or specific difficulties with language and literacy (GOI, 2022b). Importantly, the abilities and needs of autistic people can change over time, and the quality of life of autistic people can be improved with changing societal attitudes and adequate levels of support (WHO, 2023).

Differences in social interaction, communication, patterns of repetitive behaviour and sensory issues can make the social world challenging for some autistic people (APA, 2013; Doherty et al., 2023). Comparison studies in literature have reported that autistic children tend to have higher levels of emotional, social and behavioural difficulties than their peers (Ashburner et al., 2010). As the school years progress, difficulties in social communication and emotional regulation are often exacerbated for autistic children, leading to reduced social engagement and academic underachievement (Ashburner et al., 2010; Berkovits et al., 2017; Nuske et al., 2021; Sofronoff et al., 2017). Autistic adults further tend to experience significant challenges in later life in relation to accessing equal employment opportunities, alongside participation in community life and social activities (Delimata & Byrne, 2023; Oireachtas, 2023).

Sensory issues can make social situations, such as education, difficult for autistic children to navigate (Doherty et al., 2023). Due to sensory overload, some autistic people cannot communicate their needs, such that involuntary reactions can lead to autistic people being labelled with 'challenging behaviour' (Doherty et al., 2023, Lee et al., 2019). For example, Belek (2019) engaged in an ethnographic study with autistic adults. In the study, participants spoke of involuntary 'meltdowns' whereby their regulatory capacities shut down in response to sensory overload (Belek, 2019). Prizzant (2012) explains that "some self-regulatory patterns that are attempts to stay well-regulated may be regarded by some as problem behaviours, such as repetitive motor behaviours, vocalizing to shut out loud or aversive sounds and avoiding certain people, activities, or settings" (p. 5). Autistic people may also experience more challenges with self-regulating their emotions due to reduced executive functioning related to social situations. For example, a study by Jahromi, Bryce and Swanson in 2013 reported that autistic children had lower executive functioning scores than their neurotypical peers. The autistic children in the study also had reduced self-regulation and decreased school and peer engagement. In this study, the children's executive functioning predicted their emotional regulation along with their school and peer engagement (Jahromi et al., 2013). Berovits and colleagues (2017) further reported that emotional dysregulation was largely independent of IQ in their study. These findings, along with numerous other seminal works, have challenged traditional thinking relating to behaviour and communication for autistic children, and have led to a greater prioritisation of support for autistic children. This includes adapting the physical environment to meet sensory needs and providing evidence-based support to enable autistic people to communicate their emotions and self-regulate.

2.2.2 History of Autism

Waltz (2013) argues that the history of autism does not reflect an ongoing advancement towards truth; rather it is a story of how changing ideas, attitudes and research practices affect autistic people. Indeed, Zeldovich (2019) contends that the history of autism has taken 'several detours' and a 'less direct path' than other conditions. Delimata and Bryne (2023) further argue this point, explaining that "the term autism has existed for over 100 years but in that time has referred to a wide range of often contradictory psychological and behavioural characteristics" (p. 14). Up until the early 20th century, there was no 'special word' for autism (Waltz, 2013). Following the Enlightenment era, the introduction of modern medicine led to an expanse in the classification of diseases and disorders which were seen as divergences from the norm (Waltz, 2013). In countries such as the United Kingdom and Ireland, this unfortunately resulted in a growth of the institutionalism of neurodivergent people (GOI, 2018; Waltz, 2013).

For autistic children, the 20th century saw an increase in scientific models of child development. At this time, autism was related to childhood schizophrenia (GOI, 2018). This originated with the work of psychiatrist Eugen Bleuler in 1911 (Evans, 2013). Bleuler related autism to childhood schizophrenia, describing autistic thinking as a way to avoid reality and enter into an inner world (Evans, 2013). Bleuler's work influenced other notable child psychologists at the time, including Jean Piaget who drew comparisons between the concept of autism and a child's developing engagement with reality (Evans, 2013). Later, Bleuler's work, along with the work of other notable child psychiatrists at the time including George Frankl, influenced Leo Kanner (1943) who introduced the term 'Autistic Disorder' (Muratori, Calderoni & Bizzari, 2021). The word autism is derived from the Greek word 'autos', meaning self, reflecting the early notions of autism as a person remaining in an inner world (Golt & Kana, 2022).

Kanner based his research on a series of case studies of children he observed with similar symptomatology (O'Rourke, 2023). Kanner recorded observations from the children's parents, reporting a desire for aloneness and sameness among the children, and made the case for a new diagnosis of autism (Golt & Kana, 2022). Kanner (1943) also noted strengths in the children, including cognitive abilities and special interests. However, Kanner's work has later been criticised for placing blame on mothers and parenting styles in attributing to autism

diagnoses (Zeldovich, 2019). At the same time, Hans Asperger introduced a new definition of autism that explicitly included domains of hyperfunctioning, which may relate to language and special interests (de Giambattista, Ventura, Trenotoli, Margari, Palumbi & Margari, 2019). This later came to be known as Asperger's and led to a divide in perceptions and descriptions of autism (Golt & Kana, 2022). The latter half of the 20th century saw Dr Lorna Wing extend Kanner's definition of autism by introducing the 'triad of impairments' that became a notable feature of autism diagnoses, along with a new understanding of autism as a developmental disorder (O' Rourke, 2023; Zeldovich, 2019). However, it wasn't until the 3rd edition of the Diagnostic and Statistical Manual ([DSM-3], APA, 1980) that autism was included as a new class of conditions (Rosen, Lord & Volkmar, 2021). During this time, and into the 21st century, autism research and diagnoses significantly increased (Rosen et al., 2021). Yet, debates regarding the diagnosis and definition of autism remained apparent, reflecting the wide variance in understandings of and presentations of autism (Volkmar & McPartland, 2014). Currently, there is a strong drive towards genetic research, which is juxtaposed with increased self-advocacy by the autistic community and a social understanding of the role the environment and societal attitudes play in shaping the lives of autistic people (Botha & Cage, 2022).

2.2.3 Current Diagnostic Criteria

Currently, the two main diagnostic criteria for autism are the Diagnostic and Statistical Manual 5th Edition ([DSM-5], APA, 2013) and the International Classification of Diseases 11th Edition ([ICD-11], WHO, 2018). In recent years, the DSM-5 (APA, 2013) collapsed their diagnostic criteria from separate diagnoses of autistic disorder, Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified, to a singular diagnosis of Autism Spectrum Disorder ([ASD], APA, 2013). This is echoed in the updated diagnostic criteria within the ICD-11 (WHO, 2018). However, the Lancet Commission (Lord, 2022) recently argued for the introduction of the term 'profound autism' to identify individuals with autism who have intellectual and/or language difficulties. Kapp (2023) describes such attempts to categorise autism into different subtypes as 'reductionist', such that it goes against the initial idea of autism as a spectrum in a non-linear sense. Kapp (2023) contends that autistic people show variability in their presentation of strengths and needs, which change based on the social context, and

environmental and sensory demands. Similarly, autistic people can have uneven skills, which may include large differences between verbal and non-verbal IQ scores (Bolte, 2022). Looking forward, some autism researchers contend that diagnostic criteria should not include the classification of profound autism, and should place greater emphasis on social and environmental factors that affect levels of functioning, as in the International Classification of Functioning ([ICF], WHO, 2001, 2007).

2.2.4 Prevalence

According to the Lancet Commission (Lord, 2022), there are at least 78 million persons with a diagnosis of autism worldwide, the majority of whom do not receive the necessary support. The reported prevalence rate is estimated to be 1% worldwide (Khogeer et al., 2022). The prevalence of autism in Ireland is currently estimated to be 1.55 per cent (GOI, 2018). This is comparable to other European nations including the United Kingdom, Finland, and Italy (GOI, 2018). However, studying the prevalence of autism is difficult due to differences in diagnostic criteria and the under-diagnosis of autism in low- and middle-income countries (WHO, 2023). Cultural differences may also affect diagnostic criteria, however, there has been limited research into the cultural sensitivity of current diagnostic criteria (Rosen et al., 2021). Similarly, the reported male-to-female diagnosis ratio is contested and varies across research from 2:1 to 5:1 (Khogeer et al., 2022; Rosen et al., 2021). A growing body of research indicates that autism may present differently in girls and women and is underdiagnosed as a result (GOI, 2022b). This may have implications for the support needs of autistic girls in Ireland.

2.2.5 Key Considerations from Stage One

Stage One outlined how difficulties in navigating the social world can lead to reduced social engagement and academic underachievement, mediated by the need for environmental adaptations and evidence-based supports (Berkovits et al., 2017; Doherty et al., 2023). However, the history and research of autism have been marked by a medical lens that viewed autism as a ‘disorder’, and failed to understand the strengths and differences within each person (Doherty et al., 2023). These considerations underpin *Stage Two*, which explores the self-regulation supports available for autistic students.

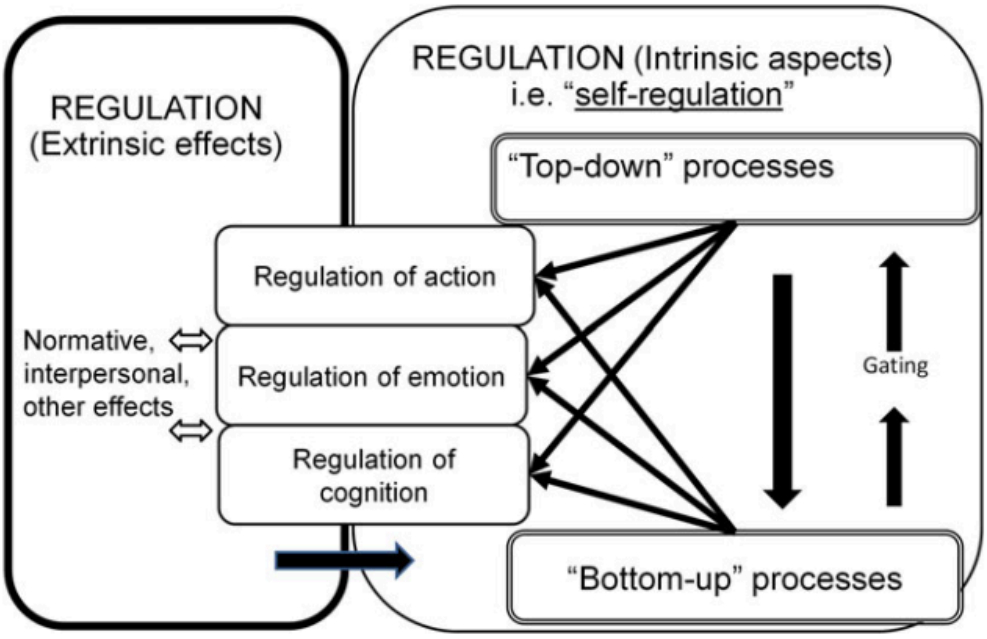
2.3 Stage Two: Literature Review on Self-Regulation

2.3.1 Introduction to Self-Regulation

Self-regulation is a dynamic process of coping with stressors and returning to homeostasis where the person is calm and alert (Inzlicht et al., 2021; Shanker, 2013). This is a multi-faceted process that encompasses both top-down (deliberate) and bottom-up (automatic) processes (McClelland, Cameron & Dahlgren, 2019). Figure 2 outlines this process (Nigg, 2017, p. 362). Top-down processes include executive functioning, attention and working memory. Executive functioning is needed to keep abstract goals in mind, inhibit distractions and shift attention to reach those goals (Raghunathan et al., 2023). In contrast, bottom-up processes focus on the regulation of one's emotions and behaviour (McClelland et al., 2019).

Figure 1

Nigg's (2017) Model of Self-regulation



Note. Figure from Nigg (2017, p. 362).

Self-regulation is key for academic, social and emotional development (Ashburner et al., 2010; Nuske et al., 2021). Indeed, self-regulation is viewed as holding "unparalleled importance for mental health" (Scionti et al., 2023, p. 106). A vast breadth of research has further established the prominent role self-regulation plays in many school skills including the ability to focus attention, inhibit inappropriate behaviour and to problem-solve (Hutchinson, Perry & Shapka, 2021). Acknowledging the expanse of self-regulation outcomes, self-regulation may be necessary for both a 'well-functioning person' and a 'well-functioning society' (Inzlicht et al., 2021, p. 320).

While regulation may be thought of as a state of homeostasis, dysregulation refers to states where there is a mismatch between the person's current level of arousal and the optimal level of arousal for a particular situation (Wass, 2023). Both regulation and dysregulation occur on a continuum, "from well-regulated states to mild, moderate, and even extreme states of dysregulation" (Prizant, 2012, p. 5). Dysregulation is caused by stress, which in terms of self-regulation, refers to something that can threaten homeostasis and results in increased energy expenditure (Binns et al., 2019). When stressed, the amygdala activates stress pathways that release the neurotransmitters noradrenaline and dopamine. These can act on the prefrontal cortex to inhibit executive functioning and metacognition, thereby reducing self-regulation (Binns et al., 2019). Throughout the day, multiple stressors can lead to dysregulation from physiological stressors such as noise to cognitive stressors like attention and working memory demands (Shanker, 2013). Too little stress can also cause dysregulation, which is why an optimal level of arousal is necessary for many self-regulatory actions (Binns et al., 2019).

Due to the complexity of self-regulation processes, researchers tend to focus on different components of self-regulation (Hutchinson et al., 2021). For example, educational researchers tend to focus on higher-order skills needed for school such as motivation and metacognition, whereas developmental researchers have focused on more basic capacities and executive functions (Hutchinson et al., 2021). Indeed, self-regulation has been studied across numerous fields, including cognitive and social psychology, developmental science, psychiatry and medicine (Nigg, 2017). This scope of research has highlighted the centrality of self-regulation to life-long outcomes (Nigg, 2017; Scionti et al., 2023).

2.3.2 Theoretical Perspectives on Self-Regulation

Self-regulation has been conceptualised in philosophy, religion and literature since early written records, including the work of the Greek philosopher Aristotle who depicted self-regulation as a human struggle between competing impulses, or goals, that need to be overcome to achieve happiness (Carron, 2014; Duckworth, Gendler & Gross, 2016). Debates regarding self-regulation remain central to many fields of psychology. Indeed, some researchers contend that "there has been a proliferation of theories and models describing different aspects of self-regulation both within and outside of psychology" (Inzlicht et al., 2021, p. 319). Karoly (2010) similarly posits that this 'proliferation' of theories accounts for the failure to "establish an analytic foothold" on self-regulation (p. 218). The lineage of theoretical perspectives includes behavioural theories, social cognitive theories, emotional theories and various goal-based and dual-process models of self-regulation.

2.3.2.1 Early Theories of Self-Regulation. Early psychological accounts of self-regulation arose in the 1970s through the work of cognitive-behavioural researchers who sought to improve students' academic performance through self-control (Usher & Schunk, 2017). Early behavioural theorists focused on learning through imitation and reinforcement (Schunk, 2012). For self-regulation, researchers focused on the stimulus-response sequence of self-regulation (Wass, 2023). The work of Vygotsky brought the concept of the 'Zone of Proximal Development' to self-regulation (Usher & Schunk, 2017). Vygotsky considered how a caregiver can support the child's developing self-regulation by offering scaffolds within the child's developmental stage. Additionally, research into delayed gratification and metacognition further brought issues of self-regulation into educational research (Usher & Schunk, 2017).

2.3.2.2 Social Cognitive Theory. However, it was Bandura's (1988) Social Cognitive Theory that was most influential for self-regulation at this time. Social Cognitive Theory offers a three-phase theory of self-regulation, involving self-observation, self-judgment and self-reaction (Usher & Schunk, 2017). Social Cognitive Theory also responded to criticisms of the predominant behavioural sciences, by considering the role of social interaction, which was neglected in previous behavioural accounts (Schunk, 2012). Social Cognitive Theory emphasises that through interacting with others, including observing and imitating social partners, children learn the skills, strategies and beliefs necessary for self-regulation (Schunk, 2012). However, Social Cognitive Theory can be criticised for not addressing the role

emotions play in self-regulation (Schunk, 2012). Usher and Schunk (2017) note that by the 1980s, "theories reflecting the cognitive-behavioural, social cognitive, cognitive-metacognitive, social constructivist, and cognitive-developmental research traditions were formulated and refined" (pp. 3-4). Self-regulation was generally studied at this time through self-report measures (Usher & Schunk, 2017). Similarly, this time gave rise to a growth in interventions where researchers investigated self-regulation interventions in educational settings (Usher & Schunk, 2017). However, these interventions were criticised for failing to capture "the dynamic nature of self-regulation" (Usher & Schunk, 2017, p. 5).

2.3.2.3 Self-Determination Theory. While Self-Determination Theory has been researched since the 1980s, recent decades have seen a renewed interest in its application to understanding self-regulation (Deci & Ryan, 2008). Self-determination theory positions self-regulation in terms of broader psychological needs. Deci and Ryan (2008) argue that there are three basic and universal psychological needs; namely the need for competence, relatedness and autonomy (Deci & Ryan, 2008). Autonomous self-regulation can be achieved through fulfilment of the these psychological needs and an open approach to understanding one's emotions (Roth et al., 2019). When these needs are not sufficiently fulfilled, one may rely on external regulation based on reward or punishment, avoidance of shame and contingent self-esteem. External regulation may not satisfy the person and can drain energy (Deci & Ryan, 2008).

A key contribution of this theory is understanding the role of emotions to self-regulation. It has been argued that the role emotions play in self-regulation has been "underdeveloped" and while often "implied", it is "seldom stated explicitly" (Inzlicht et al., 2021, p. 333). Emotions are seen as sources of insight that enable greater autonomous regulation (Roth et al., 2019). For example, strong emotions can be a source of dysregulation for autistic students, but rather than seeing emotions as something to suppress, they can be a source of insight into a child's needs and goals (Roth et al., 2019). Self-determination theory therefore argues that educators should encourage autonomous regulation of emotions by approaching emotions in a non-judgemental manner (Roth et al., 2019). Additionally, the educators' role may be to support self-regulation by respecting and validating the child's feelings (Roth et al., 2019). However, there has been little application of this research in educational settings (Roth et al., 2019).

2.3.3 Models of Self-Regulation

These theories also underpin various models of self-regulation, encompassing cognitive, neurobiological and personality-based models. An overview of these models is provided in Table 1. Inzlicht et al. (2021) argue that the most influential model of self-regulation is cybernetics. It has roots in the concept of homeostasis and research in electrical engineering. The Cybernetic Model of self-regulation focuses on feedback loops that underlie the regulation of overt action, including regulating the body's physiological functioning (Carvar & Scheier, 2012). The model also focuses on feedback loops that aim to reduce the discrepancy between the current state and the goal state (Inzlicht et al., 2021).

Table 1

An Overview of the Key Models of Self-regulation

Model and Key Reference(s)	Level of analysis
Cybernetic model (Carver & Scheier, 1998)	Goal: The focus is on the target goal or set point, with feedback loops comparing current and desired states.
Goal systems theory (Kruglanski et al. 2022)	Goal: The focus is on the structure of goals and the means to achieve them.
Resource model of self-control (Baumeister et al. 2018)	Time: The focus is on how self-control or willingness to exert effort wanes over time.
Dual systems models (Hofmann et al. 2009)	Conflict: The focus is on the conflict between hot (System I) and cold (System II) processes.
Process model of self-control (Duckworth et al. 2016)	Conflict (anticipated or actual): The focus is on strategies that help avoid or reduce conflict.
Choice models (Berman et al. 2017)	Choice: The focus is on how people weigh the different options that are saliently available to them and select the most valued option.
Trait models of impulse control (Roberts et al. 2014; Whiteside & Lynam, 2001)	Trait: The focus is on individual differences in general self-regulatory dimensions (e.g., conscientiousness).

Note. Table from Inzlicht et al. (2021, p. 330).

Goal Systems Theory (Kruglonski, Shah, Fishbach, Friedman, Chun & Sleeth-Keppler, 2018), is similar to the Cybernetic Model. However, instead of focusing on

feedback loops, this model focuses on the different pathways to achieve goals using a hierarchical network called a goal system (Inzlicht et al., 2021). Goal-based models of self-regulation are also linked to Bandura's (1988) Social Cognitive Theory (Karoly, 2010). A more recent model is the Resource Model (Baumeister, Tice & Vohs, 2018). This model compares self-control to a muscle, that through regular practice can be developed to improve overall self-regulation (Baumeister et al., 2018). This model focuses on how the expenditure of energy resources used to inhibit behaviours can affect self-regulation capabilities. Notably, the Resource Model marks a departure from information processing accounts, toward a neurobiological perspective on self-regulation (Baumeister et al., 2018).

Other models of self-regulation focus on how individual factors can affect self-regulation. This includes the Dual-Systems Model (Hofmann, Friese & Strack, 2009) which concentrates on the role impulses play in differentiating between long-term and short-term goals. The Dual-Systems Model argues that self-regulation is based on two systems, namely System 1, the impulsive system and System 2, the control system (Inzlicht et al., 2021). These systems may be 'mutually supportive' and 'in conflict' with one another, to achieve goals (Inzlicht et al., 2021). However, research from this model tends to focus on self-control explicitly, more than self-regulation. Similarly, the Process Model (Duckworth et al., 2016) considers how situations can affect self-regulation. For example, a person can proactively change situations to inhibit impulses, thereby enacting system 2. This can also be compared to the Choice Model of Self-Regulation (Berkman, Livingston & Kahn, 2017) which considers how a person's identity, including their values and group affiliations, can impact their self-regulation. The Trait Model of Self-Regulation (Roberts, Lejuez, Krueger, Richards & Hill, 2014) combines understanding from personality research, to consider how conscientiousness as a personality trait can affect self-regulation. Similarly, Gross and Thompson's (2007) Process Model of Emotional Regulation focuses on the strategies a person selects to regulate their emotions (Gross, 2008). However, this model focuses on emotional regulation explicitly, rather than overall self-regulation.

2.3.4 Frameworks of Self-Regulation

Each of the above theories and models offers a unique perspective on self-regulation and helps to develop an understanding of how self-regulation develops across childhood and into adulthood. However, recent researchers argue that an integrated approach to self-regulation is warranted, to account for how self-regulation develops through the dynamic

interplay between many different ecological systems, including biological, cognitive, and environmental systems (Binns et al., 2019; Wass, 2023). For example, Nigg (2017) contends that self-regulation "is not static" and "develops through critical periods from early life to adulthood, in nonlinear and stage-sequenced fashion" (p. 362). Therefore, there has been a movement towards frameworks or paradigms for self-regulation (Karoly, 2010).

The proliferation of research in dynamic systems theory can play a role in understanding the interplay of factors affecting the development of self-regulation. Wass (2023) argues that one can better understand self-regulation by considering self-regulation not as an individual attribute, but rather, as a dynamic interplay that takes place through interaction with the environment and other people. Accordingly, an integrated multi-disciplinary perspective may enable a broader understanding of self-regulation (Binns, 2019). Cole and colleagues (2019) further argue that developmental frameworks of self-regulation are warranted to unify previous models. Recently, the 'Autistic SPACE Framework' offered an environmental lens through which to consider the development of self-regulation (Doherty et al., 2023).

2.3.5 Developmental Frameworks

Following dynamical perspectives on self-regulation, various researchers have conceptualised developmental frameworks for self-regulation. Kopp's (1982) original research argued that "scant attention has been paid to the developmental course of self-initiated regulation of behaviour" (p. 199). Kopp (1982) therefore offered a new perspective on self-regulation, by outlining the emerging development of self-regulation across the early years. Kopp's framework offers a five-phase analysis of the development of self-regulation, as outlined in Table 2.

Table 2

Kopp's (1982) Phases of Self-Regulation

Phases	Approximate ages	Features	Cognitive requisites
Neurophysiological modulation	Birth to 2-3 months	Modulation of arousal, activation of organised patterns of behaviour	
Sensorimotor modulation	3 months to 9 + months	Change ongoing behaviour in response to events and stimuli in environment	
Control	12 months to 18 + months	Awareness of social demands of a situation Initiate, maintain, and cease physical acts and communication Compliance, self-initiated monitoring	Intentionality, goal-directed behaviour, conscious awareness of action, memory of existential self
Self-control	24 + months	As above; delay upon request Behave accordingly to social expectations in the absence of external monitors	Representational thinking and recall memory, symbolic thinking, continuing sense of identity
Self-regulation	36 + months	As above; flexibility of control processes that meet challenging situations demands	Strategy production, conscious introspection

Note. Table from Kopp (1982, p. 202).

The first phase, *Neurophysiological Modulation*, accounts for a young child's preliminary self-regulation ability, which may include control of arousal states through reflexive movements. This regulation may serve the purpose of self-soothing or may respond to external stimuli. As the child develops more definitive cycles of wakefulness, the emergence of the second phase, *Sensorimotor Modulation,* may develop from three months of age. This phase includes voluntary motor acts in response to stimuli, including reach and grasp, and playful behaviours. From 12 months, the child may enter the third phase, namely *Control*. This phase is characterised by an increasing awareness of self and control over social or task demands. Here, the child may show preliminary compliance with caregivers' demands. However, Kopp argues that this is described as control rather than self-regulation as the child has not developed the cognitive capacities, such as memory, to understand why behaviours are acceptable or unacceptable to the adult. The latter phases, *Self-Control* and *Self-Regulation*, may emerge from 24 months of age. Kopp contends that these phases develop based on cognitive maturation, including representational thought and recall memory. Self-regulation is viewed by Kopp as a more mature form of self-control that includes reflection and metacognition.

A key contribution of Kopp's model was considering the role of social support through caregivers in self-regulation, which had previously been paid little attention in empirical research (Kopp, 1982). Kopp views the caregiver as an important mediator in understanding individual differences in the development of self-regulation. Drawing on this model, the development of self-regulation can be firstly considered through co-regulation. The prefrontal cortex needed for self-regulation is gradually developing across childhood, so children rely on their adult caregivers to support their self-regulation through the process of co-regulation. For example, adults support children to recognise their emotional states and link their physiological and emotional experiences (GOI, 2022b).

2.3.6 The Stress, Self-Regulation and Communication Framework

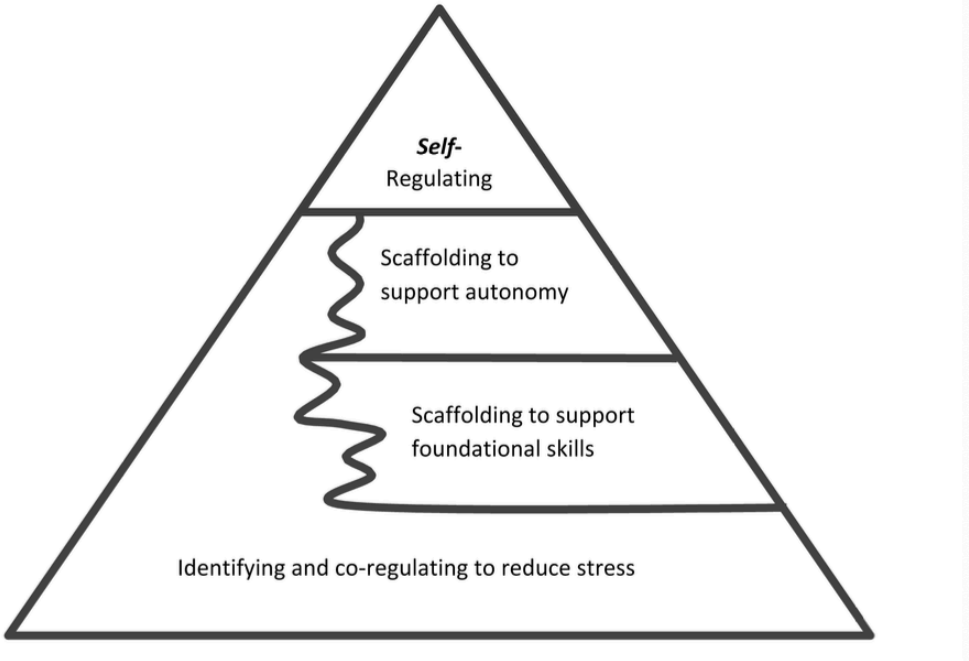
A more recent developmental model of self-regulation is the Stress, Self-Regulation and Communication (SSC) Framework, as put forth by Binns, Hutchinson & Cardy (2019) and in further research by Binns (2019). This framework acts as both a developmental account of self-regulation and a paradigm to guide practitioners in choosing and applying interventions to meet the individual needs of autistic children (Binns, 2019). Binns (2019) notes that the SSC "is not a prescriptive way to approach intervention, but rather designed to

guide clinicians through the process of thinking about how to support self-regulation and communication" (p. 36).

The SSC framework draws upon various theoretical understandings of self-regulation, including Social Cognitive Theory (Bandura, 1988). Importantly, the framework also considers the role of the environment in supporting self-regulation – a factor often omitted from other frameworks. The framework is based upon the principles of collaboration between professionals and parents and an understanding of the importance of co-regulation to autistic children. Notably, the SSC Framework is situated within a neuroaffirmative approach, which respects the unconventional use of self-regulation strategies (Binns, 2019). The framework offers a staged approach to capture the individual development of self-regulation, drawing upon three overarching phases that move from co-regulation towards autonomous self-regulation. The phases are illustrated in Figure 2 and Table 3.

Figure 2

A Visual Representation of the Stress, Self-Regulation and Communication Framework



Note. Figure from Binns (2019, p. 35).

Table 3

The Stress, Self-Regulation and Communication Framework.

Framework for Developing Self-Regulation
Phase One: Coregulating to reduce stressors Examples of strategies: • Modify the environment • Modulate exposure of sensory information • Add elements of predictability • Be warm and responsive • Read and acknowledge the child's intent • Validate children's feelings and their right to experience a range of emotions • Reduce the cognitive load • Follow the child's lead • Acknowledge that our ability to self-regulate helps us to be an effective co-regulator
Phase Two: Scaffolding to support development of foundational capacities Examples of strategies: • Engage children in problem solving (e.g. using communicative temptations and open-ended toys, throwing away the instruction manual) • Use co-construction • Create pragmatically appropriate self-regulation vocabulary
Phase Three: Scaffolding to support autonomy Examples of strategies: • Think aloud and model • Co-construct a toolbox of strategies • Use strategic questioning

Note. Table from Binns (2019, p. 37).

2.3.6.1 Phase One: Co-Regulation. The first phase is co-regulation where the social partner, for example, the child's parents or teacher, reads the child's cues, validates their emotions and adjusts the environment accordingly (Binns et al., 2019). The framework advocates for collaboration between relevant professionals, such as educators, occupational therapists, and speech and language therapists to observe and determine what triggers the child may have. This is mindful of key theories related to self-regulation. For example, Social Cognitive Theory (Bandura, 1988) emphasises the degree to which learning occurs through observation and modelling (Schunk, 2012). Self-determination theory emphasises the importance of the social partner approaching emotions and behaviour in a non-judgemental and receptive way (Deci & Ryan, 2008; Roth et al., 2019). During co-regulation, the social partner supports the child's executive functioning by asking appropriate prompting questions and co-regulating to remove distractions (Binns, 2019). Through support during the co-regulation stage, the child can then move towards developing foundational independent capacities of self-regulation such as naming their emotions and beginning to identify triggers for dysregulation (Binns et al., 2019; Kuypers, 2011).

2.3.6.2 Phase Two: Scaffolding to Support Foundational Skills. Phase Two builds upon the co-regulation strategies outlined in Phase One, and aims to support the development of foundational capacities (Binns, 2019). The SSC framework recommends explicitly teaching the child about emotions during this phase due to the evidence that autistic people can have more challenges with emotional literacy and emotional regulation (Binns, 2019). This includes teaching mental state vocabulary, as well as how emotions are experienced internally, both in oneself and in others. Educators may use self-regulation interventions, such as the ZOR Curriculum (Kuypers, 2011) to teach self-regulation language, as part of this phase.

2.3.6.3 Phase Three: Scaffolding to Support Autonomy. The third phase is scaffolding to support autonomy (Binns, 2019). The objective of this phase is to support autistic individuals to recognise and develop their own self-regulation strategies. In this phase, the researchers advocate respecting the personal self-regulation strategies of each person. Additionally, social partners can support self-regulation by talking about their own feelings and personal strategies for self-regulation. Social partners can also foster autonomous self-regulation by asking strategic questions that help children to develop metacognitive skills and become more aware of their own regulation, leading to the co-construction of a toolbox for self-regulation (Binns et al., 2019).

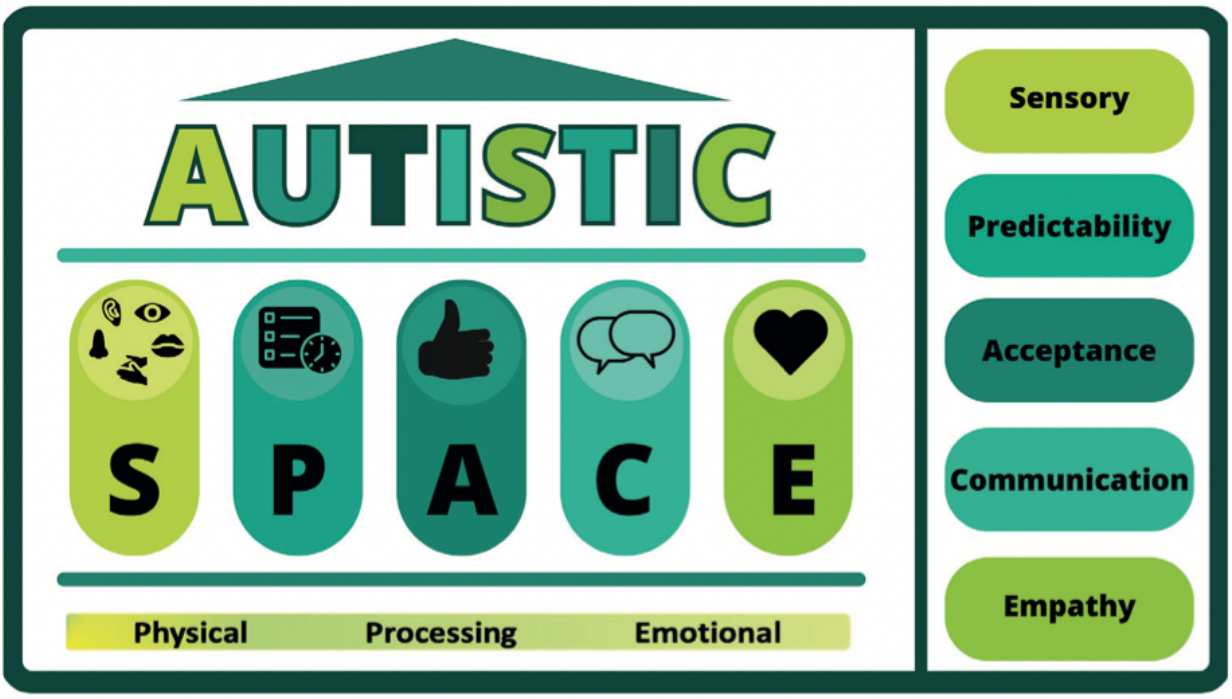
This framework offers a new perspective on the development of self-regulation, by incorporating a model that considers the role of social partners and the environment in supporting children's self-regulation. Nonetheless, it is notable that this model is relatively new within the literature and more research using this framework is warranted to understand its implications for implementing self-regulation interventions (Binns et al., 2019).

2.3.7 The Role of the Environment in Supporting Self-Regulation

The role the environment plays in supporting self-regulation is deemed both an under researched area and vital to supporting children with sensory sensitivities, such as autistic children (Manning, Williams & MacLennan, 2023). Indeed, Noddings (2017a) argued that despite a well-established research base outlining the sensory processing difficulties of autistic people, little research has translated this knowledge into practice in educational settings for autistic students. Drawing on the seminal work of educational philosophers Loris Malaguzzi and Maria Montessori, Brown (2020) contends that the environment should both be prepared to meet students' needs and evolve in tandem with the students. Recent research by Doherty et al. (2023) may provide additional insights into the role of the environment in promoting regulation. Doherty and colleagues (2023) proposed the 'Autistic SPACE Framework' to promote autism-friendly environments in healthcare settings. The 'Autistic SPACE Framework' offers a "simple framework for autism-specific accommodations", encompassing five elements namely 'Sensory', 'Predictability', 'Acceptance', 'Communication' and 'Empathy', as outlined in Figure 3 (Doherty et al., 2023, p. 7). Meeting each element helps to promote self-regulation by accommodating the unique needs of autistic people (Doherty et al., 2023). Educators can use this framework to critically consider the classroom setting to promote self-regulation. However, further research may also be necessary to expand on the current framework for application in educational environments.

Figure 3

The Autistic Space Framework



Note. Figure from Doherty et al. (2023, p. 2).

2.3.8 Interventions

The increased prevalence of autism has been attributed to intensified demands for educational and therapeutic services (Hume et al., 2021). Yet, establishing an empirical research base for this breadth of interventions has proved challenging. Interventions for autistic children are further marked by a dichotomy between clinical-based interventions and school-based interventions. A review of nearly 1000 empirical interventions for autistic children reported that half of the research was conducted in education settings, which was seen as a positive change away from the predominance of clinic-based interventions (Hume et al., 2021). However, most of this research was conducted in individual sessions by clinicians or researchers, leading to a call for research conducted by educators and other service providers working with autistic children (Hume et al., 2021). Researchers caution that interventions in alternative formats, including school-based intervention formats, are needed,

due to challenges in accessing clinical-based interventions and the need to understand contextual factors affecting self-regulation (Sofronoff et al., 2017).

Thus, a growing body of research has started exploring school-based interventions to address this gap in research. Traditional approaches focused on behavioural interventions, whereas most empirical research now draws on Social Cognitive Theory and focuses on Cognitive-Behaviour Therapy (CBT) for autistic children. Other interventions adopt an integrated approach to supporting self-regulation, using approaches such as play therapy. For school-based programmes, group therapy approaches are common for addressing the social communication development of autistic children (Nowell et al., 2019). These group therapy approaches are often adapted to address the developmental needs of autistic children. Adaptions may include using visual supports and incorporating special interests into activities (Nowell et al., 2019). Popular school-based programs include the Alert Programme (Williams & Shellenberger, 1996), the ZOR Curriculum (Kuypers, 2011) and the SCERTS Programme (Prizant et al., 2006).

2.3.8.1 Behavioural Interventions. Traditional interventions aiming to address self-regulation for autistic children have focused on behavioural management (Berkovits et al., 2017). This includes positive behaviour support and the explicit teaching of social skills. These are often taught through modelling and repetition. However, due to the life-long nature of autism, behavioural approaches have been criticised for lacking generalisability and for being removed from the child's own experiences (Berkovits et al., 2017). Therefore, researchers are now advocating for a more holistic view of self-regulation, including teaching children about their own emotions and how to regulate their emotional experiences (Deci & Ryan, 2010; Kuypers, 2011). Teaching children about their own emotional experiences can take different therapeutic forms ranging from play therapy to CBT.

2.3.8.2 Social Cognitive Interventions. Social cognitive interventions, including CBT are now the predominant approach for supporting self-regulation for autistic children (Scarpa & Reyes, 2011; Sofronoff et al., 2017). CBT focus on teaching students "to identify their own thoughts and emotions, to recognise how these affect their behaviour, and to use strategies to change their thinking and behaviour in social situations" (GOI, 2022b, p. 91). CBT interventions often take place in the form of group therapy and include developmental modifications and family involvement (Scarpa & Reyes, 2011). A central aim of CBT is to support children to develop tools to regulate their emotions and their thinking patterns

(Sofronoff, Attwood, Hinton & Levin, 2007). Popular cognitive behavioural interventions are the ZOR (Kuypers, 2011) and the Secret Agent Society Program ([SAS], Beaumont, 2010), along with the application of Social Thinking (Crooke & Garcia, 2021) methodology.

2.3.8.3 Social Thinking. Social thinking is not a set intervention. Instead, it is a "language and cognitive-based methodology that focuses on the dynamic and synergetic nature of social communication skills, all of which require self-regulation" (Crooke & Garcia, 2021, para.1). This methodology adopts a social cognitive theoretical perspective and is applied to programmes and interventions, including the ZOR Curriculum (Kuypers, 2011; Social Thinking, n.d.).

2.3.8.4 Zones of Regulation. Internationally, the ZOR Curriculum has grown in popularity (Mason, Leaf & Gerhardt, 2023; Nowell et al., 2019). The ZOR adopts a cognitive behavioural approach which seeks to equip children with the skills to become conscious of their emotions and mindfully regulate their actions (Kuypers, 2011). The curriculum categorises states of alertness and emotions into four different coloured zones. Children then engage with the curriculum to learn how to regulate and move between the zones. Despite its popularity, a recent literature review reported that there is a lack of peer-reviewed empirical studies to support the ZOR Curriculum (Mason, Leaf & Gerhardt, 2023). This poses a question about the growing popularity of the ZOR Curriculum without corresponding empirical research.

2.3.8.5 The Secret Agent Society. The SAS (Beaumont, 2010) is widely used for autistic students. The intervention adopts CBT strategies to address four key skills, namely emotion recognition, emotion regulation, social problem solving and social skills (Secret Agency Society, n.d.). The intervention includes a computer game, weekly teacher tip sheets, parent workbooks and parental information sessions (Beaumont et al., 2015). The programme is designed to be used for children between 8-12 years of age. The programme requires a facilitator to be trained and takes place in small groups in clinical or educational settings (Secret Agency Society, n.d). A key strength of this programme is that it has been empirically researched through randomised controlled trials (Beaumont, 2010), however, its application to educational settings is limited due to the training requirements for teachers.

2.3.8.6 Integrated Approaches. Other interventions offer an integrated approach, based on frameworks of self-regulation rather than a discrete theoretical perspective. These

approaches include play therapy, SCERTS and the Growing, Learning and Living with Autism Group ([GoriLLA], Nowell et al., 2019) self-regulation programmes.

2.3.8.7 Play Therapy. Play therapy interventions adopt an integrated approach to self-regulation, combining elements of child-directed play therapy, social skills and parent education, along with findings from Attachment Theory (Muller & Donley, 2019; Salter, Beamish, & Davies, 2016) and Self-Determination Theory (Deci & Ryan, 2008). Here child-directed play therapy can also be called child-centred play therapy, and "is a form of therapy that involves children engaging in enjoyable activities of their choice" (Salter et al, 2016, p. 78). The overarching aim of play therapy is to give children an opportunity to express their emotions naturally through play (Muller & Donley, 2019). The relationship between the play therapist and the child is central to the process. The play therapist creates an accepting environment which encourages the development of social and emotional skills such as joint attention, theory of mind and functional play skills (Salter et al., 2016). Recent research into play therapy outcomes for autistic children has shown some promising results, including the generalisability of study outcomes to classroom settings (Muller & Donley, 2019). However, this research is limited for autistic children (Muller & Donley, 2019).

2.3.8.8 SCERTS. The SCERTS model offers an integrated intervention for autistic students, encompassing the acronym 'SCERTS' to refer to the focus on Social Communication, Emotional Regulation and Transactional Support (Prizzant, Wetherby, Rubin & Laurent, 2014). The model offers a framework of goals that can be adapted to develop a social-emotional programme for autistic students (Prizzant et al., 2014). A key strength of this programme is that it is a teacher-led classroom-based intervention (Morgan, Hooker, Sparapani, Reinhardt, Schatschneider & Wetherby, 2018). Nonetheless, its effectiveness has been questioned due to implementation fidelity and the high levels of teacher training required to implement this intervention (Morgan et al., 2018).

2.3.8.9 The Growing, Learning and Living with Autism Group. The GoriLLA self-regulation programme (Nowell et al., 2019) is a small group-based intervention that takes place in a clinical environment. It combines elements from a structured TEACCHing (Mesibov, Shea & Schopler, 2005) methodology, Social Thinking (Crooke & Garcia, 2021) and the ZOR (Kuypers, 2011). The TEACCH approach is central to this intervention, focusing on structuring the environment to make activities understandable, incorporating students' special interests into activities, and supporting meaningful communication

(Mesibov & Shea, 2010; Nowell et al., 2019). However, this programme has minimal empirical research and has not been applied to other settings outside of a clinical environment (Nowell et al., 2019).

2.3.9 Key Considerations from Stage Two

Stage Two outlined the key theoretical perspectives on the development of self-regulation. These perspectives shaped models of self-regulation and interventions used in clinical and educational settings to support autistic students. Theoretical perspectives on self-regulation ranged from early behavioural theorists that focused on the role of imitation and reward, towards social cognitive theory that encompassed the role of social partners and more complex cognitive processes. Other theories, including self-determination theory, focus on the role of emotions and the caregiver in supporting self-regulation. These theories were also considered in terms of models of self-regulation, ranging from goal-based models to dual-systems models. Going forward, Inzlicht et al. (2021) propose that more attention is needed concerning integrative frameworks of self-regulation, as in Kopp's (1982) developmental model of self-regulation, and the more recent Stress, Self-Regulation and Communication Framework (Binns et al., 2019). Additionally, the role of the environment and school-based interventions in supporting self-regulation, as in the 'Autistic SPACE Framework' is needed (Doherty et al., 2023).

2.4 Stage Three: Systematic Literature Review

2.4.1 Rationale and Aim of the Literature Review

Following a review of the theoretical perspectives on self-regulation, a systematic literature review was conducted to methodically explore the range of self-regulation interventions for autistic children present in empirical research. A systematic approach was chosen to increase objectivity in analysing the range of interventions. Therefore, the overarching aim of the current review was to ascertain the range of self-regulation interventions present in empirical research for autistic primary-aged children. The review questions were:

What self-regulation interventions are present in empirical research to support autistic school-aged children?

What are the outcomes of the self-regulation interventions present in empirical research on measures of self-regulation, and related social and emotional outcomes?

2.4.2 Literature Search

A comprehensive literature search was conducted between the 17th May 2022 – 28th July 2022 using the following electronic databases: ERIC (EBSCO), PsychINFO and PsychARTICLES. Table 4 shows the search terms used for the search.

Table 4

Search Terms Used to Identify Appropriate Studies

#	Search Term	Databases	Results
1	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "self-regulation"	ERIC PsychINFO PsycARTICLES	7
2	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "emotional-regulation"	ERIC PsychINFO PsycARTICLES	4
3	“Zones of Regulation” and “self-regulation”	ERIC PsychINFO PsycARTICLES	0
4	“Zones of Regulation” and “self-regulation”	ERIC PsychINFO PsycARTICLES	0

5	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "zones of regulation"	ERIC PsychINFO PsycARTICLES	0
6	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "social cognitive intervention "	ERIC PsychINFO PsycARTICLES	5
7	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "social communication intervention "	ERIC PsychINFO PsycARTICLES	0
8	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "self? Regulation" AND "social? Communication"	ERIC PsychINFO PsycARTICLES	0
9	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic")	ERIC PsychINFO PsycARTICLES	2

	AND ("cognitive behavioural therapy" OR "CBT")		
10	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "social thinking"	ERIC PsychINFO PsycARTICLES	0
11	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "play therapy"	ERIC PsychINFO PsycARTICLES	5
12	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND "secret agent society"	ERIC PsychINFO PsycARTICLES	3
13	("autism" OR "ASD" OR "autism spectrum disorder" OR "autistic") AND ("Jr Detective Program" OR "Junior Detective Program" OR "Junior Detective Training Program")	ERIC PsychINFO PsycARTICLES	0

2.4.3 Screening Based on Inclusion and Exclusion Criteria

The results were screened by title, abstract and subject heading. The initial search yielded 109 results. Three studies were excluded as duplicates after the initial search. The second search screened the studies' titles and abstracts against inclusion and exclusion, as outlined in Table 5. A total of 83 studies were removed at this stage. During search three, the remaining 23 studies were exported as full-text studies. Two additional studies were also identified as ancestral studies (n = 25). These studies were then evaluated against the inclusion and exclusion criteria again. Subsequently, 20 studies were excluded as they did not fully meet the studies' inclusion criteria. The rationale for the exclusion of these studies from the review are outlined in Appendix A. Finally, five studies met the inclusion criteria and were subsequently appraised. Summaries of these studies are delineated in Appendix B. A flowchart for the literature review search process is shown in Figure 4. Table 6 also lists the included studies for this review.

Table 5

Inclusion and Exclusion Criteria

Study Feature	Inclusion criteria	Exclusion criteria	Rationale
Type of publication	Peer-reviewed and full-text available online	Not-peer reviewed and full text is not available online	To ensure quality standards and independent assessment.
Participants	Participants are school age, between 4-13 years old and have a clinical diagnosis of autism	Participants are below 4 years old and over 13 years old Participants do not have an autism diagnosis	To ensure that the literature is relevant to the current study
Language/ Context	Written in English	Not written in English	The researcher does not have the resources to access translation services
Study Design	The study includes primary data sources	The study does not have any sources of primary data e.g. empirical reviews	To ensure that the study is original
Focus of the study	The study includes a focus on self-regulation for autistic children	The study does not include a component of self-regulation for autistic children	The review question focuses on self-regulation based interventions

Measures	The study includes a measure of self-regulation or emotional-regulation. Measures of self-regulation can be qualitative or quantitative which include a pre- and post-measurement	The study does not include a measure of self-regulation or emotional-regulation	To ensure that the literature is relevant to the research review
Year of Publication	Published between 2010-2022	Published prior to 2010	To ensure that the research is up-to-date and relevant

Figure 4

Flowchart outlining the Literature Search and Selection Process

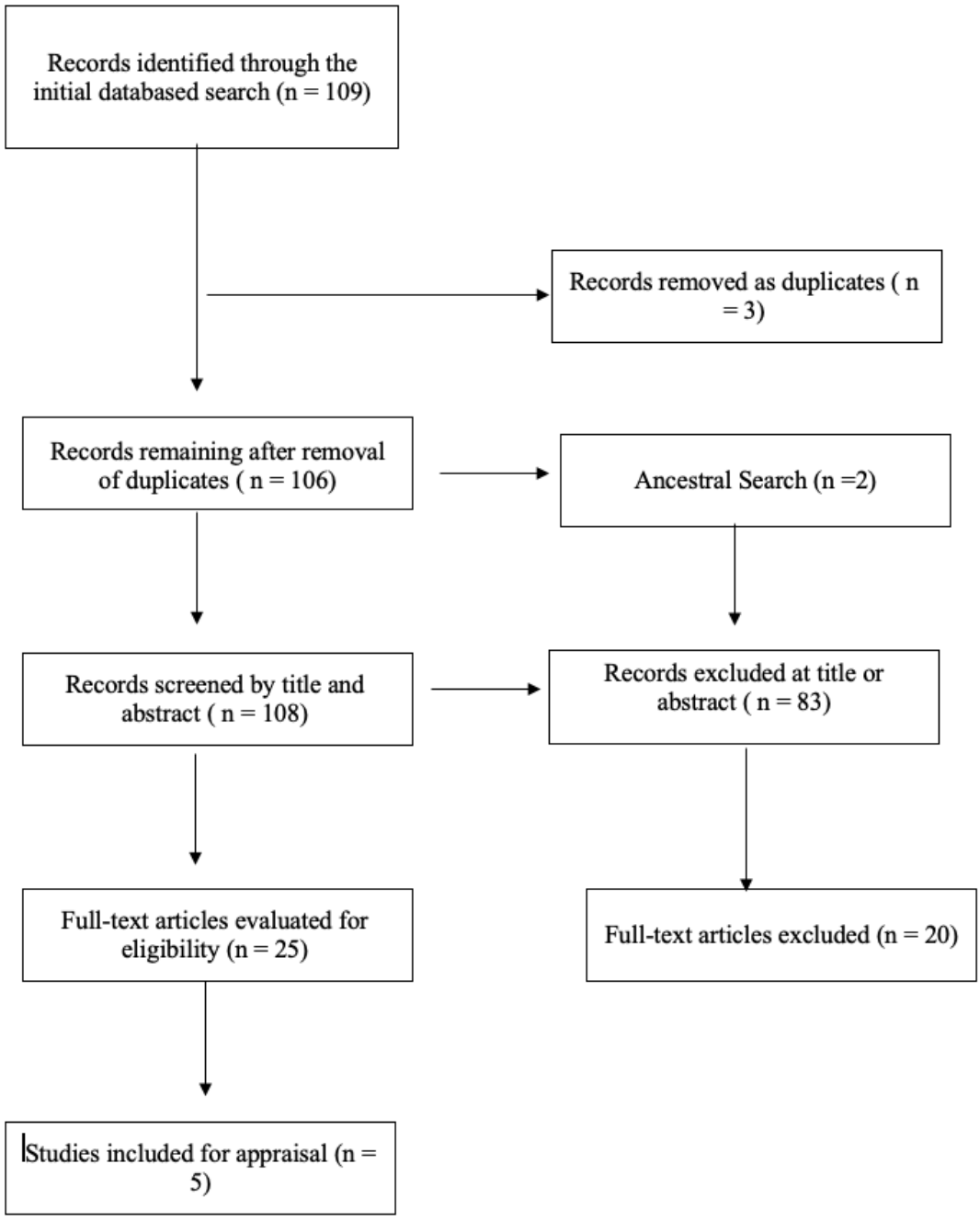


Table 6

List of Included Studies

	Included Studies
1	Beaumont, R., Rotolone, C., & Sofronoff, K. (2015). The Secret Agent Society Social Skills Program for Children with High-Functioning Autism Spectrum Disorders: A Comparison of Two School Variants. *Psychology in the Schools*, *52*(4), 390–402
2	Costescu, C. A., Vanderborght, B., & David, D. O. (2017). Robot-enhanced CBT for dysfunctional emotions in social situations for children with ASD. *Journal of Evidence-Based Psychotherapies*, *17*(2), 119–132.
3	Nowell, S. W., Watson, L. R., Boyd, B., & Klinger, L. G. (2019). Efficacy Study of a Social Communication and Self-Regulation Intervention for School-Age Children with Autism Spectrum Disorder: A Randomized Controlled Trial. *Language, Speech, and Hearing Services in Schools*, *50*(3), 416-433.
4	Sofronoff, K., Silva, J., & Beaumont, R. (2017). The Secret Agent Society Social-Emotional Skills Program for Children with a High-Functioning Autism Spectrum Disorder: A Parent-Directed Trial. *Focus on Autism and Other Developmental Disabilities*, *32*(1), 55–70.
5	Tan, Y. L., Mazzucchelli, T. G., & Beaumont, R. (2015). An evaluation of individually delivered Secret Agent Society social skills program for children with high-functioning autism spectrum disorders: A pilot study. *Behaviour Change*, *32*(3), 159–174.

2.4.4 Critical Appraisal of Studies for Quality and Relevance

Gough's (2007) Weight of Evidence (WOE) framework was employed to evaluate the methodological quality of the studies. Gough's framework assessed the methodological quality of studies, based on three criteria, consisting of methodological quality (WOE-A), methodological relevance (WOE-B) and topics of relevance (WOE-C; Delaney, 2020). Finally, the three criteria, WOE-A, WOE-B, and WOE-C were combined to create an overall

score (WOE-D) for each study (Gough, 2007). For this review, WOE-A concentrated on a non-review-specific analysis of each article using generally recognised standards (Gough, 2007). Secondly, the studies' methodological relevance was screened in WOE-B. This focused on review-specific analyses of the fitness of the evidence for answering the current study's review question (Gough, 2007). Thirdly, WOE-C focused on the relevance of the topic for answering the review questions (Gough, 2007). Appendix B offers a more detailed description of each WOE. Table 7 provides an overview of the WOE for each appraised study.

Table 7

Summary of the Weight of Evidence Scores for the Reviewed Studies

Authors	WOE-A (Methodological Quality)	WOE-B (Methodological Relevance)	WOE-C (Relevance of Evidence)	WOE-D (Overall)
Beaumont et al. (2015)	2.34	2	2	2.11 Medium
Costescu et al. (2017)	2	1	1	1.33 Low
Nowell et al. (2019)	3	2	3	2.66 High
Sofronoff et al. (2017)	2.67	2	2	2.22 Medium
Tan et al. (2015)	3	2	2	2.33 Medium

2.4.5 Participants

Firstly, the demographic characteristics of the literature were considered. A total number of 159 children with a diagnosis of autism were included in this review. The ages ranged from six to 12 years of age. In four of the studies, the gender of the participants was disclosed. The majority of participants in each of these investigations were male (n = 5). Almost half of the participants in both Beaumont et al.'s (2016) study (46%) and Sofronoff's

(2017) study (49.2%) were reported as having co-occurring conditions. The most common co-occurring condition was Attention Deficit Hyperactivity Disorder (ADHD) followed by an anxiety disorder and depression. Costescu et al. (2017) and Nowell et al. (2019) did not provide information about co-occurring conditions. This resulted in reduced WOE-A scores.

2.4.5.1 Selection Criteria. An important consideration for WOE- A was providing information on the selection criteria for participants. The primary selection criterion for most studies (n = 4) was a diagnosis of autism. All studies (n = 5) stipulated that the children had a diagnosis of autism. Several studies provided additional detail about the diagnosis. For example, Nowell et al. (2019) specified that the participants were diagnosed using the DSM-5 (APA, 2013) and Tan et al. (2015) detailed that their participants were diagnosed using the DSM-4 (APA, 2000). Additionally, Beaumont et al. (2015) specified that their participants were diagnosed with either Asperger's disorder, high-functioning autism, or pervasive developmental disorder not otherwise specified by a clinical psychologist or paediatrician. Costescu et al.'s (2017) study required participants' diagnoses to be confirmed by a clinical psychologist. Sofronoff et al. (2017) was the only study that did not provide additional detail about the participants' diagnosis of autism.

Some studies also set additional selection criteria. Both Beaumont et al. (2016) and Tan et al. (2015) stipulated that participants required a minimum IQ score on the Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999) to be included in the study. Nowell et al. (2019) required participants to be included 80-90% of the time in their mainstream primary school classrooms and to be able to read at a first-grade level. Participants in Sofronoff et al.'s (2017) study were required to have cognitive testing that demonstrated at least average cognitive functioning, as indicated by an IQ of at least 85. Costescu et al. (2017) did not set additional inclusion criteria for child participants apart from their autism diagnosis. Further inclusion standards for parents were used in two studies. Nowell et al. (2019) required parents to speak English fluently. Tan et al. (2015) required that parents had no more than mild symptoms of anxiety, depression or stress. All of the studies received a high rating for stipulating their selection criteria for WOE-A.

2.4.5.2 Demographics. None of the reviewed studies were carried out in an Irish setting. The studies were conducted in Australia (n = 3; Beaumont et al., 2015; Sofronoff et al., 2017; Tan et al., 2015), Romania (n = 1; Costescu et al., 2017) and the United States (n = 1; Nowell et al., 2019). Only two studies (Beaumont et al., 2015; Sofronoff et al., 2017)

provided demographic information. These studies received a higher WOE-A rating for providing additional detail about the demographic area of their participants. Costescu et al. (2017), Nowell et al. (2019), and Tan et al. (2015) stated the country of the study but did not provide further information, which reduced their WOE-A rating.

2.4.6 Sampling Method

Most studies (n = 4) employed purposive sampling, recruiting participants through schools, clinical settings and non-profit agencies that work with autistic children (Beaumont et al., 2015; Costescu et al., 2017; Nowell et al., 2019; Sofronoff et al., 2017). One study, Tan et al. (2015) did not detail their sampling method, which reduced their WOE-A scores. Tan et al. (2015) noted that their participants were selected from families who expressed interest in the study but did not declare how the families were contacted. Table 8 presents an overview of each included study.

Table 8

An Overview of the Literature Review Studies, Including Demographic Information, Design and Methodology

Study	Country	Design	Methods	Participants
Beaumont et al. (2015)	Australia	Quantitative between-groups design with two conditions: Condition 1: Manualised delivery of the intervention Condition 2: Informal delivery of the intervention	The Social Skills Questionnaire-Parent and Teacher Versions Emotional Regulation and Social Skills Questionnaire-Parent and Teacher Versions The Spence Children's Anxiety Scale- Parent Version James and the Maths Test and Dylan is Being Teased scenarios Child Adjustment and Parent Efficacy Scale-Developmental Disability	69 children with an autism diagnosis Ages ranged from 7-12 years
Costescu et al. (2017)	Romania	Quantitative between-groups design with two conditions:	Frequency measurements of :	27 children diagnosed with an autism diagnosis

		Condition 1: Robot-Enhanced Therapy Condition 2: Treatment as usual	Strategies used in social situation Rational beliefs or irrational beliefs Adaptive and maladaptive behaviours	Ages ranged from 6-12 years
Nowell et al. (2019)	United States	Quantitative randomised delayed treatment control group design.	The 3-Box Task The SCQ Semi-structured parent-child play observation	17 children with an autism diagnosis and their parents Ages ranged from 6-8 years
Sofronoff et al. (2017)	Australia	Quantitative design Pre-post follow-up design with four time points	Social Skills Questionnaire-Parent Version Emotional Regulation and Social Skills Questionnaire The Spence Children's Anxiety Scale-Parent Version	41 children with an autism diagnosis Ages ranged from 7-12 years

			Child Adjustment and Parent Efficacy Scale-Developmental Disability James and the Maths Test and Dylan is Being Teased scenarios Autism Spectrum Quotient	
Tan et al. (2015)	Australia	Quantitative wait-list design The intervention was staggered by two-weeks across participants	Childhood Asperger Syndrome Test Wechsler Abbreviated Scale of Intelligence Depression, Anxiety, Stress Scales The Parenting Scale Emotion Regulation and Social Skills Questionnaire	Three children with an autism diagnosis Ages ranged from 8-12 years

		The Child Adolescent Social Perception measure James and the Maths Test and Dylan is Being Teased scenarios The Piers-Harris Self-Concept Scale

2.4.7 Research Design

For WOE-B, studies received a higher rating if they adopted a mixed-methods design, or situated their research within a classroom context. In this review, none of the studies adopted a mixed-methods approach, so no study received a high rating for WOE-B. While Beaumont et al. (2015) referred to qualitative feedback from participants, they did not provide any additional detail or analysis, so they did not receive a higher rating than the other reviewed studies. All of the reviewed studies (n =5) adopted a post-positivist quantitative approach. Several studies additionally adopted an experimental design (n = 4). The majority of studies included a baseline measurement and a follow-up at six weeks (Beaumont et al., 2015; Tan et al., 2015), or at eight weeks (Sofronoff et al., 2017). Both Cosescu et al. (2017) and Nowell et al. (2019) included random assignment to intervention groups. While Sofronoff et al. (2017) did not specify how participants were divided into groups, Beaumont et al. (2015) utilized a non-random technique. In Tan et al.'s (2015) study, the intervention was delayed by two weeks across participants.

2.4.8 Interventions

A Social Cognitive lens underpinned all of the research studies in this review. Studies received a higher WOE-B rating if their studies were conducted in a classroom environment and included parental participation. Three of these studies focused on adapted versions of the Secret Agent Society (SAS) intervention (Beaumont et al., 2015; Tan et al., 2015; Sofronoff et al., 2017). Beaumont et al. (2015)'s intervention compared two versions of the SAS, involving a structured versus unstructured intervention, both within a mainstream school context. The structured condition involved school staff acting as facilitators. These facilitators were trained in the program and then delivered the manualised intervention in group sessions over 10 weeks. In condition 2, the facilitators delivered the intervention ad-hoc without a set manualised delivery program. Tan et al. (2015) also focused their intervention on an adapted version of the SAS program. A therapist delivered the program and parents acted as facilitators and participated in group sessions. The intervention consisted of nine weekly 75-minute sessions. Likewise, Sofronoff et al. (2017) focused on an adapted version of the SAS program. Here, the parents delivered the program entirely. The parents were supported by weekly Skype sessions and parent training videos. The intervention took place over 10 weeks with sessions lasting 90 minutes.

Costescu et al. (2017) also evaluated a two-condition intervention. The focus was on the application of Robot-Enhanced Therapy (RET) to a social skills intervention for autistic children, again drawing upon a cognitive-behavioural lens. The study involved two conditions. Condition One was the RET group. Condition Two was the Treatment As Usual (TAU) group. The RET group received six weekly group sessions to teach social skills with a robot. These session were delivered by a therapist. Contrastingly, Nowell et al. (2019) used the GoriLLA intervention. The intervention involved parents as active participants in group sessions and the completion of weekly homework assignments. The intervention consisted of 12 90-minute sessions, delivered by clinicians.

A primary consideration of this review was the effectiveness of the interventions used for improving self-regulation outcomes. Accordingly, studies that focused on self-regulation outcomes received higher ratings under WOE-C. However, the only study to address self-regulation as a primary aim was Nowell et al. (2019). This study received a higher WOE-C score as a result. Next, the context of the interventions was considered. Studies that conducted their intervention within a classroom context with the involvement of school staff were marked higher under WOE B. Most research was conducted in a clinical environment (Costescu et al., 2017; Nowell et al., 2019; Tan et al., 2015). Beaumont et al.'s (2016) study was conducted in a classroom setting by teachers who had received facilitator training, and therefore this study was marked higher under WOE-B. While Sofronoff's (2017) study included parental involvement, it was not conducted in a classroom setting, so it was not marked higher under WOE-B. Table 9 provides a summary of the interventions used across the reviewed studies.

Table 9

A Summary of the Reviewed Studies' Interventions and Duration of Interventions

Study	Intervention	Duration of Intervention
Beaumont et al. (2015)	Secret Agent Society (SAS) program- structured versus unstructured versions	10 weeks
Costescu et al. (2017)	Robot-Enhanced Therapy (RET)	Six weeks
Nowell et al. (2019)	Growing, Learning, and Living with Autism Group (GoriLLA) intervention	10 weeks
Sofronoff et al. (2017)	Secret Agent Society (SAS) program- Fully parent-delivered version	10 weeks (some families took up to 18 weeks to complete the programme)
Tan et al. (2015)	Secret Agent Society (SAS) program- Parent facilitated version	Nine weeks

2.4.9 Measures and Analysis

Firstly, the reviewed studies received a higher WOE-A score if they specified how they dealt with missing data and the type of analyses they used. For WOE-B and WOE-C, studies were rated higher if they included mixed-methods research, multiple assessments of study outcomes, and data triangulation. The majority of studies utilised similar measures for social skills and emotional regulation. The primary measures used were the Social Skills Questionnaire-Parent (SSQ-P) and Teacher (SSQ-T) versions (Spence, 1995), and the Emotion Regulation and Social Skills Questionnaire (ERSSQ)-Parent and Teacher Versions (Beaumont & Sofronoff, 2008). These measures were used by Beaumont et al. (2015), Sofronoff et al. (2017), and Tan et al. (2015). These authors also used the 'James and the Maths Test' and 'Dylan is Being Teased' scenarios which analyse children's responses to fictitious social situations to measure social problem-solving (Atwood, 2004).

Contrastingly, Costescu et al. (2017) used frequency measurements for their target variables, including children's responses to a variety of social situations, and frequency measurements of adaptive and maladaptive behaviours. The data were collected before and after the intervention. However, the authors did not provide any further detail on the specifics of these measurements, such as how they rated these frequency measurements. This is reflected in the authors' reduced WOE-A score. Only one study (Nowell et al., 2019) adapted its measures to specifically address their research question. The researchers used the Child Observation Protocol (COP; C. V. Carter, Varblow, Brady, & Woods, 2016) to measure 12 core social communication and self-regulation concepts taught as part of the intervention. This focused on three core aspects, Social Thinking, Self-Regulation, and Social Communication. The study also used a Parent Report of Group Outcomes measure (PROGO; Carter & Brady, 2016) which is a 12-item measure of autism knowledge and core concepts, and knowledge related to the intervention. The measure included open-ended responses which were coded by the researcher to create a total score. The measures were adapted by the authors for the intervention, such as providing students with visuals to complete measures. Nowell et al. (2019) received higher WOE-A, WOE-B and WOE-C scores for using a variety of measures that specifically addressed self-regulation.

2.4.10 Ethical Issues

In this review, no studies explicitly focused on ethical considerations. Only Nowell et al. (2019) mentioned how informed consent was ascertained by participants. This resulted in lower WOE-A scores for all these studies.

2.4.11 Findings Concerning the Review Questions

2.4.11.1 Impact on self-regulation. Only one study explicitly measured improvements in self-regulation outcomes (Nowell et al., 2017). An Analysis of Variance (ANOVA) of time x group interactions on the COP found that the intervention group had significant improvements in their total COP score ($p \leq .02$), indicating improvements in both self-regulation and social skills. However, when the researchers examined the three subscales, namely social thinking, self-regulation, and social communication, only the social thinking subscale reached statistical significance, $p \leq .05$. However, the self-regulation subscale of the PROGO showed a significant time x group effect, $p \leq .03$. For the PROGO, the other subscales of social thinking and autism knowledge did not reach statistical significance. Also, concerning self-regulation, Nowell et al. (2019) reported that parents in the intervention group showed slightly increased reported self-regulation strategies across time, although the results did not reach statistical significance, $p \leq .12$. Social thinking scenarios also did not reach statistical significance, $p \leq .08$. However, structured teaching strategies did reach significance from pre-to post-test, $p \leq .02$. Yet, the intervention did not generalise to independent coded behavioural interactions between parent-and child-dyads, $p \leq .04$. Nevertheless, three- and six-month follow-up measures revealed that time by group effects on the self-regulation subscale was significant, $p \geq .01$. Time and group interactions on the other subscales of social thinking and social communication did not reach significance. Overall, these findings indicate an improvement in self-regulation outcomes in Nowell et al.'s (2019) study.

2.4.11.2 Impact on other Socio-emotional Outcomes. Other studies referred to improvements in social and emotional competence. Three studies reported findings for the ERSSQ, SSQQ and the 'James and the Math Test' and 'Dylan is Being Teased' scenarios. For example, Beaumont et al. (2015) reported a significant effect of time on participants' scores on the ERSSQ (parent and teacher versions), $p < .001$. There was also a significant

time x group interaction, with participants in Condition One (the structured intervention group) scoring higher than participants in Condition Two (the unstructured intervention group), $p < .001$. However, for parent-reported scores on the ERSSQ, there was no significant difference between the conditions, $p = .076$. Beaumont et al. (2015) reported a significant effect of time on teacher scores of the SSQ, $p < .001$. There was no significant difference between the conditions ($p = .159$). Parent-reported SSQ similarly found a significant effect for time ($p < .001$), but not a significant effect between the intervention type and time ($p = .468$).

Sofronoff et al. (2017) looked at the combined findings for the SSQ and the ERSSQ over time. The authors reported a significant difference in parent-reported measures on the SSQ and ERSSQ over time ($p < .005$), indicating a large effect size; observed power = .99. This was also significant at a six-week follow-up ($p < .001$). Mixed results were reported by Tan et al. (2015) for the ERSSQ and the SSQ. Based on Jacobson and Truax's (1991) cut-off points, participant A's scores on the SSQ and the ERSSQ were unchanged, Participant B showed clinically significant improvement, and Participant C showed reliable improvement. These results were maintained at a six-week follow-up. The teacher-reported measure of the SSQ and ERSSQ showed that Participant A had reliable change and Participant B had no significant change. No data were available for Participant C. Sofronoff et al. (2017) additionally compared the results to that of the original clinic-based trial by Beaumont and Sofronoff (2008). The authors reported that the original clinic-based trial has significantly higher scores on the SSQ ($p = .002$), and the ERSSQ ($p = .002$), in comparison to Sofronoff et al.'s (2017) self-directed intervention. These results indicate that self-regulation interventions can have positive impacts on a variety of social and emotional outcomes, however, some mixed findings were evident.

These three studies also reported findings for the 'James and the Math Test' and 'Dylan is Being Teased' scenarios. Beaumont et al. (2015) reported a significant effect for time ($p <.001$) and a significant time x group interaction ($p = .014$) on the 'Dylan is Being Teased' scenario. There was also a significant effect for time ($p <.001$) and a significant time x group interaction ($p = .040$) for 'James and the Math Test'. For Tan et al. (2015), only one of the participants maintained clinically significant improvements on the 'James and the Math Test' at a six-week follow-up. Two of the participants, Participants B and C, demonstrated improvements on the 'Dylan is being Teased' but not on the 'James and the Math Test' measure. However, only Participant B maintained improvements at the follow-up. Participant

A's score remained unchanged on both measures. Sofronoff et al. (2017) also reported a significant effect for time on combined scores for both scenarios (p = .000). There was also a large effect size, with an observed power = .91. These results indicate that children may have transferred self-regulation knowledge to problem-solving social situations when presented with the 'James and the Math Test' and 'Dylan is Being Teased' scenarios.

Findings were also reported for non-target variables. For instance, Beaumont et al. (2015) and Sofronoff et al. (2017) reported significant improvements in parent-reported child anxiety (p = .001). Beaumont et al. (2015) also reported a significant improvement in scores of child adjustment and behaviour $p <$ .001. Costescu et al. (2017) additionally reported positive outcomes for rational beliefs $p <$ .031, with a large effect size (d = 0.80). Overall, these results suggested that self-regulation interventions led to a variety of positive outcomes for autistic students.

2.4.11.3 ***Qualitative Findings.*** None of the studies provided detailed qualitative findings. Beaumont et al. (2015) stated that a thematic analysis of parents' and teachers' qualitative feedback took place and that the findings reported that participants had improvements in their attitude toward going to school and their self-esteem. Beaumont further noted that participants had improvements in their self-regulation and emotional awareness. Further improvements in child participation in play activities and inclusion were reported. However, the authors did not provide details about these findings or how the findings were analysed. This reduced their WOE-B score and limited the generalisation of their findings.

2.4.12 Key Considerations and Conclusions from Stage Three

The systematic literature review aimed to examine the range of self-regulation interventions present in empirical research for autistic primary-aged children. The review questions were: *What self-regulation interventions are present in empirical research to support autistic school-aged children? What are the outcomes of the self-regulation interventions present in empirical research on measures of self-regulation, and related social and emotional outcomes?* The review included five studies. These studies showed promising results for the possibility of social skills interventions to help the self-regulation outcomes of

autistic children. A number of the studies focused on adapted versions of the well-established SAS Intervention (Beaumont et al., 2015; Tan et al., 2015; Sofronoff et al., 2017). Other studies focused on developing new interventions. For example, Costescu et al. (2017) trialled the use of robots in social skills classes to improve motivation and offer an individualised teaching tool for autistic children. The ZOR and Social Thinking programs, among others, were used by Nowell et al. (2019) to construct the GoriLLA Intervention. Most of these research projects were conducted in clinical settings (Costescu et al., 2017; Nowell et al., 2019; Tan et al., 2015). One study was conducted in a classroom (Beaumont et al., 2015) and one additional study was conducted in a home setting (Sofronoff et al., 2017).

Positive results were reported by several studies. Nowell et al.'s (2019) study demonstrated the possibility of positive long-term effects on self-regulation outcomes for autistic children after a clinic-based intervention. Concrete social vocabulary, self-regulation vocabulary, parent-assisted activities, and a structured TEACCH method were all used in this intervention. Three studies reported positive effects of the SAS program (Beaumont et al., 2015; Tan et al., 2015; Sofronoff et al., 2017). Beaumont et al. (2015) reported that their structured SAS intervention led to improvements in social-emotional functioning that generalised to a home environment. Similarly, the researchers provided teachers with weekly tip sheets to help them manage challenges faced by the children, which may also have indirectly improved their behaviour ratings.

Tan et al. (2015) reported mixed findings for their individually delivered SAS program. Two participants had a reliable change in parent-reported emotional regulation and social skills, however, one participant's scores remained unchanged and other mixed findings were reported on measures of social competence and knowledge of emotion management strategies. The researchers argued that the positive change on half of the measures may provide some preliminary support for individually administrated social skills programs which may be easier for some families or children to access, rather than a group-delivered intervention. Sofronoff et al. (2017) reported findings on a parent-delivered SAS program. The authors reported significant improvements in parent-reported social skills, child behaviour, and child anxiety. Parent self-efficacy also improved. The parent-delivered program included a SAS computer game, which was also used in Beaumont et al.'s (2015) study. The parents received training through video and structured workbooks (Sofronoff et al., 2017). However, the authors noted that this program was unstructured and differed considerably from clinic-based programs which preside the research.

Nevertheless, these findings need to be interpreted carefully. Nowell et al. (2019) reported that findings of improvements in concept knowledge did not transfer to independent observations of child-parent interactions, which may be because a 12-week clinic-based intervention is not enough to affect change outside of the clinic environment (Nowell et al., 2019). Additionally, Costescu et al (2017) had mixed findings and did not report a significant difference pre-and post-intervention for adaptive behaviours and social knowledge. Tan et al. (2015) cautioned that repeated administration of questionnaires and tasks affected participants' motivation. Similarly, several researchers cautioned the reliance on teacher- and parent-self-report measures which may be affected by expectancy bias (Sofronoff et al., 2017; Tan et al., 2015).

Costescu et al. (2017) questioned whether using a robot as a mediator in the intervention would lead to greater socio-emotional gains for the children. Although the authors did not provide detailed qualitative feedback, they noted in their discussion that the children were more engaged with the robots and that they were more interested in the feedback provided by the robot. However, due to the small sample size and lack of detailed qualitative data, it is difficult to make any generalisations. Both Beaumont et al. (2015) and Sofronoff et al. (2017) did not report the effect of the computer game on child engagement. Traditionally, face-to-face interventions have been used in social skills training (Soares, Bausback, Beard, Higinbotham, Bunge, & Gengoux, 2021). Recent research has begun to explore the use of technology in teaching social skills to autistic children. Technology may provide a highly motivating, portable and efficient way to teach a variety of social skills (Kellem, Charlton, Kversoy & Gyori, 2020). These new developments include the use of avatars, virtual characters and animation to make teaching social skills more engaging for autistic children (Kellem et al., 2020). However, the accessibility of this technology and training for both students and teachers can be a barrier to its applications (Kellem et al., 2020). Similarly, initial positive results from using technology can come from its novelty to the students, and more longitudinal studies are warranted to evaluate its long-term effects (Kellem et al., 2020). For example, a meta-analysis by Soares et al. (2021) found no significant differences between face-to-face and behavioural intervention technology for social skills interventions for autistic children.

Another finding to consider is the context and delivery of interventions. In the present review, three of the studies were delivered by clinicians (Costescu et al., 2017; Nowell et al., 2010; Tan et al., 201). Only one study included the involvement of school staff (Beaumont et

al., 2015). Two additional studies included parental involvement (Sofronoff et al., 2017; Tan et al., 2015). Beaumont et al. (2015) sought to extend findings by Kasari, Rotheram-Fuller, Locke and Gulsrud (2012) and Lopata et al. (2012), to explore the effectiveness of an intervention delivered by school staff rather than research personnel. In Kasari et al.'s (2012) study, the authors reported that two brief school-based social skills interventions, comprising a direct social skills teaching intervention, and an indirect peer mediator intervention, led to positive changes in social skills, which were maintained at a three-month follow-up. In Lopata et al.'s (2012) study, the authors also reported significant improvements in children's social skills, and a large effect size on measures of target social skills, following a school-based social skills intervention. This involved a three-week summer preparation program, staff training, and 10 months of social skills intervention groups taught by a multi-disciplinary team which included school staff. It should be noted, however, that these results were confined to autistic children who already were fully included in their regular education classrooms for at least 80% of the time, and had an IQ of 65 or over without any co-occurring diagnoses (Kasari et al., 2012; Lopata et al., 2012). Therefore, a question arises regarding the application of these interventions to primary schools in Ireland that have a variety of needs. Indeed, Nowell et al. (2019) acknowledged that modifications could be made to make sure that these interventions are accessible to all autistic children. This argument is echoed by Kapp (2023) who challenged traditional measurements of intellectual functioning and communication abilities, which Kapp contends do not capture the strengths and possibility for the progress of minimally speaking autistic people.

Another consideration arising from this review is the involvement of parents in research. Parental involvement was key to Nowell et al.'s (2019) study. Parents were active participants in the intervention group, and as part of the intervention, parents participated in weekly 20- to 30-minute parent breakout sessions to review the concepts learnt, brainstorm how to practice them at home, and discuss the children's progress and their homework assignments for the week. Interestingly, both parents and children in the study had an increase in social communication and self-regulation concept knowledge. The researchers also noted an increase in parents' applied written strategy responses and vocabulary. However, this did not generalise to observations of parent-child interactions post-intervention. Furthermore, parents acted as facilitators in Sofronoff et al.'s (2017) study. The study reported positive social-emotional outcomes for both parents and children. However, the authors noted that parent-delivered programs may not be suitable for all families. In the

study, there was a high attrition rate of 32%, with parents having difficulty implementing the program. Attrition rates were higher for parents who had a lower level of education and higher autism traits. While parents acted as facilitators in Tan et al.'s (2015) study, the researchers did not report on the outcomes of this involvement for the parents of children, or parents' thoughts on their involvement. While parental involvement is encouraged in research, it may be necessary to provide ample support and a structured program for parents to follow.

2.4.12.1 Limitations. All of the research studies had positive findings for the social-emotional outcomes of autistic children. However, only one reviewed study explicitly answered the research question (Nowell et al., 2019). This study adapted the intervention and measures to specifically target self-regulation. Additionally, many researchers interchangeably used the terms 'self-regulation', 'emotional-regulation', 'emotional literacy' and other measures of social skills, leading to difficulty in ascertaining the specific outcomes authors of research papers sought to explore. This also limited the comparability of the studies and the application of their findings to the current review question.

Additionally, participant sampling and ethical issues were not fully addressed by the reviewed studies. None of the studies provided rich detail about the sampling process and related ethical issues throughout their studies. This reduced the ability to critically appraise the studies.

Likewise, caution is warranted in drawing conclusions from the reviewed studies. Conclusions from brief therapies must be carefully assessed regarding autism, according to Beaumont et al. (2015), because autism is a lifelong condition and spontaneous short-term gains are unlikely. Therefore, the current research review attributed more weight to mixed-methods studies that put the results in a rich context to interpret the findings.

2.4.12.2 Implications for Theory and Practice. One of the primary recommendations from this review is to explore school-based therapies for autistic children. Beaumont et al. (2015) contend that because school-based therapies can help to reduce the financial, logistical, and accessibility hurdles associated with clinic-based interventions, they pose signification implications for policy and practice. Additionally, it is recommended to make

the interventions as inclusive as possible, to include all autistic children, regardless of linguistic or cognitive measurements (Kapp, 2023).

Based on the findings of Beaumont et al. (2015) and Sofronoff et al. (2017), it is also recommended to focus on structured programmes, which had superior gains than unstructured programs in the current review. The current review additionally showed that the involvement of parents may have promising findings for both parent and child outcomes. However, Sofronoff et al.'s study (2017) indicates that parental support is needed due to low attrition rates for fully parent-directed programs.

Three of the studies also included technology to support the delivery of their social skills program. The potential for technology is a new area of research for autistic children which may support engagement and provide an individualised program for children. However, the findings of the present review combined with a recent meta-analysis by Soares et al. (2021) caution the over-reliance on technology and indicate that face-to-face therapy may be more or equally effective.

2.5 Chapter Conclusion

To conclude, this chapter aimed to explore key literature pertaining to self-regulation development for autistic children. To achieve this aim, it was necessary to provide an in-depth analysis of autism in *Stage One* of this review. This chapter further aimed to present the key theoretical perspectives on self-regulation, along with the current self-regulation interventions available for autistic children in *Stage Two*. This study also sought to contribute to self-regulation literature by providing a systematic review of the self-regulation interventions available in empirical research for autistic children in *Stage Three* of this chapter. This systematic review also sought to examine the application of these interventions, along with the outcomes of these interventions for autistic children. Based on the key considerations of this chapter, the methodological approaches adopted in this research are outlined in Chapter Four.

Stemming from the literature presented in Chapter Two, the overall aim of the current research study was to explore environmental, social and cognitive supports for self-regulation. The specific research questions were:

1. How does the class teacher modify the classroom environment to support co-regulation for her students?
2. What are the primary co-regulation strategies used by the class teacher and parents to support the children's self-regulation?
3. What are the responses of the participants to an individualised cognitive-based self-regulation intervention?
4. What are the enablers and barriers to the effective implementation of the self-regulation intervention?

Chapter Three
Methodology

3.1 Chapter Introduction

The current study adopted a three-way approach to supporting the self-regulation development of autistic children, encompassing environmental, social and cognitive supports for self-regulation. The primary research questions were *"How does the class teacher modify the classroom environment to support co-regulation for her students?", "What are the primary co-regulation strategies used by the class teacher and parents to support the children's self-regulation?", "What are the responses of the participants to an individualised cognitive-based self-regulation intervention?", "What are the enablers and barriers to the effective implementation of the self-regulation intervention?".*

Drawing from the literature presented in Chapter Two, this chapter presents the methodological approaches of the current study. The chapter commences by presenting the values underpinning this research and the overall research paradigm, including the key methodological, epistemological and ontological considerations. The case study design of this study is then presented, along with the study's procedure and measures employed. The process of data analysis is also explored with reference to reflexive thematic analysis and the descriptive-analytic approach for quantitative data. Finally, this chapter explores the key ethical considerations of this research.

3.2 Values

This research was underpinned by the primary value that "every learner matters and matters equally" and thus, research plays a role in upholding the respect and dignity of each person (UNESCO, 2017, p. 13). This value led this research from the initial research question to the methodology and analysis. Through this lens, I acknowledged my role as a subjective observer in the research process. I adopted a qualitative research position to enable reflection and pragmatism throughout the research process. As outlined in Chapter Two, it was also essential to reflect on ableism in autism research (Botha & Cage, 2022). Therefore, I sought to include voices from the autistic community in my literature review, and I was also guided by Ireland's autism charity 'AsIAm' (2019) to choose the language used in my study. This research was further guided by a neuroaffirmative lens, which recognises that a fundamental aspect of being human is natural variations in the brain (Botha & Cage, 2022). My research,

therefore, strove to focus on creating environmental adaptations to support sensory needs. My research also sought to develop a self-regulation intervention that could be adapted for use with neurodiverse learners, being cognisant of differences in communication styles and sensory sensitivities.

3.3 Research Paradigm

Research paradigms can be characterised as the overarching belief systems that underpin research (Braun & Clarke, 2022). Broadly speaking, the two main research paradigms are the positivist and postpositivist lenses. Positivist paradigms are related to empiricism, and the application of quantitative methodologies to answer research questions to obtain objective knowledge (Bibi, Khan & Shabir, 2022). Thereafter, postpositivist paradigms developed from the positivist lens, and developed the role of sociocultural influences that can 'blur' the lines of objective reality (Braun & Clarke, 2022).

Developing a research paradigm also involved considering questions of epistemology, ontology and methodological approaches. Firstly, epistemology refers to the nature of knowledge. Epistemological questions may include how knowledge is acquired and how one makes sense of the world (Bibi et al., 2022). Secondly, ontology relates to questions of reality. Researchers take different stances on the nature of reality and what kind of reality exists (Bibi et al., 2022). Finally, research methodology can be thought of as a theoretically informed framework that encompasses tools and techniques for collecting and analysing data (Braun & Clarke, 2022). The two main methodological approaches are qualitative and quantitative. The qualitative approach is generally inductive and involves the researcher investigating a particular phenomenon through an exploratory lens (Bibi et al., 2022). Quantitative approaches, on the other hand, generally involve deductive reasoning where variables are tested based on prior theories and data is collected and analysed using formal procedures (Bibi et al., 2022). Additionally, some researchers apply a mixed-methods design which incorporates elements from both quantitative and qualitative methodology. Qualitative methodology may also be used as part of an overall qualitative research paradigm. A qualitative paradigm can be referred to as 'Big Q', which involves both qualitative tools and techniques (Braun & Clarke, 2021). Using qualitative tools alone may be thought of as 'Small Q', whereby some qualitative tools are used as part of an overarching quantitative or positivist research paradigm (Braun & Clarke, 2022).

The ‘Big Q’ Qualitative paradigm draws from a post-positivist lens, and extends this approach by adopting reflexive principles. Additionally, a pragmatic approach was adopted, which allows for a combination of methodological approaches to answer the research question (Shah, Shah & Khaskhell, 2018). Pragmatism as a paradigm combines post-positivist and constructivist epistemological positions (Morgan, 2014). Importantly, it seeks to understand the nature of reality from both approaches. For the current study, a ‘Big Q’ qualitative research paradigm was chosen, whereby reflexive thematic analysis was employed as the primary methodology and as part of the overall research paradigm (Braun & Clarke, 2022). Flexibility was evident within the Big Q qualitative research paradigm. While the study adopted an overarching qualitative methodology, quantitative descriptive data was also collected to gain a broader picture of the overall case.

3.3.1 Theoretical Approach

Another methodological consideration of the present study was the theoretical approach adopted by the researcher. Braun and Clarke (2022) differentiate between experiential and critical orientations to research. An experiential orientation can be defined as an approach to qualitative research that focuses on how participants express meaning and experiences (Braun & Clarke, 2022). In experiential orientations, language is seen as a tool for communicating meaning (Braun & Clarke, 2022). In contrast, a critical orientation focuses on interpreting patterns of meaning and unpacking these patterns of meaning to realise implications (Braun & Clarke, 2022). Here, language is seen as a social practice and a way to both create meaning and realities (Braun & Clarke, 2022). For the current study, an experiential orientation was adopted. This approach was adopted to allow for an exploration of participants’ responses to the intervention.

Additionally, an inductive data collection approach was primarily employed in the current study. An inductive approach locates the analysis within the data itself, whereas a more deductive approach draws upon prior theoretical constructs as a lens through which to analyse the data (Braun & Clarke, 2022). An inductive approach is grounded in the data and the data is coded to reflect the meaning of the participants, rather than based on a pre-existing coding frame (Byrne, 2022). However, the researcher also incorporated a degree of deductive coding to ensure the research was relevant to the overall research questions (Byrne, 2022). For example, the SSC framework was employed in the data analysis and used to guide analysis.

3.3.2 Epistemological and Ontological Position

Other methodological questions that were considered were the ontological and epistemological positions of the current study. Ontology refers to the perspective research takes on how we construct and understand knowledge (Braun & Clarke, 2022). Broadly speaking, a realist ontology assumes that knowledge can be uncovered through objective research. Contrastingly, relativism is both an ontological and epistemological position that assumes that the notion of a singular reality does not exist and therefore views reality as a result of both human action and interaction (Braun & Clarke, 2022). Critical realism is another ontological approach that seeks to combine ontological realism with epistemological relativism, thereby recognising that truth may be influenced by human practices (Braun & Clarke, 2022). Epistemology is closely related to ontology and refers to theories of knowledge (Braun & Clarke, 2022). A postpositivist epistemological position recognises that knowledge is influenced by the sociocultural context and the researcher's own values (Braun & Clarke, 2022). The current study adopted a critical realism ontological position which acknowledged that social and cultural influences give differing perspectives and contexts to the development of self-regulation (Braun & Clarke, 2022). Additionally, the current study aligned with a post-positivist epistemological position. This approach was adopted to allow for an in-depth analysis of the role of social and cultural influences in the development of self-regulation for the participants of the study.

3.3.3 Reflexivity

The epistemological stance of this study also aligned with a reflexive thematic analysis approach (Braun & Clarke, 2021, 2022). This approach acknowledges that one's experiences, attitudes and beliefs guide the research process. Through my reflexive analysis, I sought to interpret key theoretical assumptions, values and experiences of participants related to the development of self-regulation. To achieve this aim, I documented decisions, thoughts and reflections in an online journal. Appendix C outlines an excerpt from my research journal.

3.4 Design

This study employed a single-embedded case study design. A case study design was chosen to allow for an in-depth exploration of the experiences of the participants using

multiple sources of data collection and analyses (Swanborn, 2010; Yin, 2009). Chapter Two outlined how previous research into self-regulation supports for autistic children have highlighted the positive outcomes of participation in self-regulation interventions (e.g. Beaumont et al., 2015; Nowell et al., 2017). These research studies have contributed to wider knowledge of the development of self-regulation for autistic children. However, they may be limited by largely taking place in clinical settings, which may neglect to account for the multi-faceted nature of self-regulation development. Similarly, research has highlighted the need to develop evidence-based programmes that take place in a school setting due to the financial and time constraints of clinical programmes (Beaumont et al., 2015; DES, 2017). Therefore, a case study design, as set in a school environment, was chosen to respond to the limitations of previous research into self-regulation.

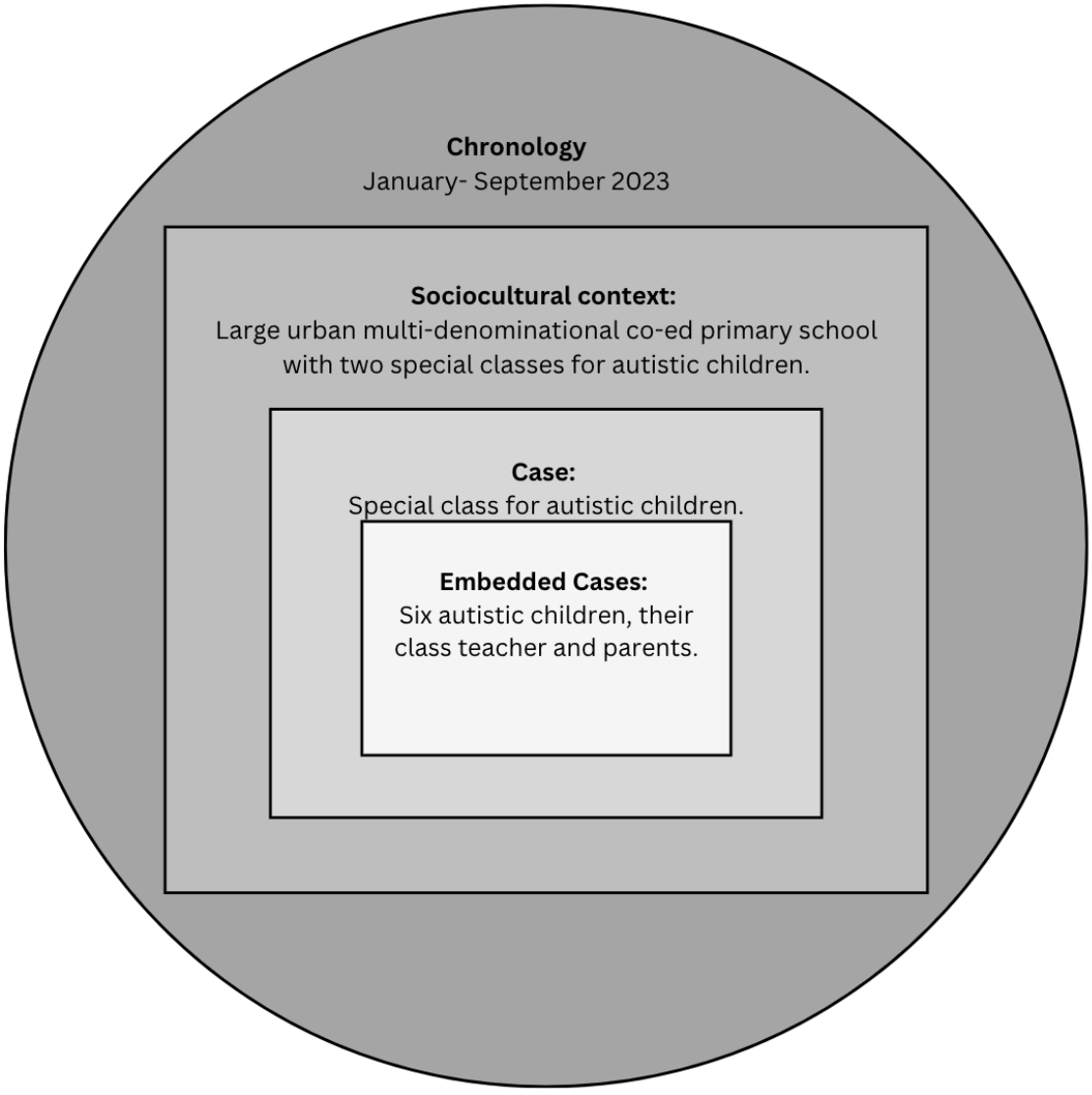
A case refers to a specific phenomenon that can be spatially and temporally defined (Gerring, 2016). Gerring (2016) explains that researchers use case studies to answer research questions that require a detailed exploration of complex social phenomena. Case study designs have sometimes been mistaken for other exploratory qualitative research designs such as ethnography. However, Yin (2009) defines the key features of case study design as focusing on one case or a set of cases in a set time period, relying on multiple sources of evidence and drawing on prior theoretical positions in the field.

The chosen case for the current study was a class for children who have a diagnosis of autism in the Republic of Ireland. This case study design was situated in an urban primary school in Ireland. The case was a special class, which included one class teacher, two SNAs and six students with a diagnosis of autism. Additionally, the children's parents were invited to participate in the research. An embedded single case study design was adopted. This meant that there was one overall single case, which was the special class setting, and the researcher drew on individual subcases within this design (Yin, 2009). The case study was situated within a large urban primary school that was multi-denominational and co-educational. The school had two special classes for autistic children and was situated in a suburb of a large city in Ireland. An illustrated version of this design is presented in Figure 5. This design acknowledged the role that social interactions and the environment play in supporting the development of self-regulation (Binns, 2019). A sociocultural perspective also considered how wider inclusive policies, including policies on inclusive education and current guidelines for teaching in special classes and teaching autistic children (GOI, 2022b) may influence the participants in this case study. Additionally, this research was cognisant of the wider debates

in educational policy reform about the role of special classes in Ireland, as outlined in Chapter One.

Figure 5

An Illustration of the Current Study's Case Study Design



A primary strength of this case study design is that it took place in a natural environment and allowed for flexibility to apply a variety of research approaches in observing the case in question. However, it is also important to note that the case study design has limitations. One primary limitation is that the case study design did not follow an

experimental design and therefore, did not control for variables needed for scientific generalisation (Yin, 2009). This means that the results of this case study may not be reflective of other special classes or primary school settings in Ireland and internationally. Rather, I chose this design as a foundation to explore the individual development of self-regulation for specific children in a specific class. It is envisaged that the findings presented in this research will act as a base for further empirical research.

3.5 Sampling

The participants were chosen using a non-random convenience sample from the school where the researcher worked. I did not teach these children, however, I was a teacher in another special class for autistic children in the school at the time of the study. Non-probability sampling techniques such as convenience sampling are widely used in educational research due to the time and resource constraints of larger population-based sampling in educational settings (Dhivyadeepa, 2015). The sampling employed was considerate of the practicalities of special classes in Ireland. As special classes in Ireland have six students, it was practical to include all six students in the case study. Similarly, one class comprising six students, their teacher and parents was deemed by the researcher a sufficient sample size to allow for in-depth analysis of each embedded case within the larger case of the special class (Braun & Clarke, 2022). Therefore, for the current research a sample of one special class, comprising six students, their class teacher and parents, was chosen from the larger population of autistic children attending special classes in Ireland.

3.6 Participants

Participants included six children from a primary school class in Ireland who had a diagnosis of autism, their parents/ guardians and the class teacher. Child participants were between seven and 10 years of age, were enrolled in a special class for autistic students and were integrated into mainstream classes for part of the school day, ranging from senior infants to fourth class. The class teacher was invited to participate in the study. The class teacher assisted the researcher in contacting the parents of the child participants and inviting them to participate in the study. To report results, all participants were given pseudonyms. The children were given the pseudonyms ‘Emma’, ‘Tom’, ‘Kyle’, ‘Sam’, ‘David’, and ‘Luke’. For the semi-structured interviews, the parent participants were called ‘Anna’, ‘Kate’, Maria’, and ‘Susan’, and the class teacher was given the name ‘Angela’.

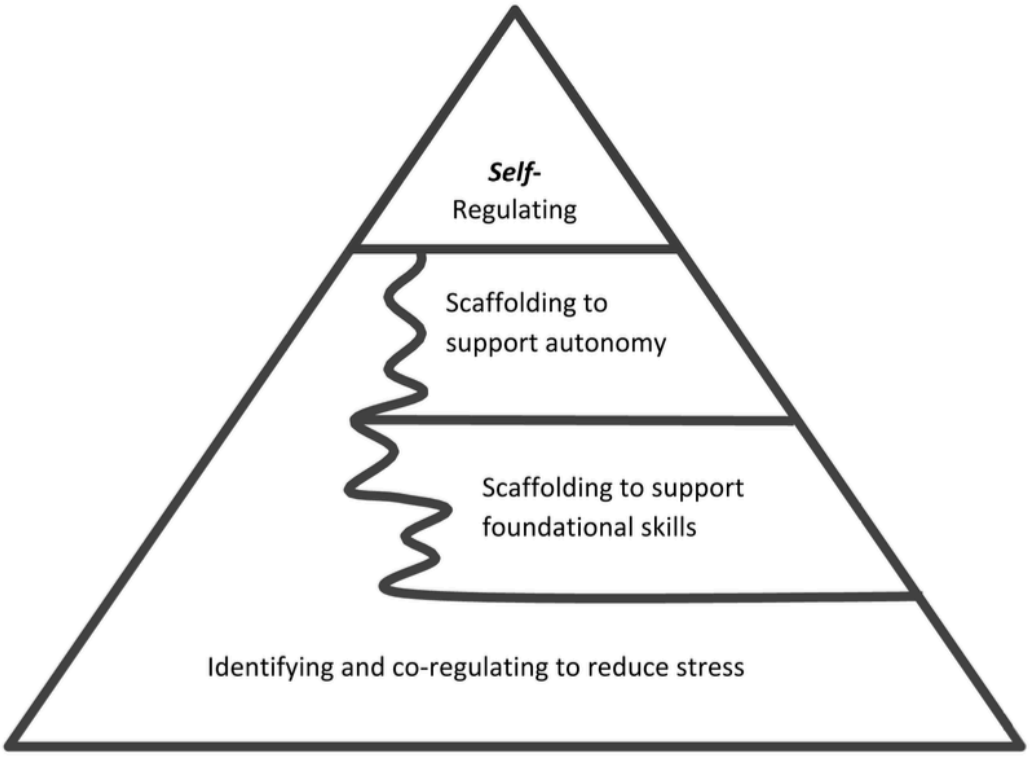
To be included in the study, child participants had to be enrolled in a special class for children with a diagnosis of autism or have daily access to the special class. Participants also had to be of school age, between four and 13 years of age. The exclusion criteria were participants who did not have a diagnosis of autism and did not have access to the autism class in the school. The inclusion and exclusion criteria did not apply to the class teacher or parents, who were included in the study based on their connection with the child participants.

3.7 Methodology

As outlined previously, this study adopted a 'Big Q' qualitative research paradigm that was pragmatic in nature. Accordingly, the procedures of this study considered practical classroom considerations, such as time and resource demands, and involved the researcher working with the class teacher to develop suitable methodologies. The procedures of the study were also influenced by the SSC framework (Binns, 2019; Binns et al., 2019), as illustrated in Figure 6 and previously presented in Chapter Two.

Figure 6

A Visual Representation of the Stress, Self-Regulation and Communication Framework



Note. Figure from Binns (2019, p. 35).

3.7.1 Procedure Based on the Stress, Self-Regulation and Communication Framework

The current study adopted a group intervention approach to addressing the self-regulation development of autistic children. The researcher drew upon the SSC framework (Figure 6), to develop a phased approach to supporting the development of self-regulation for autistic children, moving from environmental supports and adaptations towards co-regulation and more independent self-regulatory capacities. The procedure of the current study was divided into five phases.

3.7.1.1 Phase One: Informed Consent and Baseline Measures. Following ethical approval from the Mary Immaculate Research Ethics Committee (MIREC), the first phase of the study commenced in January 2023. *Phase One* involved pre-intervention data collection. A detailed procedure for *Phase One* is recorded below.

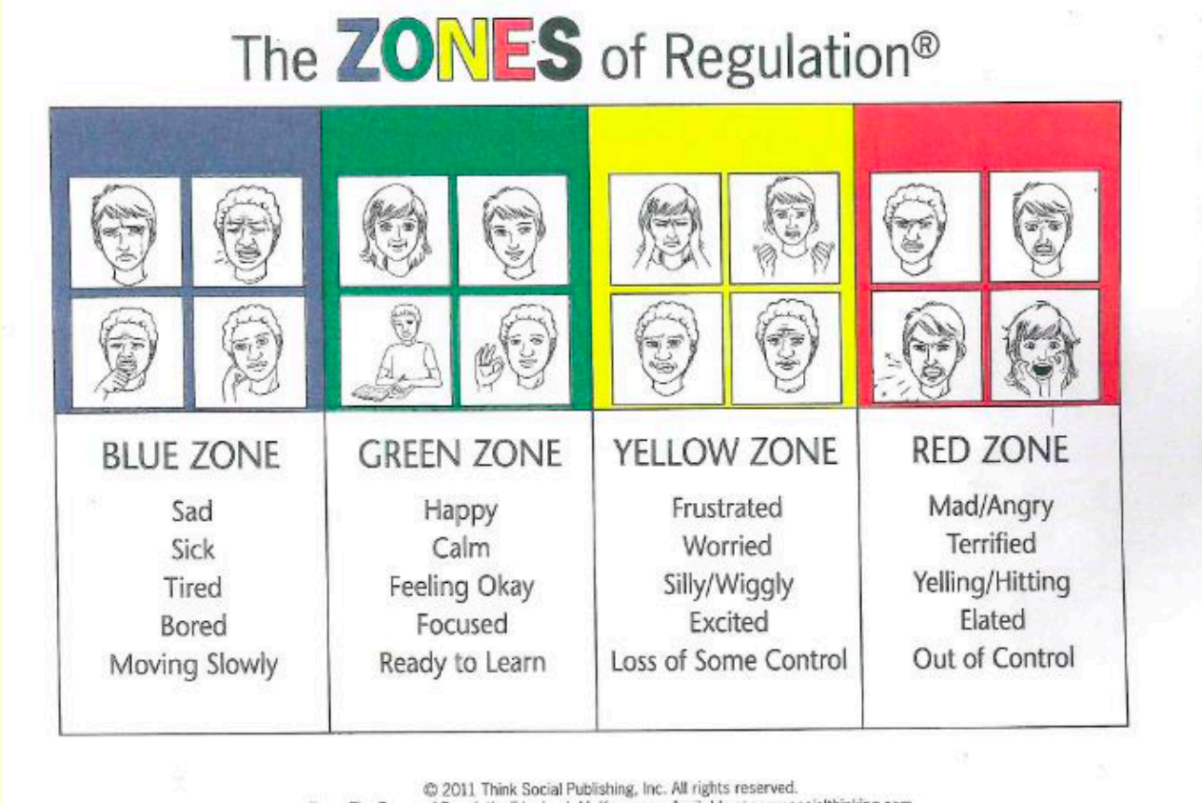
- First, the researcher provided the school principal and class teacher with information sheets and consent forms (Appendices D-G).
- The class teacher distributed information sheets and consent forms to the parents of the child participant (Appendices H and I).
- After receiving consent from the parents, the researcher provided the class teacher with child-friendly information sheets (Appendix J) and assent forms (Appendix K). The class teacher read these forms individually with the children.
- Next, the researcher distributed questionnaires to the class teacher. These questionnaires were baseline quantitative measures of teacher- and parent-reported child self-regulation outcomes for each child using:
    - 'The Emotional Regulation and Social Skills Questionnaire-Teacher Version' ([ERSSQ-T], Beaumont & Sofronoff, 2008; Appendix L)
    - 'The Emotional Regulation and Social Skills Questionnaire-Parent Version' ([ERSSQ-P], Beaumont & Sofronoff, 2008; Appendix M).
- The class teacher completed the teacher-reported measures and distributed the parent-reported measures to the parents.
- Upon completion of these questionnaires, the class teacher returned them to the researcher.

3.7.1.2 Phase Two: Identifying and Co-Regulating to Reduce Stress. Following on from *Phase One*, this phase involved identifying triggers in the environment and creating individual supports for the children.

- First, the researcher provided the class teacher with the 'Sensory Audit for Schools and Classrooms' ([SASC], Middletown Centre for Autism, n.d.; Appendix N) to assess the suitability of the classroom environment for autistic learners.
- Secondly, the class teacher was provided with a 'Positive Sensory Profile' ([PSP], Positive About Autism, n.d.; Appendix O), which was used to develop a sensory profile of each child, including their sensory preferences, sensory dislikes, and individual supports needed.
- The researcher then provided the class teacher and parents with a handout, containing strategies from the SSC Framework to support co-regulation (Binns et al., 2019).
    - This included a list of common stressors, that may cause dysregulation for students (outlined in Appendix P).
    - The class teacher and parents were also provided with examples of co-regulatory strategies, from the SSC Framework (Binns et al., 2019; Appendix Q).
- Finally, the researcher provided the class teacher and parents with visuals for regulation, based on the ZOR Curriculum (Kuypers, 2011; Appendix R), which the children could use to express their emotions throughout the day. Figure 7 illustrates an example of a ZOR visual provided to parents.

Figure 7

A Zones of Regulation Visual



Note. Figure from Kuypers (2011, p. 36)

3.7.1.3 Phase Three: Cognitive-Based Self-Regulation Lessons. This phase drew upon the recommendations from the SSC Framework (Binns et al., 2019) by providing explicit support for foundational self-regulation skills, including teaching self-regulation language and emotional literacy. Additionally, during this phase, the students were encouraged to identify their triggers and personal strategies for self-regulation. A detailed procedure for *Phase Three* is listed below.

- Firstly, the researcher met with the class teacher to plan the lessons at this stage.
    - A total of six lessons from the ZOR Curriculum (Kuypers, 2011) were chosen for this intervention. An overview of each lesson is provided in Table 10.
    - The number of lessons was based on Lalor's (2020) research that implemented a shortened version of the ZOR Curriculum in an autism class in Ireland.
    - During planning meetings, the class teacher noted that her students could become distressed at a change of routines and could become dysregulated if they were expected to concentrate for too long. Therefore, it was decided by the researcher and class teacher to conduct the intervention during the class morning meeting time to fit into the class schedule. The researcher and class teacher decided to break the overall weekly lesson plan into short five to 15-minute lessons that could be incorporated into the class morning meeting time.
- Next, the researcher drew from previous research presented in Chapter Two, to ensure the structure and content of the lessons were suitable for the students.
    - The structure of each session was adapted from Scarpa and Reyes' (2011) approach to teaching self-regulation for autistic children. This included welcome time, storytime, activity, and wrap-up.
    - The sessions were also structured using methods from the TEACCH approach (Mesibov & Shea, 2010), including a schedule of activities, countdowns, and visuals to show the start and end of activities (Nowell et al., 2019).
    - Developmental modifications were also adapted from other evidence-based self-regulation interventions including the use of play activities, mindfulness activities, visuals and songs (Scarpa & Reyes, 2011; Nowell et al., 2019).
- The lessons were then delivered in a group format by the class teacher between February and June 2023. The lessons were delivered throughout this time period, as chosen by the class teacher to suit the class schedule.

    - Lessons One to Three explored fundamental self-regulatory language and concepts.
    - Lessons Four to Six introduced higher-order self-regulation skills such as recognising triggers, and developing personal strategies or 'tools' for regulation.
    - Lesson One introduced the zones to the children. Children were encouraged to use the language of the zones to categorise how they felt.
    - Lesson Two used video materials to explore the zones in oneself and others. This lesson allowed children to identify emotions in others, and begin to recognise that people can experience different emotions and that all emotions are okay.
    - In Lesson Three, the children started to explore scenarios and reflect on how different scenarios would make them feel.
    - Lesson Four introduced triggers, and encouraged children to explore calming strategies when they are feeling in the yellow or red zones. The lesson plan noted that if the children were not ready to move onto this phase, the class teacher could continue exploring the concepts from Lessons One to Three with these children.
    - Lesson Five explored further tools for regulation, including sensory supports and thinking strategies.
    - Lesson Six asked the children to co-construct a personal zones toolbox with their teacher to identify the tools they find effective for regulation.
- Parents were provided with an overview of each session, visuals and optional home-learning supports based on each lesson. These were provided in a handout distributed to the parents by the class teacher.
- An example lesson plan is available in Appendix S.

Table 10

An Overview of Lesson Activities and Goals

Lesson Number	Lesson Activities	Goal
1	Learning the vocabulary of the zones.	Increase emotion vocabulary and recognition of facial expressions.
2	Learning about the zones in video.	Gain an awareness of other's perspectives, learn how their behaviour can affect other's feelings and identify themselves in the zones.
3	Learning about the zones in me.	Learn to identify the zones in themselves and learn it is natural and expected to experience all of the zones.
4	Caution! Triggers ahead.	Recognise their personal triggers, learn and try out calming techniques including breathing strategies.
5	Exploring sensory support tools and thinking strategies.	Gain an insight about how sensory supports can help regulate emotions, explore positive and negative self-talk, looking at the size of the problem and thinking patterns.
6	Creating a personal zones tool box.	Understand that they can engage in various strategies to change their zone and self-regulate.

Note. Table from Lalor (2011, p. 77).

3.7.1.4 Phase Four: Post-Intervention Data Collection and Interviews. This phase took place in June 2023. An overview of this phase is detailed below.

- Firstly, the researcher distributed post-intervention questionnaires to the class teacher, comprising teacher- and parent- measures of child self-regulation outcomes for each child using the ERSSQ-T and the ERSSQ-P (Beaumont & Sofronoff, 2008, Appendices L and M).
- The class teacher completed the questionnaires for her students and returned the questionnaires to the researcher.
- The class teacher distributed the parent questionnaires to the parents, and upon completion, returned them to the researcher.
- Next, the researcher invited the parents and the class teacher to participate in semi-structured interviews. The interview schedule is outlined in Appendix T.
    - The semi-structured interviews took place in a classroom in the participating school.
    - A total of five interviews took place, encompassing four interviews with parents, and one interview with the class teacher.
- The researcher also sought to elicit student voice at this stage. The Children's Emotion Management (CEM) Scale (Zeman, Shipman & Penza-Clyve, 2001; Appendix U) was used to elicit student voice of their self-regulation.
    - The CEM (Zenman et al., 2001) was adapted to make it more suitable for neurodiverse learners. The adaptation included providing a Talking Mats approach where visuals were incorporated into the measure so the children could respond verbally or non-verbally to this measure.[1]
    - The class teacher worked individually with the children to complete this measure.
    - The class teacher relayed to the researcher that the children were guessing the answers to the questions.
    - The researcher therefore decided that this scale was not suitable and that the data would not be further analysed.

[1] A Talking Mat is a "visual communication framework which supports people with communication difficulties to express their feelings and views" (TalkingMats, n.d., para. 1).

3.7.1.5 Phase Five: Follow-Up Data Collection. The final phase of the study took place in September 2023. This follow-up measure was collected at a 12-week follow-up. A summary of this phase is detailed below.

- Firstly, the researcher distributed follow-up questionnaires to the class teacher, comprising teacher- and parent- measures of child self-regulation outcomes for each child using the ERSSQ-T and the ERSSQ-P (Beaumont & Sofronoff, 2008, Appendices L and M).
- The class teacher completed the questionnaires and returned the questionnaires to the researcher. The class teacher then distributed the parent questionnaires to the parents, and upon completion, returned them to the researcher.

3.8 Measures

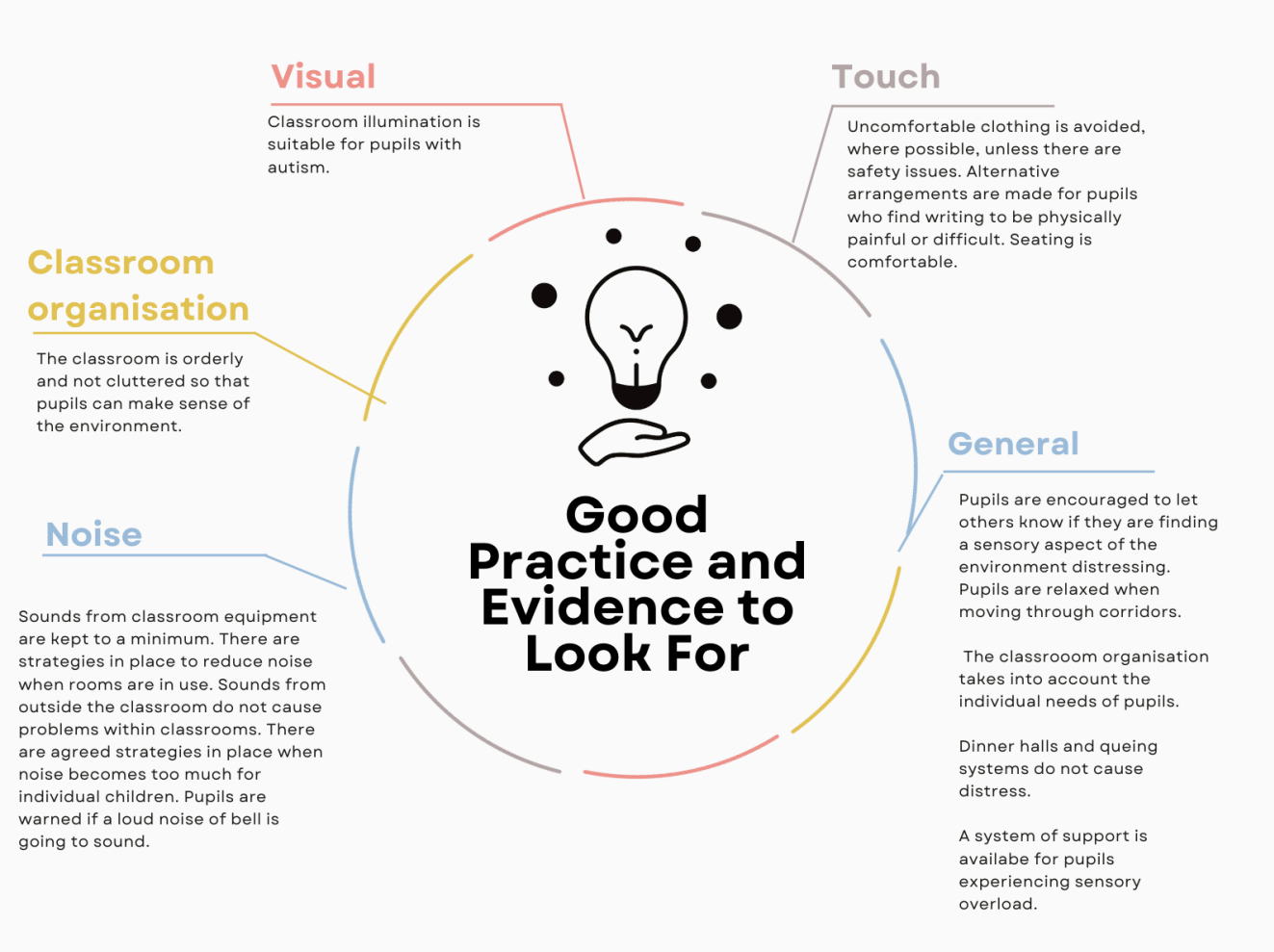
Both quantitative and qualitative data were collected. Qualitative data were collected using two qualitative documents and semi-structured interviews. The qualitative documents included the SASC (Middletown Centre for Autism, n.d.) and the PSP (Positive About Autism, n.d.). One type of quantitative datum was collected, namely the ERSSQ (Beaumont & Sofronoff, 2008). The measure was used to evaluate the children's self-regulation outcomes. The measure included a teacher- and parent-reported version and was utilised at three time points, at pre-intervention, post-intervention and at a 12-week follow-up.

3.8.1 Qualitative Data

3.8.1.1 Qualitative Documents. The first form of qualitative data collected were documents relating to children's co-regulation, both at an environmental and social level. The first document was the SASC (Middletown Centre for Autism, n.d.; Appendix N). This document offered prompts for the class teacher to use to critically appraise the current classroom environment, and develop areas to improve the environment, based on best-practice guidance for autistic learners (Middletown Centre for Autism, n.d.). Figure 8 outlines the prompts the document asked the class teacher to consider, including classroom organisation and sensory considerations. The class teacher completed this document based on these prompts.

Figure 8

Prompts used for Conducting a Classroom Sensory Audit (Middletown Centre for Autism, 2022).



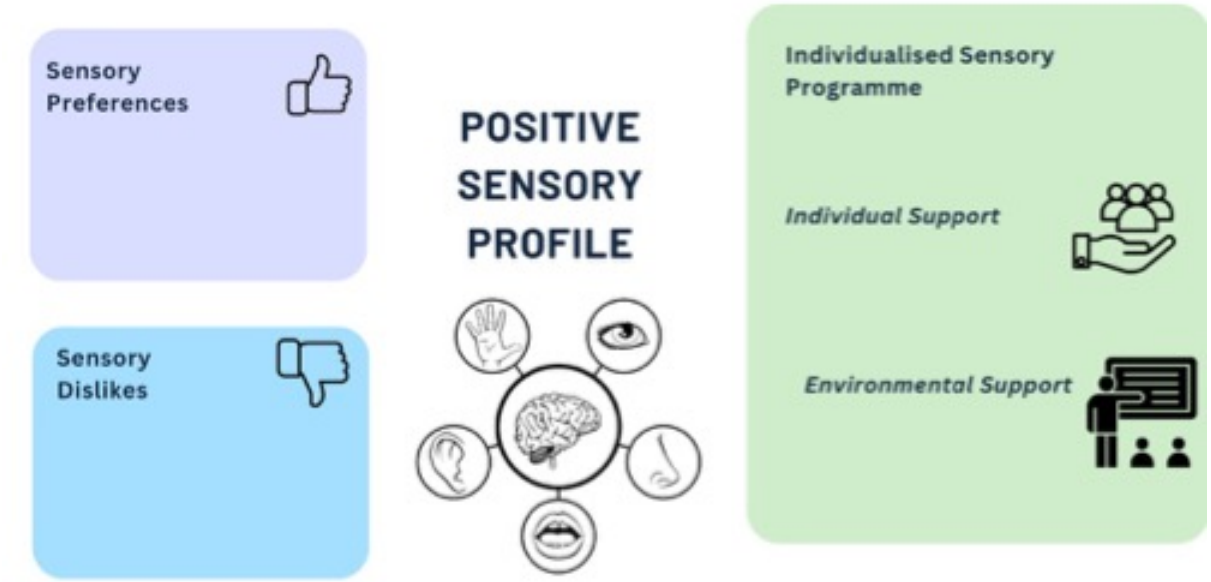
Note. The prompts used in this figure is adapted from the original document on the Middletown Centre for Autism website (n.d.).

The second document was the PSP (Positive about Autism, n.d., Appendix O). This document offered prompts to develop an individual sensory profile for each child. Prompts included considering the pupil's sensory preferences, sensory dislikes, and ways to develop an individualised sensory programme through environmental adaptations and individual support. The original document included both a 'Positive Sensory Programme' and a

'Sensory Support' prompt. These prompts were combined by the researcher and called 'Individualised Sensory Programme' for readability . Additionally, the prompt 'Sensory Aversives' was changed to 'Sensory Dislikes' by the researcher for readability . The class teacher completed a sensory profile for each child to observe children's sensory and regulatory needs and create an action plan to support those needs. Figure 9 presents the key prompts used for the Positive Sensory Profiles.

Figure 9

Prompts from the Positive Sensory Profile (Positive About Autism, n.d.)



Note. This figure has been adapted from the original document on the Positive About Autism website (n.d.).

3.8.1.2 Semi-structured interviews. The second type of qualitative data collected was semi-structured interviews. The researcher invited all parents, and the class teacher to engage in semi-structured interviews. The interviews aimed to explore the class teacher's and parents' responses to the self-regulation interventions, along with their recommendations for further implementation of the programme. Additionally, the interviews sought to gain insights into the class teacher's and parents' experiences of prior self-regulation programmes,

and their own perceptions and recommendations for the children's self-regulation. Four parents participated in the interviews, along with the class teacher. These interviews all took place in person in a quiet classroom in the participatory school. The interviews lasted between 20-50 minutes and were audio-recorded by the researcher. The interview schedule is outlined in Appendix T.

3.8.2 Quantitative Data

Quantitative data collected included a teacher and parent version of the ERSSQ (Beaumont & Sofronoff, 2008).

3.8.2.1 The Emotion Regulation and Social Skills Questionnaire (ERSSQ). The ERSSQ was developed by Beaumont and Sofronoff (2008) for research with autistic children, based on limitations of previous social skills scales for autistic research participants (Butterworth et al., 2014). The scale was developed to measure changes in emotional and self-regulation for autistic children. The scale has two versions, a parent and a teacher scale. Respondents use a five-point Likert scale, ranging from never (0) to always (4) to rate the child's social behaviours. The ERSSQ parent scale has 27 items and the teacher scale has 25 items. Sample items from the scale include 'Copes well when s/he makes a mistake', 'Deals with social problems successfully'. The scale has been validated for use with autistic children by several researchers (Beaumont & Sofronoff, 2008; Black, Lai, Desrocher, Lee, Sellitto, Vashi & Weiss, 2023; Butterworth et al., 2014). Additionally, the ERSSQ has a high reported internal consistency (a = .89; Beaumont & Sofronoff, 2008). Research has also reported a high concurrent validity between the parent and teacher forms (r = .86, p < .001, Butterworth et al., 2014), along with concurrent validity between the ERSSQ and the Social Skills Questionnaire (Spence, 1995), r = .73, p < .01 (Beaumont & Sofronoff, 2008).

3.9 Data Analysis

3.9.1 Qualitative Analysis of Documents

The qualitative documents, consisting of the SASC (Middletown Centre for Autism, n.d.) and the PSP (Positive About Autism, n.d.) were analysed by the researcher descriptively. This process involved using a combination of tables and figures to illustrate the data descriptively.

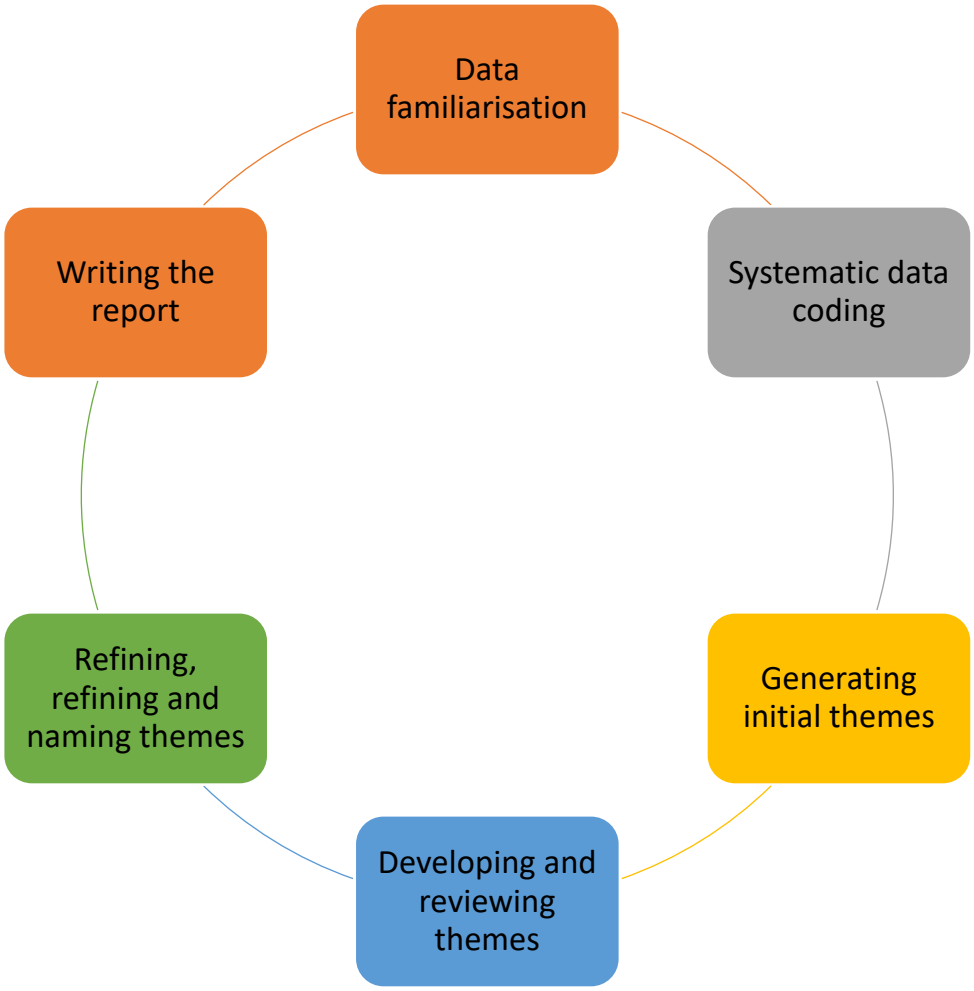
3.9.2 Thematic Analysis of Semi-Structured Interviews

The current study aligned with Braun and Clarke's (2021, 2022) approach to reflexive thematic analysis to analyse the semi-structured interviews. The study broadly drew on their six-phase process for thematic analysis, which is illustrated in Figure 10. This six-phase process included data familiarisation, systematic data coding, generating initial themes, developing and reviewing themes, refining themes and writing the report (Braun & Clarke, 2021). Within this reflexive approach, codes were developed through interpretation, reflection and review of the data.

While conducting the interviews in June 2023, I familiarised myself with the data, and noted my responses throughout the interview process. This included noting my emotional responses to the interviews, such as my experiences of empathy with the parents as they shared their challenges accessing services for their children. I also noted times when I reflected on my own experience as a teacher of autistic children during my interview with the class teacher. As the researcher is an active participant in the data analysis using Braun and Clarke's (2021, 2022) approach, I used my emotional experiences and reflections as a guide to developing initial codes. Similarly, I reflected on my readings from the literature review, particularly the theoretical perspectives on the development of self-regulation. The SSC Framework (Binns et al., 2019), along with Self-Determination Theory (Deci & Ryan, 2008) and Social Cognitive Theory (Bandura, 1988) guided my analysis during this time. The formal transcription process commenced in July 2023. The audio recordings were transcribed into a written format on Microsoft Word. During this time, I re-listened to interviews and refined my initial codes. At this stage, there were approximately 50 codes. From September 2023, the codes were further refined and grouped by meaning to develop initial themes. In November 2023, the initial grouping of six themes was refined to the final analysis of four themes.

Figure 10

Braun and Clarke's (2021) Six Stage Process of Thematic Analysis



3.10 Quantitative Analysis

While this study adopted a primarily qualitative paradigm, quantitative data were also analysed to provide richer data for the case study. IBM SPSS software was use to aid a quantitative analysis of the parent- and teacher- reported measures of child self-regulation on the ERSSQ (Beaumont & Sofronoff, 2008).

3.10.1 Screening Data

Firstly, the data were screened to prepare the data for analysis. For both the teacher scale and the parent scale, variables labelled 'Has temper tantrums' and 'Makes comments that embarrass others' were reverse-coded. Next, the data was screened for missing values. This screening revealed 12 variables with missing values on the teacher scale, and 10 cases for the parent scale. These variables had between one to two cases of missing data. For variables with missing data, the sum of the means was used to replace missing data. The researcher ran a series of paired samples t-tests to compare the original variables with the new series means variable. No significant difference was found in the paired sample t-tests for these variables. Replacing missing data with the series mean was, therefore, considered suitable for this data set.

3.10.2 Descriptive Statistical Analysis

Following the screening of data, the data were analysed using descriptive statistical analysis. This approach to quantitative analysis was adopted as this study was principally qualitative based. Additionally, the small participant size of the case study did not warrant inferential analyses. The descriptive statistical analysis involved comparing means between scores and using visual graphs and tables to compare scores across time points and participants.

3.11 Reliability and Validity

This study firstly acknowledged the limitations of case study designs and sought to explore and explain the development of self-regulation in this particular special class in Ireland. The study did not try to generalise these findings to other primary schools in Ireland. Instead, the study aimed to add to a broader understanding of how self-regulation may develop in autistic children. To do so, the study adopted several measures to add to the overall reliability and validity of the case study methodology. Concerning construct validity, the design used multiple sources of evidence in data collection, including quantitative data from questionnaires, qualitative documents, and semi-structured interviews. Secondly, the study sought to add to the external validity of the design by following prior theoretical knowledge related to self-regulation and applying the SSC framework to outline analyses of results. The present study did not seek to maintain internal validity as it was an exploratory study and did not try to define a causal relationship between variables. To add to the overall reliability of the study, the research outlined detailed procedures and included relevant

documentation in appendices to allow for other researchers to replicate the current procedures with other cases.

3.12 Ethical Considerations

Ethical approval was obtained from MIREC in Mary Immaculate College in September 2022 (Appendix V). The study undertook several measures to ensure the research was considerate of ethical principles of educational research. Firstly, all children in the special class were invited to participate in this intervention. Previous self-regulation interventions outlined in Chapter Two mandated that participants had to have certain levels of expressive language or cognitive testing measures to participate in the studies (e.g. Sofronoff et al., 2017; Tan et al., 2015). However, this research did not want to exclude any child so the research was designed to be adapted for use with all children, as outlined in the procedures of the study. As the study took place in the child's classroom, I also established measures in case a child chose to opt out of the study. Children could participate in the lessons without completing the related questionnaires, or the children could complete independent work activities within the classroom setting. The parents were also informed that the children could participate in the sessions without taking part in the study to prevent any child from missing out on the learning. However, all of the children chose to participate in the study.

As the research was taking place in a school environment, I was also cognisant of power differences and ensured the children were made aware during the consent process that the research was voluntary and that they could withdraw at any time. Another consideration was that the research pertaining to the children took place in the child's classroom. This included the group intervention and the collection of child-reported measures of self-regulation. The child's classroom was deemed the most suitable place as it was a safe and familiar environment to the children and allowed the research to fit into the daily classroom routine.

3.12.1 Consent

Several measures were adopted to ensure all participants read and understood both the information and consent forms. The participants were all informed that they had the right to withdraw from the study at any point without consequence. As outlined in the procedures of this study, the principal and class teacher were first provided with information sheets and informed consent forms (Appendices D-G). Upon obtaining consent from both the principal

and the class teacher, I provided the class teacher with parent information sheets and consent forms (Appendices H and I). The class teacher gave these to the parents and returned these forms to the researcher upon completion. Parental consent was obtained for both the parent's participation in the study and their child's participation. When parent consent was obtained, the class teacher then provided children with child-friendly information sheets (Appendix J). The class teacher read these individually with the children and subsequently, read the child assent sheets with the children individually. The children's assent forms were easy to read and had visuals to aid understanding (Appendix K).

3.12.2 Confidentiality and Anonymity

The researcher anonymised the data and removed any identifying characteristics from the data. For paper data, the researcher collected the documents from the class teacher and stored them in a locked filing cabinet in the researcher's home. For electronic data, including the audio files from the interviews, the researcher stored these on an encrypted password-protected computer. Following transcription, the audio files were destroyed to protect personal information. The researcher did not collect any sensitive personal data from the participants.

3.13 Chapter Conclusion

This chapter presented the methodological approaches used throughout this study. It presented the methodology as a 'Big Q' Qualitative paradigm which draws upon pragmatism and reflexive thematic analysis (Braun & Clarke, 2022). Drawing upon this paradigm, a mixed-methods data collection approach was adopted. The qualitative data collected included documents and semi-structured interviews. Descriptive quantitative data of child measures of self-regulation were also collected by the researcher. The chapter outlined the detailed procedures for the case study. Following this, this chapter presented the analytical approaches used for the mixed-methods data, along with exploring key ethical considerations of working with children. The next chapter will present the findings that emerged from the analysis of this data.

Chapter Four
Results

4.1 Chapter Introduction

Initially, this chapter presents qualitative findings, including findings from qualitative documents, comprising the SASC (Middletown Centre for Autism, n.d.; Appendix N) and the PSP (Positive About Autism, n.d.; Appendix O). These are described through visuals, tables and summaries by the researcher. The chapter then presents findings from the semi-structured interviews with parents and the class teacher. These were critically analysed using reflexive thematic analysis. The second part of this chapter presents quantitative findings from teacher- and parent-reported measures of children's self-regulation. These were reported using descriptive statistical analysis.

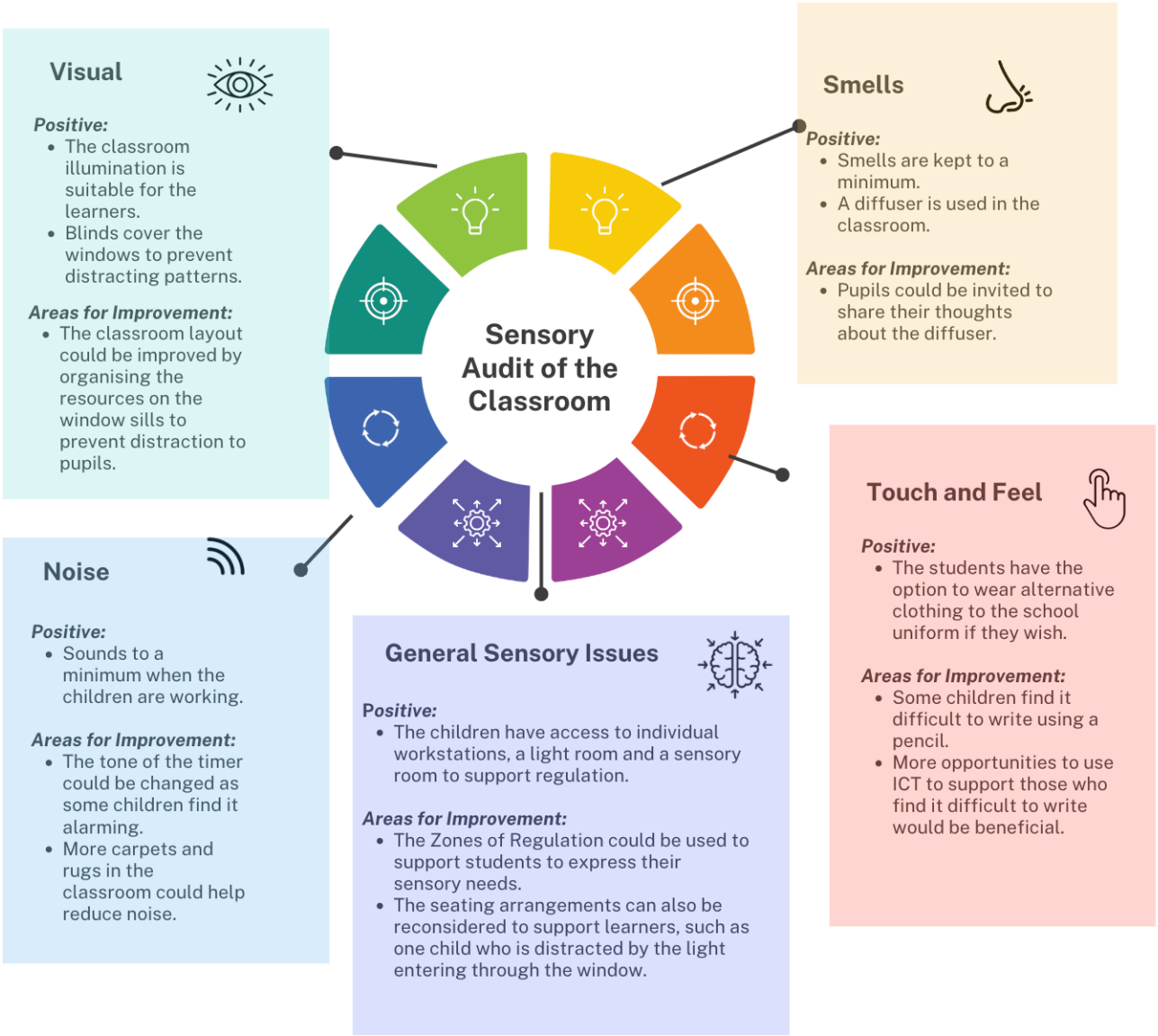
4.2 Qualitative Findings

4.2.1 Qualitative Documents

4.2.1.1 Sensory Audit of the Classroom. Figure 11 presents an overview of the findings from the SASC, as completed by the class teacher (Middletown Centre for Autism, n.d.).

Figure 11

A Visual Summary of Findings from the Sensory Audit for Schools and Classrooms



4.2.1.2 Positive Points in the Classroom. The class teacher, Angela noted several points in her classroom that were working well for her students, including the layout of the classroom. Angela observed that she kept the classroom clutter-free and the students' workstations were kept clear to remove distractions. Additionally, Angela observed that the classroom had designated areas for specific activities, such as morning meetings. The students also had their own entrance to their classroom to avoid queuing when entering and leaving the classroom. Other aspects of the environment that were working well for the students were the option for students to wear alternatives to the school uniform and the availability of a sensory room and a calm room in the classroom known as a 'light room' to provide students with individual space for regulation.

4.2.1.3 Areas for Improvement. Based on the sensory audit of the classroom, Angela also observed some aspects of the classroom that could be improved to support the students' regulation. Angela noticed that the windowsills had become cluttered and could be changed to support the students' work at their independent workstations. Additionally, she noted that one child was seated beside a window and was becoming distracted by the light coming in through the window. She changed the seating arrangement for the child after noticing this. Likewise, Angela realised that the current classroom timer could be adjusted so the noise wouldn't alarm the children. Angela also reflected on the need to include her students' opinions in designing their classrooms. For example, Angela noted that she was currently using a diffuser in the classroom to release relaxing aromas. She said that she would like to ask the children's opinions on the diffuser. Angela wanted to support the children to express their sensory preferences using the language of the ZOR.

4.2.2.1 Sensory Profiles. Figures 12-17 presents an overview of the findings from the PSP (Positive About Autism, n.d.) created by the class teacher for each student.

Figure 12

Emma's 'Positive Sensory Profile' (Positive About Autism, n.d.)

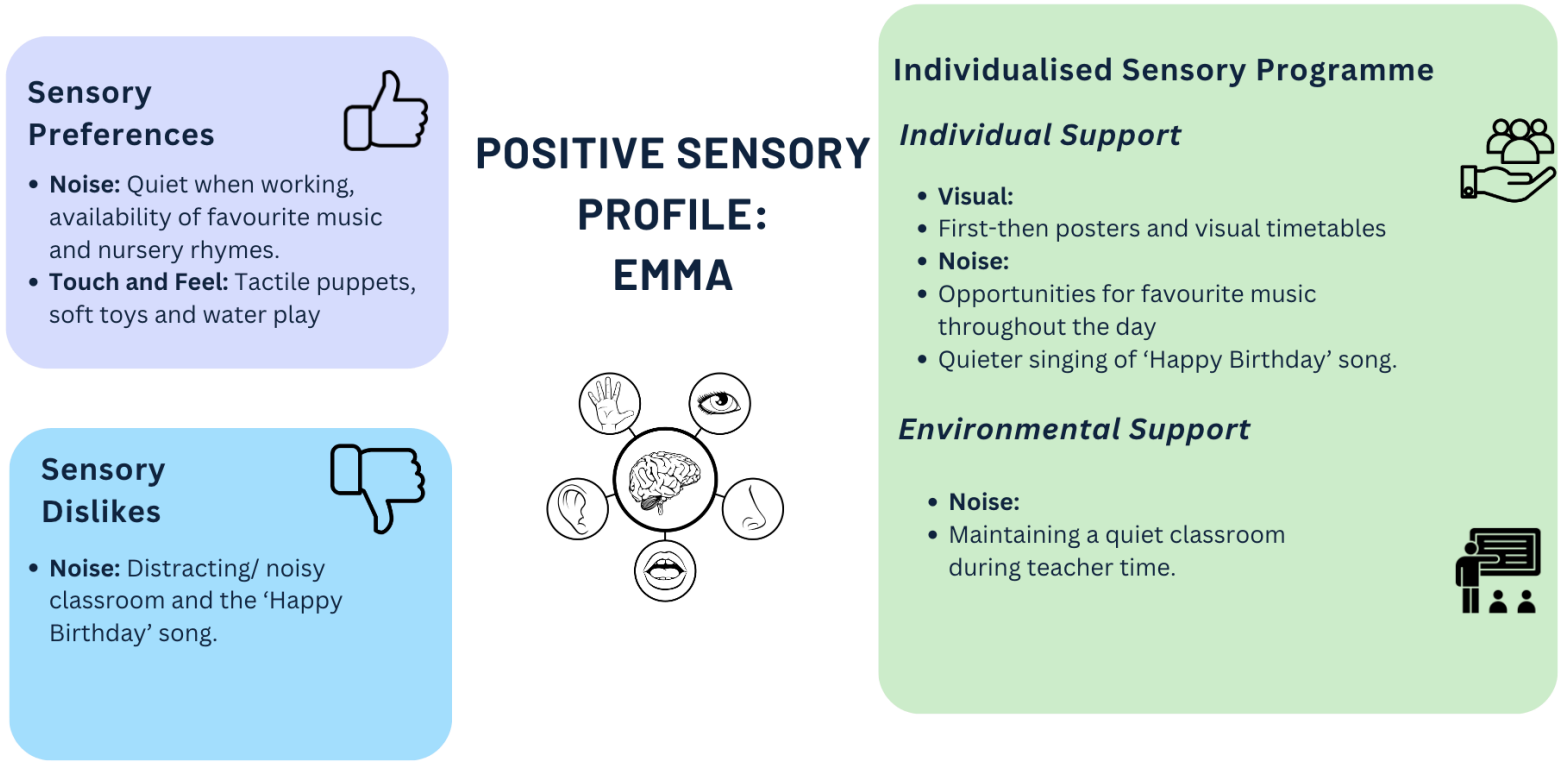


Figure 13

Tom's 'Positive Sensory Profile' (Positive About Autism, n.d.)

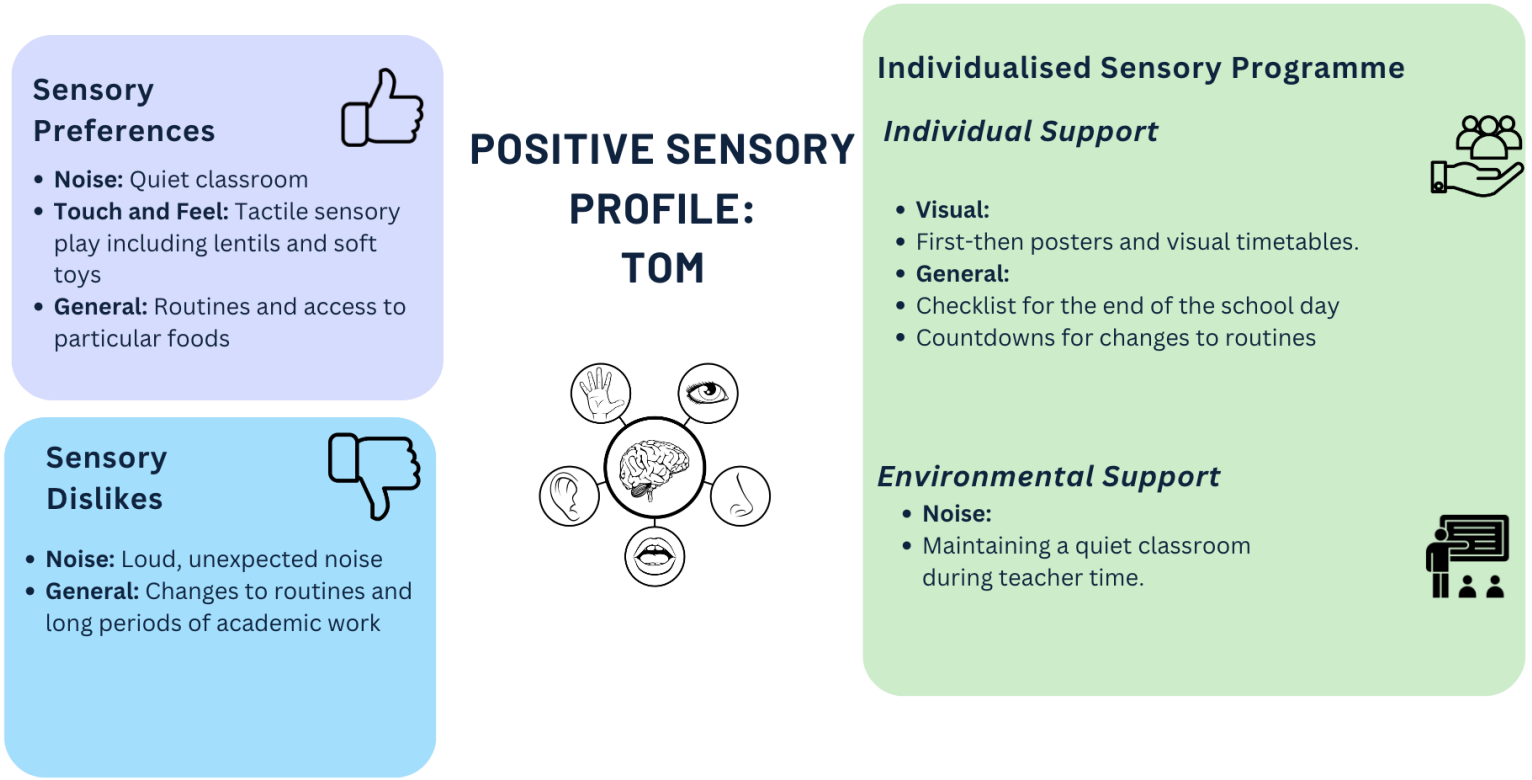


Figure 14

Kyle's 'Positive Sensory Profile' (Positive About Autism, n.d.)

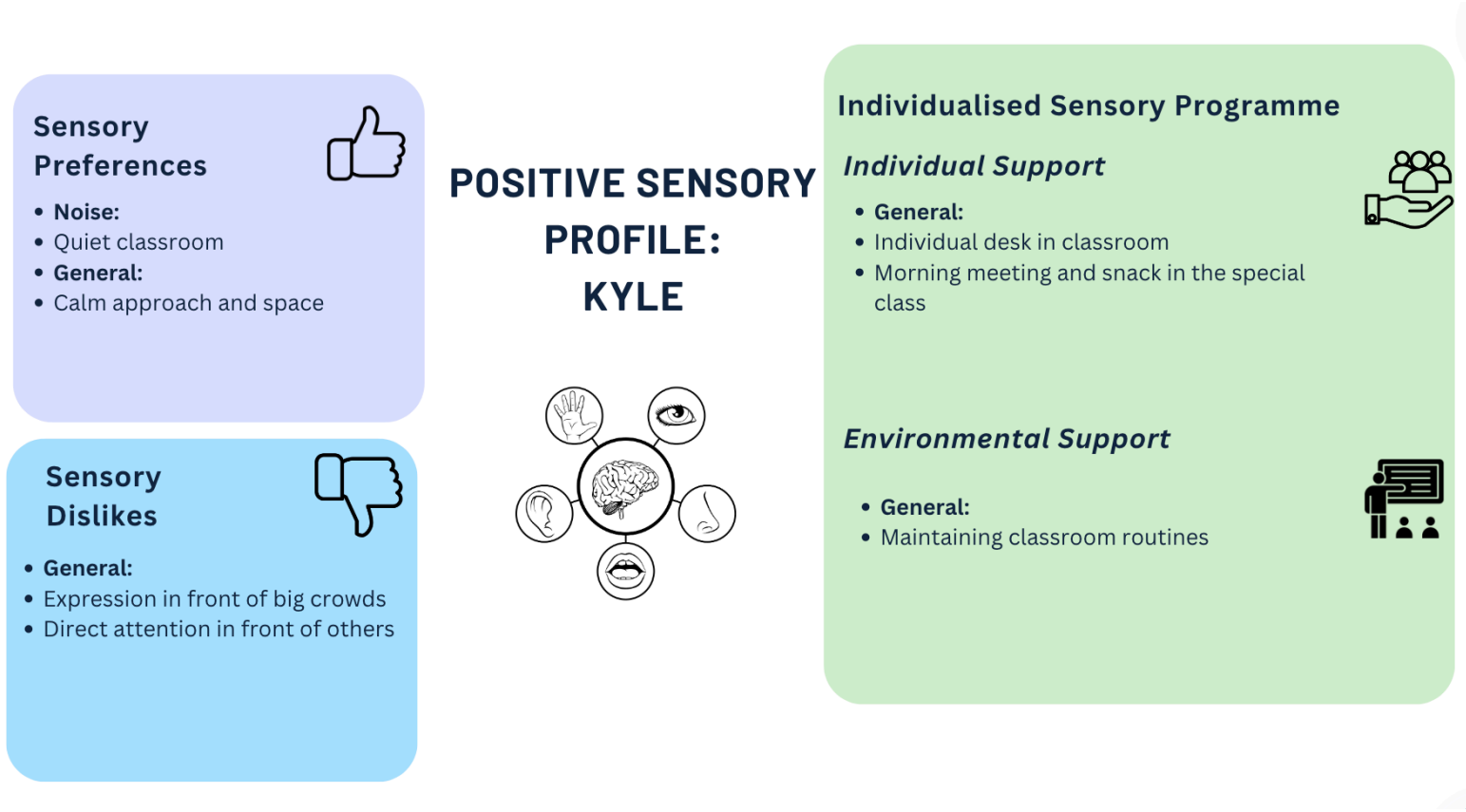


Figure 15

Sam's 'Positive Sensory Profile' (Positive About Autism, n.d.)

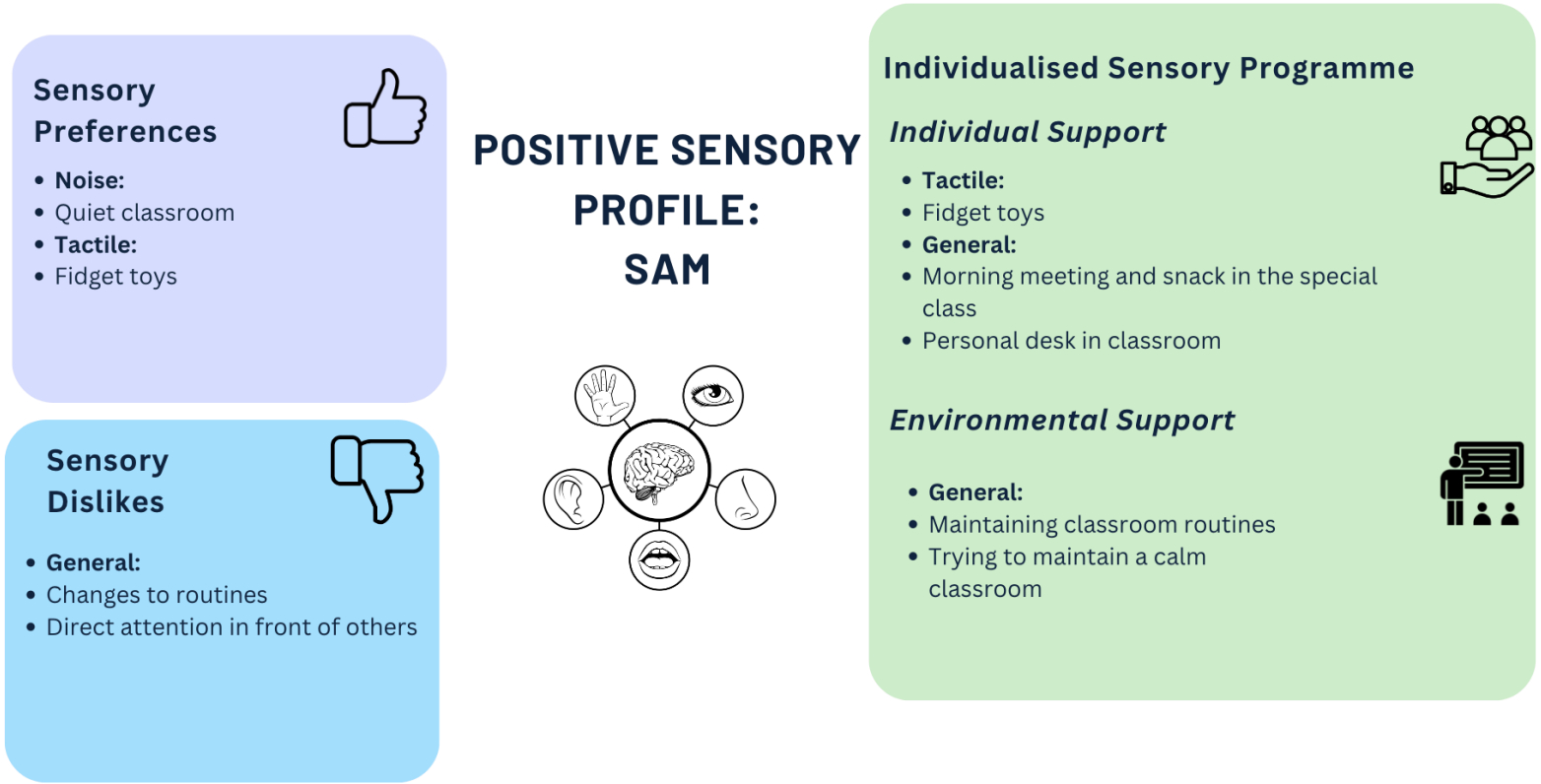


Figure 16

David's Positive Sensory Profile' (Positive About Autism, n.d.)

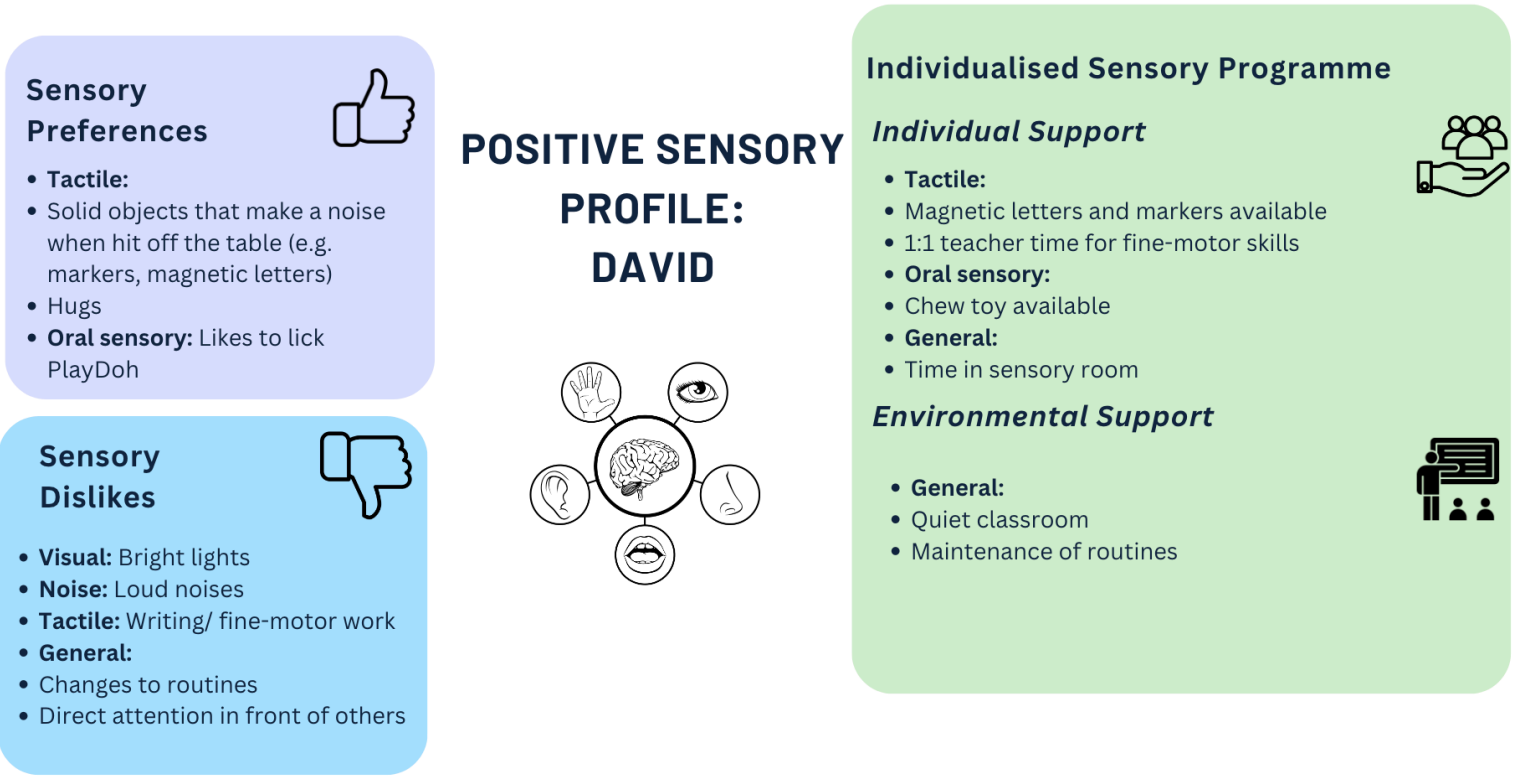
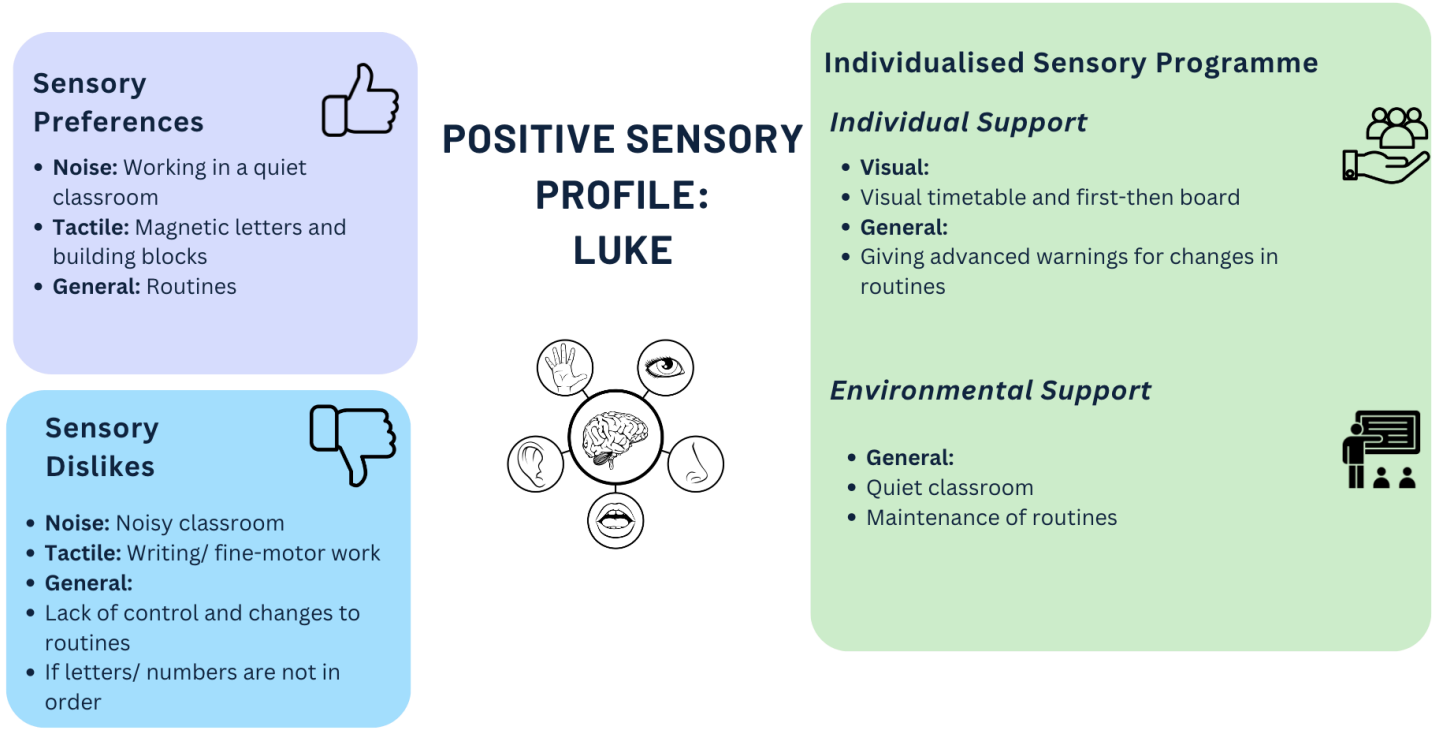


Figure 17

Luke's 'Positive Sensory Profile' (Positive About Autism, n.d.)



The following descriptors (presented in Table 11) were used to analyse the completed sensory profiles. These descriptors were sourced from Daly et al. (2016).

Table 11

Descriptors used to Analyse the Sensory Profiles (as sourced from Daly et al. 2016)

Descriptor	One child/ individual children	Some	Half	A majority	Almost All	All
Frequency of Occurrence Amongst Participants	16.67% (*n* = 1)	33.33% (*n* = 2)	50% (*n* = 3)	66.67% (*n* = 4)	83.33 % (*n* = 5)	100% (*n* = 6)

4.2.2.2 Sensory Preferences. Almost all of the children had a desire for a calm and quiet learning environment (*n* = 5) and tactile sensory preferences (n = 5). Half of the children also had a desire for routines (*n* = 3). Other sensory preferences for individual children were ordering letters and numbers (*n* =1), access to favourite music (*n* =1), and access to particular foods (*n* = 1).

4.2.2.3 Sensory Dislikes. A majority of children disliked a lack of control (*n* = 4) and changes to routines (*n* = 4). Half of the children disliked academic work (*n* = 3) and the direct attention of others (*n* =3). Additionally, some children disliked writing (*n* = 2). For one child, bright lights were a sensory dislike (*n* =1), while verbal expression was a sensory dislike for another child (*n* =1). Another child disliked letters and numbers not being in order (*n* =1).

4.2.2.4 Individualised Sensory Programme. The most common environmental support for almost all of the children was maintaining a quiet and calm classroom (*n* =5). This was followed by the maintenance of classroom routines for a majority of the children (*n* =4) and providing a personal desk for a few children (*n* =2). The class teacher identified visual supports, including first-then charts and visual timetables as the most common individual support for half of the children (*n* = 3). Some children required warnings for changes to routines (*n* =2), and the option to attend the special class for morning meetings

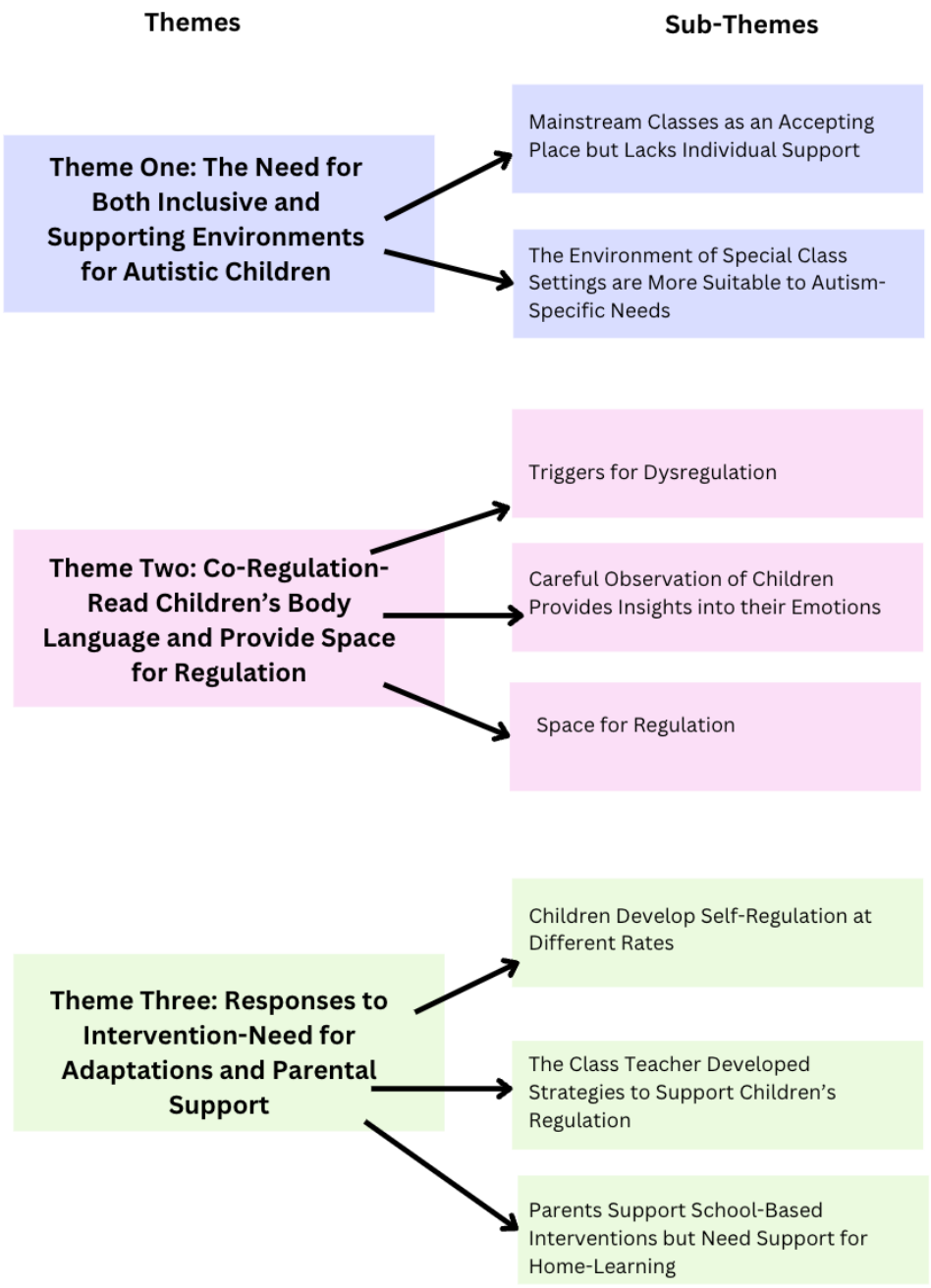
and snack time (n = 2). Additionally, individual children required 1:1 teacher support for areas of distress (n =1), access to favourite music (n =1) and the sensory room (n =1) and the provision of tactile supports based on their sensory preferences, including fidget toys (n =1) and magnetic letters (n = 1).

4.3 Thematic Analysis of Semi-Structures Interviews

Reflexive thematic analysis was adopted to guide the qualitative analysis of the semi-structured interviews. Figure 18 provides an overview of the themes evident in this study.

Figure 18

A Concept Map of the Three Themes and Sub-Themes



4.3.1 Theme One: The Need for Both Inclusive and Supportive Environments for Autistic Children

A significant theme that was evident among participants was the need for school environments that are both inclusive and that provide autism-specific support. Special classes and autism early-intervention classes emerged as highly valued places for parents which met the specific needs of their children. This was explored in two sub-themes, namely 'Mainstream Classes as an Accepting Place but Lacks Individual Support' and 'The Environment of Special Class Settings are More Suitable to Autism-Specific Needs'.

4.3.1.1 Mainstream Classes as an Accepting Place but Lacks Individual Support.

While all of the children enrolled in the study were in a special class setting, some of the children had been enrolled in mainstream pre-schools or primary classes before moving to a special class for children with a diagnosis of autism. Parents generally spoke of the mainstream pre-school experience as positive. For instance, Maria chose this setting to engage her child, Luke "*with the kids*", and Luke settled very well in the mainstream setting. Maria noted that "*he was fine in the mainstream preschool like as he had no tantrums and no issues like that. He has his world, his own interests like water play and lining up things."* However, Maria later decided to move her child to an autism early intervention preschool, based on a recommendation from Luke's psychologist, who felt that Luke required "*more specific staff*" and individual support.

Kate similarly enrolled her child, Emma, in a mainstream preschool. Kate described the mainstream preschool environment as a warm and accepting place for Emma where Emma "*was very happy"*. However, a psychologist who visited the preschool relayed to Kate that "*the teacher really loved her, but in terms of a structured programme, there probably could be better".* Additionally, Kate explained that the preschool advised her that Emma "*needs an SNA".* However, the preschool was not "*in a position to provide it"*, and told Kate that she would have to provide an SNA for Emma. Similarly, when Emma transitioned to a mainstream primary school, the Special Education Teacher met with Kate and explained that she could *"foresee difficulties of her* [Emma] *managing in a mainstream room in terms of her activity*". Kate then decided to move Emma to a special class setting. Kate felt this was the right decision. She noted that at the time of the interview, Emma *"wasn't accessing the curriculum* [when integrating into mainstream] *...she was sitting in the quiet corner when*

maths was on because her SNA was out". Consequently, Kate emphasized the importance of the special class setting for supporting Emma's needs.

4.3.1.2 The Environment of Special Class Settings are More Suitable to Autism-Specific Needs. Stemming from sub-theme one, there was a sense amongst parents that special class settings, including autism pre-schools and autism special classes, provided more structured programmes and environments to meet the students' needs. Anna mentioned the special class "*environment"* multiple times as a significant source of support for her child. She described how the support her son received in the special class helped his transition from pre-school to primary school, *"because the way he comes in, the environment, and all the help he is receiving which makes him improve now. So, it's* [the special class] *absolutely amazing".*

Similarly, Susan spoke of the individual support her son received at an autism early-intervention pre-school, which she remarked was "*very much tailored around the individual child":*

> *"I suppose it was our first time meeting teachers…and staff that specifically worked with children with autism…That was the first time we all saw the visual schedules and he was introduced to the visual schedules…there was a sensory room, a beautiful sensory room. They had a lovely outdoor space with the basket swings, all that kind of sensory input with the, the trampolines and everything…".*

Additionally, the small teacher-pupil ratio and SNA support in special classes were valued by parents. For example, Kate said that her daughter *"talks so fondly of her SNAs".* Parents also mentioned that their child's communication challenges made it difficult for them to know what their child was doing in school. This challenge was exacerbated by the Covid-19 pandemic, as Kate described, *"I wasn't sure what was happening or how long she was spending in what room or whatever…".* This difficulty was made easier by the special class teacher and SNAs who have daily communication with the parents, at pick-up and drop-off time, along with daily communication journals. Susan explained that *"what's worked well for us now, is that his teacher is great because she'll do the communication every day. She will put little pictures in sometimes of what he's doing. But that's great because he's obviously never going to tell us what he's doing".*

4.3.2 Theme Two: Co-Regulation-Read Children's Body Language and Provide Space for Regulation

Co-regulation was a theme that arose across the interviews at numerous stages. Some participants spoke about this explicitly, whereas other participants spoke about their child's triggers and co-regulation strategies implicitly, in the subtle ways they described supporting their child. A central element of this theme was the importance of reading the children's body language and observing them to provide insights into their emotions and triggers. Additionally, parents spoke of providing the children with space to regulate. This theme had three sub-themes, namely 'Triggers for Dysregulation', 'Careful Observation of Children Provides Insights into their Emotions' and 'Space for Regulation'.

4.3.2.1 Triggers for Dysregulation. Triggers refer to anything that may cause the child to experience dysregulation, which may encompass environmental, cognitive, biological or social triggers. Parents first mentioned home-based triggers, which included engaging in adaptive behaviours such as teeth brushing and toilet training. Anna said that she had tried various rewards to motivate her child to brush his teeth, but they oftentimes don't work, including offering her "*phone", "chocolate"* and "*TV*". Another prominent trigger for many children was the word '*no*'. This was articulated by both parents and the class teacher. The class teacher explained that *"one boy would struggle if you say no to him. That's triggering for him. Sometimes you're better off saying OK, let's go, rather than just saying no in front of him".* However, triggers could be challenging to identify when the children *"can't verbalise it"* (Kate). Therefore, many parents had to use careful observation as a primary co-regulation strategy to decipher their child's triggers.

Additionally, some parents mentioned how their child's dysregulation was exacerbated by the Covid-19 pandemic. Susan explained that the past few years *"with the pandemic, they've been awful…I think it was very, very unsettled…".* This difficulty may have been heightened by the limited access to services during this time, as commented by many parents. Maria mentioned how she attended many workshops "*before Covid*", and other parents spoke of attending disability services prior to the pandemic which were then "*dissolved"* (Susan). This meant that parents had an additional responsibility to meet the needs of their children, oftentimes with limited support.

4.3.2.2 Careful Observation of Children Provides Insights into their Emotions. For two pre-verbal children, their mothers expressed how they were able to learn how their child

communicates their emotions and needs from careful observation of language adopted from their favourite television shows. For instance, Maria noted that her child "*gets words from Peppa Pig to explain his own things".* Maria gave the example of her husband taking away her son's iPad and how Luke might use language from Peppa Pig to communicate "*Grumpy Rabbit*" to explain that his mother or father may be "*grumpy".* Similarly, Susan explained that her child, Tom takes language from Paw Patrol and uses these scripts to communicate his feelings, *"So if he's angry, he'll say Marshall's red. Marshall from Paw Patrol. That's him expressing his anger, you know".* Based on this understanding, Susan realised that her son was a *"Gestalt language processor"* and hoped that *"over time…then he'll just be able to say, I'm angry".*

Parents also emphasised the importance of reading children's body language as signs of dysregulation. For instance, Anna explained that "*when you are trying to listen to their emotions, the way they feel, their body language, you catch what's going wrong or what he needs".* Parents were also able to decipher non-verbal cues to ascertain how their child was getting on in school. Most parents spoke about their child's willingness to go to school as the primary indicator of how their child is finding school. For example, Susan explicated that she knows Tom is enjoying school now because *"last year…if he saw his uniform, he ran away…that would be his way of showing it* [his attitude towards school]." Likewise, Kate made clear that Emma *"wouldn't generally volunteer information in terms of, you know, how she's getting on in school".* Thus, Kate generally sensed how Emma is getting on based on her willingness to go to school in the morning.

4.3.2.3 Space for Regulation. Another primary co-regulation strategy was providing children with space to regulate. Susan explained that when Tom becomes dysregulated, she provides him with "*a bit of space"* and reassures him. She explained that "*sometimes if the emotional, the physical reaction is there…that has to play out sometimes, just reassurance when it's happening…".* Similarly, Anna emphasised that her primary co-regulation strategy was to *"leave them in their own time so by the time they want to do something they will do it in their own way, which is going to be amazing".* For some parents, providing regulatory time after school was also essential. This included providing the children with an iPad or phone. Maria explained that Luke *"has kind of a specific routine, like as long as he enters the house, he needs his iPad for some time like it's a long time in the school".*

4.3.3 Theme Three: Responses to Intervention- Need for Adaptations, Time and Parental Support

The class teacher and parents provided insights into the children's responses to the intervention. Additionally, this theme detailed the class teacher's response to the programme, and the necessity to adapt the programme to meet the students' needs. Similarly, the parents spoke of the need for in-person parental training, and their preference for school-based interventions for their children. This theme had three sub-themes, 'Children Develop Self-Regulation at Different Rates', 'The Class Teacher Developed Strategies to Support Children's Regulation' and 'Parents Support School-Based Intervention but Need Support for Home-Learning'.

4.3.3.1 Children Develop Self-Regulation at Different Rates. When speaking about children's responses to the intervention, it was clear that the children responded to the intervention at different rates, and respecting their individual development was necessary to successfully implement the programme. The class teacher described how some children initially found it difficult to identify negative emotional states, and it was necessary to use a variety of strategies to support these children. Angela explained that "*at the start* [of the intervention]*, we kind of just introduced the zones"*. The students "*could identify that someone else was in a zone",* however, some students found it "*difficult*" to recognise if they were not "*in the Green Zone".* Angela went on to explain that this "*just needs more practice"* and "*has improved'.*

Similarly, Angela noted that the children found it challenging to identify their triggers. Angela observed that for *"some of them...they engaged with that* [identifying triggers for dysregulation] *no problem. And for other kids, they found it upsetting to talk about.".* These children *"understood"* the *"expectations of the lessons. But they found it upsetting to talk about their triggers".* Angela proposed that adapting the programme to meet the children's individual self-regulation development was, therefore, necessary. For instance, Angela remarked that she exposed all of the children to the lessons but provided individual children with different supports and expectations. For some children, they identified their triggers. Other children were not ready to move on to this stage, so Angela worked with these children to identify triggers in characters from movies and books. Angela explained this:

> "*I kind of just gave them scenarios and yeah, oh, look at this boy here. He's getting upset because it's too loud outside. That's yeah, that's what's triggering him and just*

using the vocabulary around them, even if it wasn't. Even if they weren't fully understanding it, I thought that just using the vocab and just exposing them to it, it could build up after a while."

Angela emphasized that time was important for the students, to allow for students to develop their self-regulation skills at different paces. Angela described how she "*can see little changes coming in"*, such as "*with some of the kids, we've started saying, OK, you're in the Green Zone, why are you in the Green Zone?"* Teacher modelling was also key to supporting her students. Angela modelled her own emotions, to show the children that "*it's okay not to be in the Green Zone all the time".* Angela used the 'think aloud' strategy to model to her students how "*you look at your toolbox and you figure out, OK. Yeah, it helps me if I do some breathing, or it helps me if I play some music to help me get back into the green zone".*

Overall, Angela remarked that the children enjoyed the intervention, commenting that *" it has had a very positive experience in the classroom".* This interview occurred at the end of the designated lesson period, yet Angela mentioned that "*we still do our zones every day, every morning".* Similarly, parents noted positive changes in their child's social communication development since the start of the intervention. Kate referred to *"a change* [in Emma] *in terms of really trying to have a conversation".* Likewise, Maria remarked that her son Luke, *"had so many new things, interests, especially his understanding of things, little commands and like awareness and response to his name and things like response to his environment".* Susan also spoke about a change in terms of her child's happiness and attitude towards school*, "He's, he's, really happy coming in. He's asking to go to school, asking early in the morning, go to school, you know?"*

4.3.3.2 The Class Teacher Developed Strategies to Support Children's Regulation.

Angela explained that she developed her knowledge of self-regulation strategies for the children in her class. Angela was a newly qualified teacher who had recently started teaching in the autism class before starting this study. Angela mentioned that she did not have a lot of experience with supporting self-regulation before this programme. Angela said that they "*learned about the Zones of Regulation in college, but I hadn't put it into practice in school before".* She went on to explain that she had learnt about the "*window of regulation*" in theory but thinks that the use of colours in the ZOR programme "*was a nice way of kind of introducing it to the kids"* and an opportunity "*even just to talk about it with the kids as well".* Angela also spoke about how engaging with the programme helped her to gain a wider

perspective on co-regulation tools. Angela commented that she learned "*to make sure that every child was self-regulated before they start work"* and that she *"realised that every child has kind of one of two things that they really rely on to self-regulate".* For example, she discovered that the sand "*really helps"* one boy in her class, but another boy "*hates the sand"* and prefers "*firm objects and hitting firm objects against hard surfaces, so yeah and then the intervention, it kind of just showed me all the other options."* She also reflected that her engagement with the programme helped her to learn more strategies, such as "*breathing and that's definitely worked for some kids".*

Additionally, Angela mentioned that she used the SASC (Middletown Centre for Autism, n.d.) to change the design of her classroom to meet the student's individual needs:

> "*And there were little things like there was one boy and he was sitting beside the window, and it never even entered my head that that was affecting his learning, but it was just from doing the audit and everything I realised, oh my God, that that's just not working for him at all."*

Overall, Angela reflected on the importance of regulation, and how engaging with the programme helped her to learn more about students' self-regulation needs, saying that "*it just kind of, just delivers home that there's no point trying to move on with what you're doing unless the children are regulated".*

4.3.3.3 Parents Support School-Based Intervention but Need Support for Home-Learning. The interviews revealed that while the parents spoke positively of the intervention, they had not engaged with the home-learning elements of the intervention. One parent said that the child "*would have mentioned that people are identifying colours in her classroom so she would have explained that",* however, Kate *"didn't fully understand it".* While parents had received home-learning packs, many did not seem to use these packs and earlier in interviews spoke of frustration with an overuse of *"handouts"* by intervention programs run by the Health Service Executive (HSE) and felt that the disability services were "*not providing that sort of therapy* [in-person] *anymore and things do tend to be put on parents"* (Kate).

Additionally, parents spoke of their child's communication as a barrier to implementing the home elements. For instance, Susan explained that due to her son's

communication challenges, she doesn't know what's going on in school, *"…communication is a big thing…Tom has never had a conversation. My gut would tell you that Tom's very much like that's school and this is home".*

However, the interviews also revealed that parents believed that the current intervention was positive for their children, and they supported school-based interventions. Kate explained that a key strength of the current self-regulation programme was that it took place in the school with other children, which was *"what's missing in all of the structured interventions that the HSE are running because they don't look at meeting children at all".* Additionally, Kate explained that the HSE interventions focus on *"behaviour, and is there injurious behaviours…it has to be at that level before somebody will meet you".*

One parent put forward the solution of a video demonstration to model how to use the zones at home. Susan explained that " *a little video demonstration*" would be "*really helpful…a little video of how it would work would be brilliant".* Susan noted that she received the materials for the home learning activities but would like more training on "*how it's used here"* to "*mirror that at home".* Similarly, Kate proposed an *"information evening where we could go through the programme, or even online maybe, whatever is needed".*

4.4 Descriptive Statistics

This section presents results from teacher-, and parent-reported measures of child self-regulation, stemming from the ERSSQ (Beaumont & Sofronoff, 2008) .

4.4.1 Teacher Measure of Child Self-Regulation

The ERSSQ (Beaumont & Sofronoff, 2008) was used to measure teacher-reported child self-regulation outcomes. Higher responses on the scale indicated higher teacher-reported self-regulation measures for the children in this study, with a maximum possible score of 100. At pre-intervention, the mean total score was 44.52, SD = 11.05. The total mean score increased at post-intervention to M = 56.22, SD = 10.47. At follow-up, the total mean score decreased to, M = 45.30, SD = 11.94. These descriptive statistics are summarised in Table 12.

Table 12

Summary of Total Scores for Teacher Measure on the ERSSQ Across Timepoints

Timepoint	*N*	Minimum	Maximum	*M*	*SD*
Pre-intervention	6	29.25	56.60	44.52	11.05
Post-intervention	6	39.00	67.75	56.22	10.47
Follow-up	6	28.60	58.00	45.30	11.94

4.4.1.1 Comparison of Responses Across Participants. Responses were further analysed to compare total scores between the participants at the three different time-points. Figure 19 summarises the participants' responses across the teacher scale across the three time-points.

Figure 19

A Clustered Bar Chart Comparing Participants' Scores Across the Teacher Scale

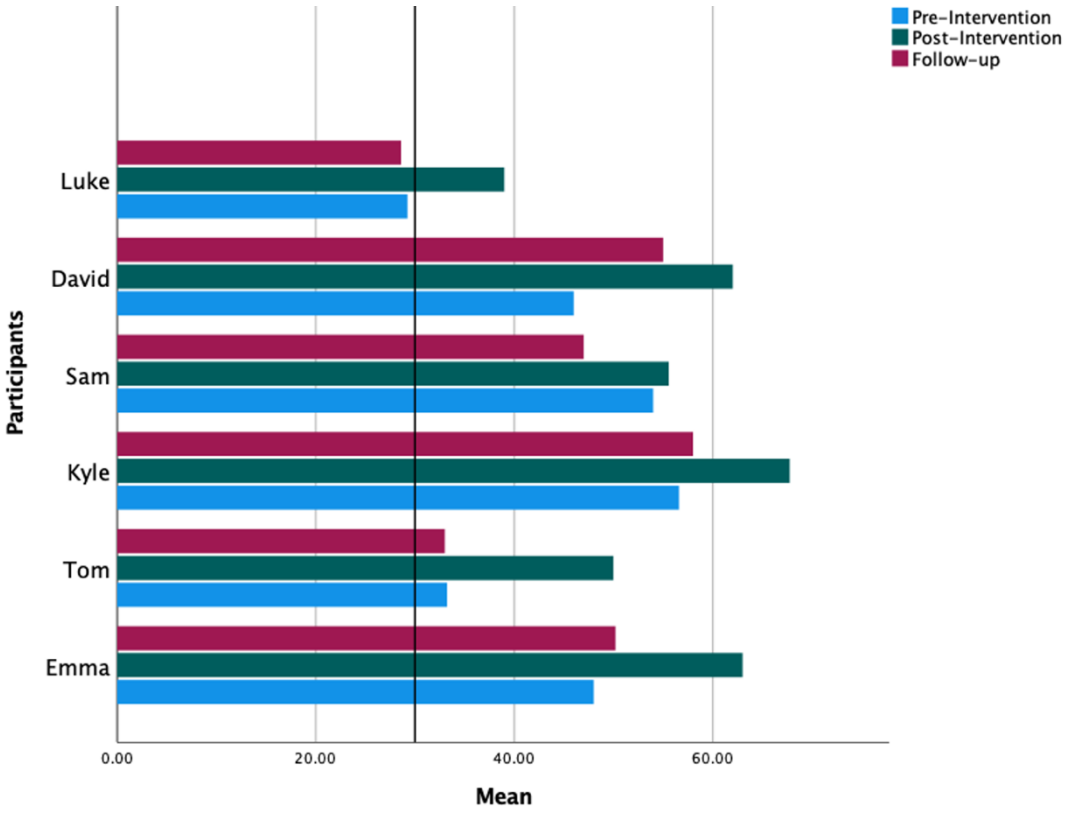


Figure 19 illustrates that the participants' scores on the teacher scale increased between pre-intervention to post-intervention. The participants' scores then decreased from post-intervention to follow-up. At pre-intervention, Kyle had the highest teacher-reported self-regulation score (M = 56.60). This increased to M = 67.75 at post-intervention and decreased to M = 58.00 at follow-up. Sam had the second-highest pre-intervention teacher-reported score (M = 54.00). Sam's post-intervention score increased to M = 55.55 and decreased at follow-up to M = 47.00. Emma's score increased from pre-intervention (M = 48.00) to post-intervention (M = 63.00). Emma's score then decreased at the follow-up (M = 50.20). David had a similar pre-intervention score (M = 46.00) and his score increased at post-intervention to M = 62.00, followed by a decrease at follow-up to M = 55.00. Tom had the second-lowest pre-intervention score (M = 33.25). Tom's score increased to M = 50.00 at post-intervention and dropped at follow-up to M = 33.00. Luke had the lowest pre-intervention score (M = 29.25). Luke's score increased at post-intervention (M = 39.00) and similarly decreased at follow-up (M = 28.60).

4.4.2 Parent Measure of Child Self-Regulation

The ERSSQ (Beaumont & Sofronoff, 2008) was also used to measure parent-reported child self-regulation outcomes. Higher responses on the scale indicated higher parent-reported self-regulation measures for the children in this study, with a maximum possible score of 108. At pre-intervention, the total score averaged $M = 44.07$, $SD = 1.67$. This increased at post-intervention to $M = 55.98$, $SD = 17.15$ and at follow-up to $M = 61.33$, $SD = 24.08$. Table 13 presents a summary of this data.

Table 13

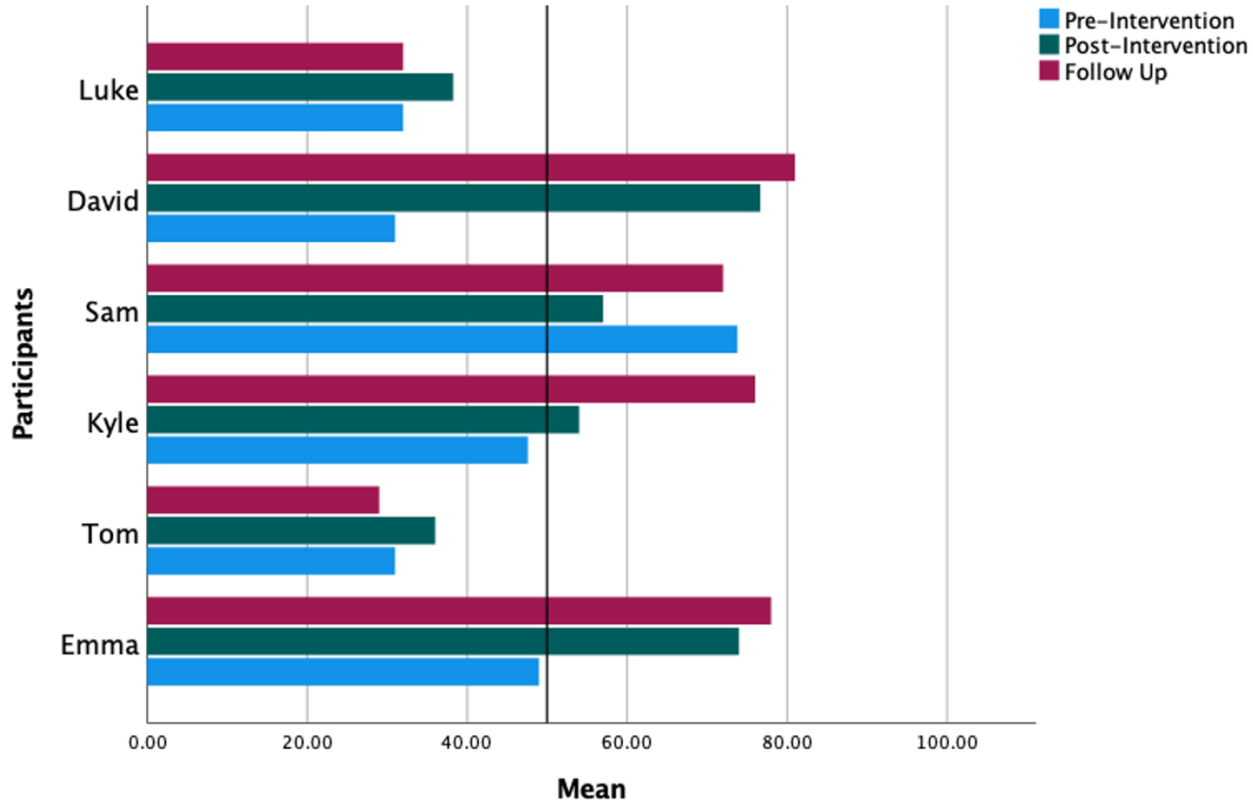
Summary of Total Scores for Parent Measure on the ERSSQ Across Timepoints

Timepoint	N	Minimum	Maximum	M	SD
Pre-intervention	6	31.00	73.80	44.07	16.78
Post-intervention	6	36.00	76.65	55.98	17.15
Follow-up	6	29.00	81.00	61.33	24.08

4.4.2.1 Comparison of Responses Across Participants. Responses were further analysed to compare total scores between the participants. Figure 20 summarises the participants' mean scores on the parent scale across the three time-points using a clustered bar chart.

Figure 20

A Clustered Bar Chart Comparing Participants' Scores Across the Parent Scale



Sam had the highest score at pre-intervention (M = 73.80). Sam's score decreased at post-intervention to M = 57.00 and increased again at follow-up (M = 72.00). Emma's score increased from M = 49.00 at pre-intervention, to M = 74.00 at post-intervention, followed by a further increase at follow-up, M = 78.00. Kyle's scores changed from pre-intervention M = 47.60, to an increase at post-intervention, M = 54.00, and a further increase at follow-up, M = 76.00. Luke's scores started as M = 32.00 and had a slight increase at post-intervention to M = 38.25, followed by a decrease at follow-up, = 32.00. Tom and David had the same score at pre-intervention, M = 31.00. Tom's scores increased at post-intervention to M = 36.00 and David's scores further increased post-intervention to M = 76.65. Tom's scores fell at the follow-up to M = 29.00, while David's scores further increased to M = 81.00.

4.4.3 Comparison of Responses Between Teacher and Parent Scale

Table 14 additionally compared the total mean scores across the teacher and parent scale. The comparison in scores from pre-intervention to post-intervention and follow-up was

compared using percentage differences across the time points. The table revealed that both the teacher and the parent scale had an increase from pre-intervention to post-intervention, with a 26.27% increase for the teacher scale and a 27.07% increase for the parent scale. At follow-up, the scores on the teacher scale decreased by 19.42% whereas the scores on the parent scale increased by 9.56%.

Table 14

Comparison of Scores Between the Teacher Scale and the Parent Scale

Scale	Pre-Intervention (M)	Post-Intervention (% Change +/ -)	Follow-Up (% Change +/ -)
Teacher Scale	44.52	+ 26.27%	-19.42%
Parent Scale	44.07	+ 27.07%	+ 9.56%

4.5 Chapter Conclusion

This chapter started by presenting qualitative data related to child self-regulation outcomes, including qualitative documents and a thematic analysis of semi-structured interviews with the class teacher and parents. The chapter then presented descriptive statistics of quantitative data related to child-, teacher-, and parent-reported measures of child self-regulation, at three time points. These results are analysed and discussed in Chapter Five, with reference to previous research in the field.

Chapter Five
Discussion

5.1 Chapter Introduction

Guided by a neuroaffirmative perspective and a social-cognitive lens, the current study sought to firstly explore environmental and social supports for self-regulation, through identifying stressors in the classroom environment and developing strategies for co-regulation. Thereafter, the study sought to examine the efficacy of an individualised cognitive-based self-regulation intervention for autistic children. The study was grounded in a reflexive qualitative paradigm, as guided by Braun and Clarke (2022) that drew on the researcher's prior experiences in the data analysis process. The SSC Framework (Binns et al., 2019) acted as an overarching framework, which considered how self-regulation develops through co-regulation and scaffolded support for independent self-regulation.

This study addressed four research questions. The first research question asked how the class teacher modified the classroom environment to support co-regulation for her students. Drawing from the first research question, the second research question sought to explore the primary co-regulation strategies used by the class teacher and parents to support the children's self-regulation. The third research question considered the children's responses to an individualised cognitive-based self-regulation intervention. Finally, the fourth research question explored the enablers and barriers to the effective implementation of the self-regulation intervention.

A mixed-methods design was used to answer these research questions. Qualitative data from the class teacher was collected, comprising the SASC (Middletown Centre for Autism, n.d.) and the PSP (Positive About Autism, n.d.). Semi-structured interviews with the class teacher and parents also gave insight into these research questions. Following in-depth analysis, three themes emerged from these interviews which were, Theme One 'The Need for Both Inclusive and Supportive Environments for Autistic Children', Theme Two 'Co-Regulation: Read Children's Body Language and Provide Space for Regulation' and Theme Three 'Responses to the Intervention: Need for Adaptations and Parental Support'. Pre-, post- and follow-up quantitative data of teacher and parent measures of child self-regulation outcomes on the ERSSQ (Beaumont & Sofronoff, 2008) provided an additional perspective to answer these research questions. Overall, the results of the current study provide

preliminary support for an individualised self-regulation intervention that incorporates environmental, social, and cognitive-based supports.

5.2 Research Question One: How does the Class Teacher Modify the Classroom Environment to Support Co-Regulation for her Students?

The first research question sought to explore how the class teacher modified the classroom environment to support co-regulation for her students. Findings from the study revealed that the class teacher used both the SASC (Middletown Centre for Autism, n.d.) and the PSP (Positive About Autism, n.d.) to enact environmental modifications to support self-regulation. The primary action areas identified by the class teacher included the need to consider seating arrangements for students, to maintain a quiet and calm classroom and to incorporate student voice when designing the classroom. The SSC Framework espouses the importance of observing and watching "for possible indications that a child is being negatively impacted by stressors" such as experiencing strong emotions, social withdrawal, or increased anxiety (Binns et al., 2019, p. 4). Thereafter, modifications should be made to the environment to remove stimulation that may evoke a stress response (Binns et al., 2019). Enacting environmental modifications was a dual process in this study, stemming from consideration of both general environmental conditions in the SASC and individual supports necessary in the PSP. This process is considered best practice for supporting children's self-regulation through an environmental lens. Noddings (2017b) contended that once general classroom sensory considerations are considered, educators should develop individual pupil profiles to meet students' varying sensory sensitivities.

The need to create classroom environments that are suitable for autistic students and children with SEN has been endorsed in many key educational documents including, the UNCRPD (United Nations, 2006), the Report of the Task Force on Autism (Oireachtas, 2023) and further championed in research with the autistic community (Delimata & Bryne, 2023; MacLennan et al.,2023). Furthermore, the centrality of the environment was enshrined in the work of Montessori practitioners (Montessori Academy, 2023) and the world-renowned Reggio Emilia schools (Strong-Wilson & Ellis, 2007). It should be noted, however, that none of the studies from the systematic literature review presented in Chapter Two considered the role of the environment for self-regulation. This represents a significant gap in research, with a growing body of research focusing predominantly on cognitive-based self-regulation interventions for autistic students. However, there remains a failure to consider the

role of the environment in supporting the self-regulation development of autistic students. This may represent a dichotomy between a medical-lens of autism within cognitive-based self-regulation interventions alone and a neuroaffirmative lens of autism that considers the importance of interrelated factors for self-regulation, including environmental, social and cognitive factors.

5.2.1 The Special Class Setting

It should be noted that the classroom environment in the current study aligned with many of the areas for best practice identified by Middletown Centre for Autism in the SASC (n.d.). Notably, the class teacher reported in the SASC that the classroom was spacious, and had designated areas for different activities, such as individual work, morning meeting and lunchtime. Additionally, the children had their own entrance to and from the classroom to avoid long queues. The classroom also had access to a courtyard with a swing, trampoline and a sensory play area for the children. Furthermore, the children had access to a calm room in their classroom, and a sensory room that was shared with the second special class in the school. Other aspects of the environment that were deemed suitable for the children included appropriate classroom illumination, such as the provision of blinds to cover windows. The class teacher also kept sounds and smells to a minimum. Moreover, the students were afforded the option to wear alternative clothing to their uniforms. These findings relate to other research on special classes for autistic students, which found that special classes offer individual support for autistic students within an environment designed to "cater specifically to autistic pupils" (Oireachtas, 2023, p. 57).

Similarly, Theme One from the qualitative interviews 'The Need for Both Inclusive and Supportive Environments for Autistic Children', revealed that parents perceived the environment of the special class as very suitable for their children. Indeed, one parent described the special class as "amazing", describing how "the environment, and all the help" her son was receiving had been a huge support for her and her son. Likewise, the NCSE (2019) reported that most parents want their child with SEN to be educated in a special class or school because they believe that the environment is more suitable for their child, including smaller class sizes and experienced teachers.

Contrastingly, the Report of the Task Force on Autism highlighted that Ireland's ratification of the UNCRPD places the role of special classes within a vision for full inclusion as contentious (Oireachtas, 2023). Notably, the NCSE (2024) recently recommended that

Ireland should move "to become a fully inclusive system" where all students are educated in a mainstream environment (p. 15). Tiernan (2022) reflected that special class placements may result in segregation for some autistic students (Tiernan, 2022). When analysing this interview data and literature, I was prompted to reflect on my own experience teaching in both mainstream and special class settings, and how the smaller class size and additional support in special class settings enabled me to offer environmental adaptations to support autistic students. This led me to agree that without significant change to mainstream environments, special class settings remain a valued and necessary part of the continuum of educational provision for autistic students (Oireachtas, 2023).

5.2.2 Environmental Modifications from the Sensory Audit for Schools and Classrooms

Environmental modifications that arose from the SASC included adjusting seating arrangements and incorporating student voice into the classroom design. For example, the class teacher reported in the SASC document (Middletown Centre for Autism, n.d.), that one child was seated beside a window and the light and clutter on the windowsills seemed to distract this child. Later, in the post-intervention interviews, the class teacher, Angela, reflected that after completing the SASC, she changed the child's seating arrangements. These findings relate to other recommendations from research into classroom environments to support self-regulation. For example, Noddings (2017b) reported that alternative seating arrangements are important for children with sensory sensitivity, including autistic children.

Additionally, Angela noted in the SASC that she desired to incorporate student voice when enacting classroom modifications. However, the class teacher recorded that communication challenges were a primary barrier to achieving this aim. This is a noteworthy finding considering research by Delimata and Byrne (2023) whose study reported that autistic young people and their parents felt that schools were designed for neurotypical people. Autistic students in that study described having to fight to get sensory accommodations in schools. Notably, Brown (2020) argued that classroom environments are not given due attention in educational policies. This is revealed in the current policy manifesto in Ireland which does not explicate the role of student voice in designing their learning environment. Looking at international research studies may be necessary to determine how to incorporate student voice in classroom design (MacLennan et al., 2022). For example, a case study by Love (2018) explored how architects could work with autistic students to design autism-friendly classrooms. The researchers utilised visuals to work with autistic students to elicit

their environmental preferences. It was evident from the research findings that autistic students desired spacious classrooms with designated areas for activities and tactile sensory supports, as exemplified below (Love, 2018, p. 158).

> *"I would like a big classroom because I feel claustrophobic. I don't want a small classroom with lots of people in it. It makes me feel frustrated and angry and I feel like I want to run out the room to get away…I would like a separate room for play and activities like playing Lego or reading a book. It would need to be a quiet room with bean bags or comfy seats with soft material like cotton or fake leather."*

These findings, therefore, prompt consideration of current educational policy in Ireland, and the gap that exists in eliciting student voice when designing their learning environment, a gap that may have a significant impact on students with sensory sensitivities, including autistic children.

5.2.3 Environmental Modifications from the Positive Sensory Profiles

Additional environmental modification arose from consideration of the students' sensory preferences and sensory dislikes in their PSP. The PSPs revealed that most students desired a quiet and calm classroom, which was thereafter developed into a key environmental modification to support students' self-regulation in this study. The SSC Framework (Binns et al., 2019) posits that biological stressors, such as noise, can cause children to become dysregulated. When dysregulated, it is difficult for the child to engage in academic activities, especially activities that require more complex cognitive resources such as executive functioning and social-based academic activities. The desire for a quiet and calm classroom is deemed fundamental in research from autistic self-advocates (Belek, 2019; Delimata & Byrne; MacLennan et al., 2022). The experience of being "stuck" in a noisy environment is described by an autistic participant as being both "pervasive" and "looming", resulting in an experience of shutdown (Belek, 2019, p. 36). Therefore, speaking at the Multisensory Research Forum, researchers argued that more attention is needed with regard to the impact of noisy classrooms on autistic students, and reducing class sizes is fundamental to reducing background noise and providing the necessary support for autistic students (City College of New York, 2009). Similarly, the Report of the Task Force on Autism (Oireachtas, 2023) announced the goal to "work to reduce class sizes to allow teachers the opportunity to better observe the development of pupils and to reduce distraction and distress for autistic pupils in overcrowded classrooms" (p. 20). This finding is significant considering current class sizes in

Ireland. The Irish National Teachers' Organisation ([INTO], 2022) reported that 83% of students are educated in classes above the European average of 20 students, with 12% of students in Ireland being educated in classes exceeding 30 students. The INTO General Secretary John Boyle argued that until the class sizes are brought down, the vision for inclusion will not be achieved (INTO, 2022). Overall, the findings suggest that careful consideration of classroom environments to support self-regulation should be prioritised in educational agendas and classroom practice.

5.3 Second Research Question: What are the Primary Co-Regulation Strategies used by the Class Teacher and Parents to Support the Children's Self-Regulation?

The second research question sought to determine what were the primary co-regulation strategies used by the class teacher and parents to support the children's self-regulation. The findings revealed a disparity between the co-regulation strategies reported by the class teacher and parents, with the class teacher prioritising environmental and cognitive-based co-regulation strategies, along with sensory toys and objects for co-regulation. Contrastingly, the parents primarily focused on reading children's body language and providing space and routines for co-regulation. As part of the intervention, the class teacher and parents were provided with a list of co-regulation strategies from the SSC Framework (Binns et al., 2019). These included modifying the environment, modulating exposure to sensory information, providing routines, reducing cognitive load and validating children's feelings. While co-regulation is not an explicit part of many CBT interventions, other theoretical perspectives on self-regulation, including Self-Determination theory (Deci & Ryan, 2008), Kopp's (1982) Developmental Framework for Self-Regulation, and the SSC Framework (Binns et al., 2019) consider that research cannot separate the development of self-regulation from its roots in co-regulation.

5.3.1 Co-Regulation Tools Used by the Class Teacher

A primary finding concerning the second research question was that the class teacher, Angela, developed her knowledge and repertoire of co-regulation strategies. The interview revealed that the class teacher initially relied on sensory objects, such as fidget toys as co-regulation strategies. This was evident in the PSPs (Positive About Autism. n.d.), which were completed at the onset of the study. The PSPs detailed many sensory-based objects that the children enjoyed in school, including fidget toys, sand, magnetic letters, and Play-Doh.

However, the class teacher reflected in her interview that throughout the engagement with the intervention, she learnt about other strategies such as mindfulness breathing, and cognitive-based strategies, including re-framing negative thoughts, which became important co-regulation strategies for her students. Additionally, Angela realised that co-regulation strategies are unique to each child, as exemplified in the interview where Angela recognised sand as a primary co-regulation tool for one child. Angela noted that from engaging with the intervention, she learnt that this tool did not work for other children, enacting the view of the SSC Framework that educators need to employ a variety of co-regulation tools to support their students (Binns et al., 2019).

Likewise, the ZOR Curriculum envisions that children will develop a repertoire of regulation tools, including sensory objects, breathing strategies and CBT tools (Kuypers, 2011). When analysing this data, I also reflected that I had initially relied on sensory tools at the onset of my teaching career but discovered other tools from the ZOR curriculum. These findings also prompted me to consider the evidence base for sensory tools. Recent years have seen a rise in fidget toys and other sensory tools, with many commercial retailers marketing these toys as regulation tools (Aspiranti & Hulac, 2022). However, sensory tools are not widely used in traditional CBT interventions, which focus on more cognitive-based tools such as mindfulness and changing thinking patterns. Thus, research on sensory toys and objects such as fidget toys is both nascent and controversial. Some researchers argue that sensory toys may provide some support for self-regulation, but there is an absence of empirical research to warrant their growing use in educational settings (Kriescher, Hulac, Ryan & King, 2023). Contrastingly, autistic self-advocate Felepchuk (2021) explained that sensory toys and fidgets are part of an autistic person's stimming, a necessary behaviour for self-regulation. Similarly, research by Delimata and Byrne (2023) reported that autistic people recalled being reprimanded for using fidget toys, and this was a source of frustration for the autistic students who required access to fidget toys for regulation. These findings indicate that further research with autistic people is needed to consider the role of sensory objects in regulation, and to explore the justification for the increased use of sensory tools in education settings in recent years (Aspiranti & Hulac, 2022).

An analysis of the PSP (Positive About Autism, n.d.) for each child further revealed that the class teacher focused primarily on environmental supports for regulation, but also considered individual co-regulation supports, including maintaining routines. Routines were similarly prioritised by parents. Likewise, the SSC Framework (Binns et al., 2019)

emphasises how routines promote regulation by offering predictability. This is articulated in research by Delimata and Byrne (2023), where the routine of school acted as a support for many autistic people, as described by one autistic young person, “I like how it was the same thing every day and I knew where I was going and what I was doing” (p. 48).

Additionally, access to the sensory rooms was an important co-regulation tool for the children in the current study. Sensory rooms “are specialised spaces that contain equipment which can create light, sound and touch experiences” (Unwin, Powell & Jones, 2022, p. 1379). These rooms are typically designed to address the sensory and regulation needs of autistic people (Unwin et al., 2022). Additionally, qualitative data with teachers working in special classes suggest that sensory rooms allow autistic students to control their sensory input, thereby reducing anxiety and increasing self-regulation (Unwin et al., 2021).

5.3.2 Co-Regulation Tools Used by Parents

Parents spoke of the challenges in determining what caused their child to experience dysregulation, as many of the children in this study did not communicate verbally. However, the parents spoke of reading body language and carefully observing their children to determine strategies for co-regulation. Direct observation is seen as a powerful co-regulation tool in the SSC Framework, which considers how continual observation of children in varying contexts can provide insights into their responses to stressors, and thereby enable the adult to co-regulate to “mitigate the negative impact of stress” (Binns et al., 2019, p. 6).

One of the most interesting findings from the study concerned parents’ use of observation to determine the function of their child’s communication. In Theme Two, two parents reflected on how their children repeated scripts from popular television programmes, ‘Paw Patrol’ and ‘Peppa Pig’ to indicate dysregulation. Through careful observation, the parents realised that the children were communicating these scripts to express feelings of anger or frustration. This use of language is known as Gestalt Language Processing [GLP], which is a complex and under-researched area in autism (Blanc, Blackwell & Elias, 2022). Early research in this area by Prizant (1982) observed that autistic children may use certain echoic patterns of speech to serve communicative functions. Therefore, Luyster, Zane and Wisman (2022) contend that unconventional language used by autistic people, including GLP needs to be carefully observed as it can play a key role in understanding communicative attempts and emotional expressions (Blanc et al., 2023; Luyster et al., 2022).

Similarly, parents' use of co-regulation strategies seemed to develop from their own intuition and judgement, particularly during the time of the Covid-19 pandemic when parents had limited access to services. Theme One revealed how parents had limited access to communication with teachers during the time of the pandemic which was difficult for the parents to decipher their child's progress in school. This challenge was married with reduced access to services during the pandemic, as explored in Theme Two. These findings have implications for a wider consideration of the long-term effects of the pandemic on children. Indeed, researchers argue that children can be particularly vulnerable to the short and long-term effects of the pandemic (Flynn, Murray, Forkan & Kealy, 2022). Additionally, some research suggests that autistic children were especially impacted by the pandemic (Baweja, Brown, Edwards & Murray, 2022). While this research is nascent, parents of autistic children reported that children's self-regulation skills reduced during the pandemic (Morris, Hope, Foulsham & Millis, 2021). Therefore, additional research and supports may be warranted to mediate the impact of the pandemic on autistic children.

Another co-regulation strategy prioritised by the parents was providing space for regulation. Theme Two provided insight into how parents prioritised letting their child's 'emotional' or 'physical' reactions play out and providing the children with the space to experience these reactions. These findings reflect participatory research by MacLennan et al. (2022) which reported that autistic people valued the provision of a space to recover from meltdowns caused by sensory overloads. In the current study, providing space for regulation also incorporated quiet time after school and the use of technology. Many parents felt that technology provided their children with time to regulate. This finding is interesting, as the role of technology in supporting autistic people is mixed. Some research suggests that technology can support autistic people by offering a safe and predictable environment (Valencia, Rusk, Quiñones & Jamet, 2019). However, other researchers are concerned that autistic children tend to have high screen time, and this may hinder their social development (Westby, 2021). The role of technology for regulation remains limited and most research on technology for autistic people has focused on applications to social skills interventions. Therefore, conclusions on the role of technology for regulation remain nebulous.

Stemming from this, the findings from the second research question suggest that understanding students' needs is fundamental to co-regulation. Recently, the 'Autistic Space Framework', as put forward by Doherty et al. (2023), contends that addressing the sensory differences experienced by autistic people is the first step towards "meaningful accessibility",

as experiences of sensory overload pose significant limitations to the everyday well-being of autistic people and access to services (p. 2). Likewise, Delimata and Byrne (2023) reported that autistic students felt that teachers and other students misunderstood their needs and perceived 'meltdowns' or 'sensory overloads' as misbehaving (p. 49). This can lead to an autistic person masking their sensory overload, as explained by another participant, "*Going into school... I was acting like everything was alright, in fact, when I was kind of crumbling inside and it was all too much"* (p. 5). These findings indicate that knowledge of autism and the unique needs of students is fundamental to inclusion in educational settings.

Notably, while both the class teacher and parents were provided with the same list of co-regulation strategies from the SSC Framework, there were significant disparities in the co-regulation tools employed. It seemed that the class teacher developed strategies through her own research and professional teacher training. In contrast, the strategies employed by the parents seemed to develop naturally, from their observations of their child. These differences appear to align with differing theoretical perspectives on self-regulation. The class teacher's emphasis on cognitive tools for regulation aligns with Social Cognitive Theory (Bandura, 1988). Contrastingly, the parents' emphasis on observation and respecting space for regulation align with Self-Determination Theory (Deci & Ryan, 2008), which focuses on respecting children's emotional expression and providing space for emotional expression (Roth et al., 2019). Further research in this area could enable additional insights into the different co-regulation tools prioritised in educational settings and home settings, leading to an understanding of ways to learn from both theoretical perspectives on self-regulation.

5.4 Third Research Question: What are the Responses of the Participants to an Individualised Cognitive-Based Self-Regulation Intervention?

The third research question sought to explore the responses of participants to an individualised cognitive-based self-regulation intervention. Findings revealed a positive response to the intervention, with findings from both qualitative and quantitative data indicating that children's self-regulation improved. However, challenges were also faced by the children in developing self-regulation, resulting in a need to adapt the intervention to meet their individual self-regulation developmental trajectories.

5.4.1 Changes in Self-Regulation Outcomes

For the current study, the ZOR Curriculum (Kuypers, 2011) was used to apply a cognitive-based intervention to first scaffold foundational self-regulation skills, and then more autonomous self-regulation skills in the six children. The interview with the class teacher revealed that the children enjoyed participating in the intervention. Angela noted in Theme Three that the children enjoyed taking part in the intervention, and children still brought up elements such as the 'Coach' and the 'Critic' from the lessons. This finding corresponds to Lalor's (2020) study, which similarly reported a positive response to the ZOR Curriculum (Kuypers, 2011) by autistic children.

Furthermore, quantitative findings from the study illustrated improvements on outcome measures of self-regulation for this cognitive-based intervention. This was evidenced by increases on both the parent and teacher versions of the ERSSQ (Beaumont & Sofronoff, 2008) from pre-intervention to post-intervention. The parent measure also showed a continued increase at follow-up, however, the teacher measure had a slight decrease at follow-up. While the student scores on the ERSSQ were not analysed inferentially due to the small sample size, it was evident that the children had made a substantial gain in self-regulation scores from pre-intervention to post-intervention. The increase in self-regulation scores in this study is consistent with the results of the reviewed studies from Chapter Two. The five studies presented in the systematic literature review similarly adopted a CBT approach to their self-regulation interventions and reported positive changes in outcome measures from pre-intervention to post-intervention (Beaumont et al., 2015; Costescu et al., 2017; Nowell et al., 2019; Sofronoff et al., 2017; Tan et al., 2015). Three of these studies also used the ERSSQ for teacher and parent measures of child self-regulation (Beaumont et al., 2015; Sofronoff et al., 2017; Tan et al., 2015). Therefore, the results of the current study suggest that participation in a cognitive-based self-regulation intervention can lead to some immediate improvements in self-regulation outcome measures for autistic children.

However, an analysis of the follow-up measures revealed that changes in self-regulation outcomes may not be maintained. In the current study, the teacher measure of child self-regulation on the ERSSQ dropped at follow-up while the parent scores continued to increase, albeit marginally. These teacher findings are similar to those of other social cognitive self-regulation interventions, with authors reporting that changes in outcome measures were not maintained at follow-up (Beaumont et al., 2015; Costescu et al., 2017; Tan et al., 2015). Nonetheless, a consideration may also be warranted to the timing of the follow-up measure in the current study. Notably, the follow-up occurred in September 2023, when

the children were transitioning back to school after the summer holidays. A review of literature suggests that transitions can be challenging for autistic children, such that they can result in heightened anxiety and dysregulation. For example, Delimata and Byrne (2023) reported that autistic young people identified returning to school in September as particularly challenging, explaining that "every year when you go back, there's obviously a new timetable…change of rooms, change of teachers" (p. 55). This challenge may, therefore, partially explain the change in scores at this time. Additional research at various time-points may be needed to establish the maintenance of self-regulation outcomes. Quale (2019) also recommends re-teaching interventions at several timepoints to improve outcome maintenance.

Challenges During the Intervention

The class teacher acknowledged challenges faced by the children during the intervention. Six lessons were adapted from the ZOR Curriculum (Kuypers, 2011), with three lessons focusing on 'Scaffolding to Support Foundational Skills' and three lessons focusing on 'Scaffolding to Support Autonomy'. The ZOR Curriculum (Kuypers, 2011) uses the term 'zones' as a conceptual framework to teach students how to categorise feelings and communicate their feelings using four different coloured zones (Kuypers, 2011). The students then learn skills to recognise when they are in different states, and "explore calming techniques, cognitive strategies, and sensory supports so they will have a toolbox of methods to use to move between zones" (Kuypers, 2011, p. 1). Findings from the interview with the class teacher revealed that while most children engaged with the 'Scaffolding to Support Foundational Skills' lessons, some children were not ready to move on to the 'Scaffolding to Support Autonomy' lessons. In Theme Three, Angela described how the children were able to identify the 'zones' in other people and characters, which is central to 'Scaffolding to Support Foundational Skills'. However, some children were reluctant to identify negative emotions in themselves. Similarly, when the class teacher introduced lessons from 'Scaffolding to Support Autonomy', the interviews revealed that some of the children were not ready to move on to more complex CBT skills such as identifying triggers and personal calming tools. Therefore, the class teacher continued to work with these children on the initial foundational self-regulation lessons, such as identifying their range of emotions.

Consequently, it is evident that children developed their self-regulation skills at different rates, and adaptations were a necessary part of this intervention. This seems to align

with the Resource Model of Self-Regulation, which considers self-regulation as a muscle that can be improved through regular practice (Baumeister et al., 2018). Additionally, this understanding is considerate of developmental perspectives on self-regulation which argue that self-regulation develops in a non-linear and dynamic fashion (Binns et al., 2019; Wass, 2023). It should be noted that children in this class spanned a wide range of ages and class levels, ranging from Senior Infants to Fourth Class at the time of the study. However, as special classes in Ireland often have a range of ages, meeting the different developmental trajectories of students is essential for special class teachers. In Theme Three, Angela expounded how she used pedagogical strategies to support the variety of needs during these lessons, including differentiated expectations, teacher modelling and continued practice. For instance, Angela used the 'think aloud' strategy, whereby she made her thinking explicit to the children when describing her own emotions, triggers, and calming strategies, thereby promoting the use of self-regulation strategies, and acceptance of a range of emotions. Similarly, Angela noted how all children took part in the lessons, but she set different expectations for students, with some students focusing on foundational skills while others focused on autonomous self-regulation skills, such as emotional literary. This finding therefore prompts consideration of the importance of the teacher-student relationship in fostering self-regulation (Roth et al., 2019), something I reflected on from my own experience teaching autistic children. Similarly, from working with the class teacher in the study and partaking in the interview with her, her passion to support her students was evident.

However, the findings from the current study pose questions about the suitability of the ZOR Curriculum (Kuypers, 2011) for autistic learners without adaptations. Notably, a recent meta-analysis found that ZOR lacks an empirical research base, with the meta-analysis only finding three empirical papers for the ZOR (Mason et al., 2023). Findings from these studies were also mixed (Mason et al., 2023). The ZOR curriculum states that it can be used with children from as young as preschool and was designed to be used with neurodiverse children (Kuypers, 2011). However, the current study reported the need for adaptations, including developing additional visual supports, 1:1 teacher time, and differentiating expectations for students, for the lessons to be suitable for students. Similarly, as identified in the systematic literature review, Nowell et al. (2019) enacted adaptations to the ZOR in the GoriLLA intervention by incorporating elements from Social Thinking (Crooke & Garcia, 2021) and TEACHH (Mesibov et al., 2005). The authors noted that adaptations were necessary to meet the needs of all students (Nowell et al., 2019). Thus, these findings have

implications for the ZOR, revealing the need to adapt the curriculum to meet the individual needs of students.

5.5 Fourth Research Question: What are the Enablers and Barriers to the Effective Implementation of the Self-Regulation Intervention?

Finally, the fourth research question sought to determine the enablers and barriers to the effective implementation of the self-regulation intervention. Regarding enablers, the class teacher and parents reported that the school-based setting and capacity to adapt the intervention enabled the effective implementation of the intervention. Contrastingly, the primary barrier to implementing the intervention was the lack of parental engagement. According to the SSC Framework, interventions should be adaptable to meet the individual needs of autistic students (Binns et al., 2019). This is echoed by research from the NCSE (2015) and the GOI (2022b), which reported that effective interventions for autistic students should be individualised. Parental involvement is further deemed essential to effective interventions in the 'Autism Good Practice Guidelines' (GOI, 2022b).

5.5.1 Enablers

The primary enabler for this intervention was the school setting, which facilitated a teacher-led intervention. Previous literature established the benefits of school-based interventions (Kasari et al., 2012; Lopata et al., 2012). While only one study in the systematic literature review was conducted in a school setting (Beaumont et al., 2015), these researchers contended that school-based interventions offer additional opportunities for children to practice skills and learn from their peers. The teacher-led intervention also allowed the teacher to adapt the intervention to meet the individual needs of her students. This is significant considering that a key limitation of many studies presented in Chapter Two was the requirements set on participants to meet minimum measures of verbal language expression and IQ testing (Beaumont et al., 2016; Nowell et al., 2019; Sofronoff et al., 2017; Tan et al., 2015). As described in Theme Three, the class teacher modified the ZOR lessons to meet the students' needs, including setting differentiated expectations for her students based on their self-regulation developmental trajectories. It was evident that the class teacher was knowledgeable about autism and passionate about developing her knowledge. This is important as the NCSE (2016) stated that "students in special classes require experienced

teachers with appropriate qualifications, and wherever possible, a background in working with students with special educational needs" (p. 10).

The school setting also enabled me as the researcher to work with the class teacher to fit the intervention into the children's routines, thereby reducing possible cognitive stress associated with an unfamiliar and unpredictable environment. We decided to fit the intervention into the class morning meeting time. Kuypers (2023b) explained that the ZOR can be implemented into morning meeting time to offer a structured time where the children can express their emotions, and engage in personal reflection of their own emotions, along with developing increased awareness of their classmates.

Additionally, Beaumont et al. (2015) argued that school-based interventions can be more accessible for many children by reducing the financial and logistical obstacles of accessing clinic-based interventions. This was echoed in Theme Three which explored how parents felt that the 'responsibility' was put on them to deliver support and interventions for their children, as many disability services did not meet with the children, and instead offered parental training or 'handouts'. One parent also argued that the HSE will only provide support to parents if there is "injurious behaviour", arguing that "it has to be at that level before somebody will meet you". Likewise, in the Report of the Task Force on Autism (Oireachtas, 2023), the report contended that the lack of availability of therapeutic supports places the burden on autistic people and their families to cater for their needs. These findings represent a lack of proactive early-intervention support for children in the current education system, and the possibility of school-based intervention to meet the needs of autistic students.

5.5.2 Barriers

The primary barrier in implementing this intervention was the lack of parental engagement. Parents were provided with the intervention book and home resources at the start of the intervention and the class teacher regularly communicated with the parents about the intervention. However, as this intervention was delivered by the class teacher, I did not have direct contact with the parents until the post-intervention interviews. During these interviews, it became apparent that the parents did not seem to use the home learning resources. A key obstacle to the use of the home learning elements identified by the parents was communication challenges. Parents identified communication challenges as a primary barrier to accessing information on school-based interventions, as many of the parents in the study explained that their children did not communicate verbally about their school day. This

may present as a barrier in communicating with the children about the intervention used in the current study.

Additionally, Theme Three helped to reveal that the format of the home-learning resources may not have been suitable for the parents. The parents were frustrated with the use of handouts in disability services. This frustration may then have transferred to the home-learning packs sent home as part of this intervention, resulting in parents expressing a preference for in-person training in their interviews, as explored in Theme Three. These findings have implications for the current home-learning elements of the ZOR Curriculum (Kuypers, 2011). The ZOR handbook provides information handouts to parents to explain the ZOR training. However, it does not explicitly include parent training sessions (Kuypers, 2011). These findings prompted my own reflections, and I remarked on the difficulties in communicating interventions to parents during the Covid-19 pandemic. The use of audio-visual information, including video calling software enabled me to demonstrate resources I used during the pandemic. This approach may also be more suitable for this intervention than handouts, and allow for flexibility in providing training that does not require in-person meetings.

Findings from the systematic literature further explicated this barrier. Three reviewed studies included parental involvement (Nowell et al., 2019; Sofronoff et al., 2017; Tan et al., 2015). Sofronoff et al. (2017) trialled a fully parent-delivered version of a CBT intervention for self-regulation. Sofronoff et al. (2017) reported some positive findings, such as increases in parent self-efficacy. However, the researchers cautioned that many parents found it difficult to implement the programme and there was a high attrition rate in this study despite the provision of parental training and structured workbooks. In Nowell et al.'s (2019) study, parents participated in weekly parent breakout sessions to learn new strategies that can be implemented at home and discuss the children's progress. However, while parents' self-regulation vocabulary and written responses showed positive improvements, changes in self-regulation outcome measures did not generalise to independent coded behavioural interactions between parent and child dyads. Similarly, Lalor's (2020) thesis reported a low response rate for parental participants in her study. Therefore, the complexity of parental involvement in interventions needs further consideration to enable the effective implementation of self-regulation interventions across home and school environments (GOI, 2022b).

5.6 Chapter Conclusion

To conclude, this chapter discussed the findings presented in Chapter Four. Drawing upon Braun and Clarke's (2022) approach to reflexive thematic analysis, the findings of the current study were considered in light of previous literature and my own experience teaching as a special class teacher and engaging in the research process. Chapter Six offers a conclusion to the research, considering the implications of these findings in relation to policy, practice and theory.

Chapter Six
Conclusion

6.1 Chapter Introduction

Shanker (2012, p. 6) proposed that "a genuine paradigm shift" is needed to understand children's behaviour in terms of self-regulation. This paradigm shift encompasses a neurodiversity affirmative approach to self-regulation, which recognises the role of environmental influences on the unique developmental trajectory of each person (Doherty et al., 2023). This paradigm shift concedes that each autistic person presents with a unique profile of strengths and needs, and interventions must therefore cater for heterogeneity and move away from homogenous accounts of human development (Rose & Shevlin, 2020). The current research study sought to offer a new perspective on self-regulation, a perspective that responds to Shanker's (2012) vision for a society that understands the necessity of self-regulation support for autistic people. This research considered self-regulation from a multi-faceted perspective, incorporating the latest research on environmental influences on self-regulation and the role of social support in the form of co-regulation and evidence-based CBT interventions for autistic people (Doherty et al., 2023; GOI, 2022b; Scarpa & Reyes, 2011). This is contextualised at a time of significant concerns about the educational provision for students with SEN in Ireland, where Ireland's ratification of the UNCRPD (United Nations, 2006) leads to a question about the role of special classes for autistic students, and how this could marry to a vision of 'full inclusion' (NCSE, 2024; Tiernan, 2022). Conversely, research with autistic people explicates concerns about current educational environments which are not always suitable for the self-regulation needs of autistic students (Delimata & Byrne, 2023; MacLennan et al., 2022; Oireachtas, 2023).

6.2 Summary of Research Findings

The present study provided preliminary support for the effectiveness of an individualised self-regulation intervention for autistic students. The first major finding of the study concerned environmental provisions for self-regulation. The study found that the special class setting supported regulation by offering a prepared environment that was designed for autistic students. The study also reported that the class teacher used both the SASC (Middletown Centre for Autism, n.d.) and the PSP (Positive About Autism, n.d.) to

enact environmental modifications for her students. The second major finding of the current study was that the class teacher and parents prioritised different co-regulation strategies for the students in this study. The class teacher initially relied on sensory tools, but through participation in the study, focused on cognitive-based tools for regulation such as breathing strategies and reframing negative thoughts. In contrast, the parents prioritised observing their children and reading their body language to provide space for regulation. The third finding of the current study conveyed that students responded positively to the self-regulation intervention, with both quantitative and qualitative data reporting an improvement in self-regulation. It was also revealed that students developed self-regulation skills at different rates, and therefore, the self-regulation intervention was adapted to meet the unique developmental trajectory of the students. The fourth finding concerned the enablers and barriers to implementing the intervention. The primary enabler for the current study was that the intervention was teacher-led and took place in a school setting. This setting facilitated the class teacher to make adaptations to meet her students' needs. The primary barrier for the current study was the lack of parental engagement, which was related to the need for in-person parental training.

6.3 Implications for Policy and Practice

6.3.1 Implications for Ireland's Ratification of the UNCPRD

The current research study poses several implications for current policy developments in Ireland, including Ireland's ratification of the UNCRPD (United Nations, 2006). The Irish Government prioritised reflection on the current educational provision for students based on this ratification, including consideration that "reasonable accommodations of the individual's requirements is provided" and that "persons with disabilities receive the support required, within the general education system to facilitate their effective education" (Oireachtas, 2023, p. 61). The current research study responds to the UNCRPD by considering how to enact these accommodations through environmental supports, social supports and an individualised cognitive-based intervention within a special class setting. The SASC enabled the class teacher to consider the suitability of the classroom environment for autistic learners. Then the class teacher used the PSP to consider individual pupils' sensory requirements and develop a profile of environmental and individual support. These tools could be widely available to schools to enact the changes needed to accommodate students. Additionally, the results of the current study indicated that the individualised self-regulation intervention, encompassing

environmental, social and cognitive-based components was effective in supporting children's development of self-regulation skills. This intervention can provide support for students to develop self-regulation, a skill needed for academic and social development along with life-long health and well-being (Binns et al., 2019; Shanker, 2012).

Ireland's ratification of the UNCPRD further enacted reflection on the role of special classes and schools in the continuum of educational provision for students with SEN (NCSE, 2024). The current study highlights that the special class setting was valued by parents and provided environmental modifications necessary for the self-regulation of autistic students. While it was beyond the scope of the current study to examine the impact of mainstream settings on autistic students, the NCSE (2019) highlighted a "fear from principals, teachers and parents that students might not as well educated or cared for in mainstream settings." (p. 59). The report also stated that these fears were heightened by concerns that mainstream settings cannot meet the needs of all students, which was echoed in The Report of the Task Force on Autism (Oireachtas, 2023). Additionally, the NCSE (2024) reported that while most stakeholders "agreed that, ideally, all students, including students with special educational needs, should be educated together in the same school", most stakeholders "also indicated their belief that Ireland needs to maintain a continuum of education provision that includes mainstream classes, special classes, and special schools" (p. 12). This reflects a hesitancy to move towards full inclusion, without due consideration of how to provide all children with the necessary support in a mainstream environment.

Thus, the NCSE (2024) described Ireland's journey towards full inclusion as a "progressive realisation", reflecting the need to carefully consider the path ahead to "enable all students to access education in their local schools" (p. 15). Professional learning, therapeutic supports for students and a shared societal commitment to inclusive education are key to achieving this goal (NCSE, 2024). Reflecting on the results of the current study, mainstream class teachers may also benefit from increased training in providing suitable environments to meet sensory needs, within the vision for universal design. The special class setting may therefore, become a more flexible setting for individualised interventions, using evidence-based practices that facilitate meaningful inclusion (Travers, 2023). Therefore, the current study recognises that special classes can provide a suitable environment for autistic learners, and careful consideration of how the environment and supports of mainstream classes may be adapted to meet the needs of autistic learners is needed in the upcoming years as Ireland considers how to move towards a vision for full inclusion.

6.3.2 Implications for Practice

Furthermore, the current study has numerous implications for classroom practices. These implications focus on creating inclusive classroom practices. Firstly, the findings of the current study suggest that an understanding of the unique self-regulatory needs of autistic people is necessary for inclusive classroom practices. This understanding incorporates the role of the environment, which should be designed with and for a neurodiverse population. Additionally, a combination of whole-class self-regulation supports, such as morning meeting check-ins using the ZOR (Kuypers, 2011), and individualised small-group and individual self-regulation interventions with autistic children may be necessary. Respecting students' individual self-regulation strategies such as stimming and fidget toys is also necessary for inclusion (Felepchuk, 2021).

Additionally, the results of the current study have implications for understanding behaviour. Considering behaviour from a self-regulation perspective acknowledges how 'challenging behaviour' can be caused by dysregulation (Shanker, 2012). This understanding is needed, as the NCSE (2019) reported that an increase in challenging behaviour for students with SEN was leading to exclusion from mainstream classes and reduced school hours. For autistic people, dysregulation occurs when there is a mismatch between the person's current level of arousal and the demands of the environment or social situations (Binns et al., 2019). Due to sensory sensitivities, the environment is often not suitable and can lead to sensory overload and experiences of 'meltdowns' (Belek, 2019; Lee et al., 2019). Likewise, differences in social communication can cause dysregulation for autistic people in social settings, and many settings such as schools can, therefore, cause increased dysregulation (WHO, 2019). Some research indicates that autistic children's self-regulation skills were impacted by the pandemic (Baweja et al., 2022; Manning et al., 2021). Research has found that difficulties with social communication can lead to reduced social engagement, difficulties making and maintaining friendships, and academic underachievement (Berkovits et al., 2017; Nuske et al., 2021). Therefore, this study argued that educators need to engage in careful observation of students to uncover their triggers and co-regulation strategies to support self-regulation.

The NCSE (2019) also found that a key contributor to challenging behaviour for children with SEN, was "inadequate space to create a suitable learning environment for students who require adequate space for sensory needs or to regulate behaviour" (p.43). Therefore, findings from the current study have implications for creating inclusive

environments for neurodiverse learners to support their self-regulation. This includes providing routines and predictability within the school day and considering seating arrangements and lighting in the classroom. Furthermore, sensory-friendly areas in the classroom, often known as 'calm corners' may be useful, along with access to a sensory room. As a desire for a quiet and calm classroom was prominent for the children, this poses questions about the suitability of many mainstream classes in Ireland due to the large class sizes (INTO, 2022). To support autistic students, reducing class sizes may be necessary (INTO, 2022).

The current study poses additional implications for school-based interventions. A lack of school-based resources to support autistic people was identified as a primary challenge for autistic students that was contributing to challenging behaviour, anxiety and exclusion (Delimata & Bryne, 2023; NCSE, 2019). The results of the current study reveal that school-based interventions that are adapted to meet the individual needs of students can lead to positive outcomes. As evidenced in this study, teachers could develop individual profiles for their students to support their self-regulation.

6.4 Recommendations in Relation to Policy and Practice

Drawing upon these findings, a series of recommendations are outlined for policy, practice, and future research.

- The State should work with Middletown Centre for Autism (2022) and the National Educational Psychology Services (NEPS) to consider the suitability of school environments for autistic learners. This may involve issuing a copy of the SASC (Middletown Centre for Autism, n.d.) to schools, along with a series of CPD courses for school staff to create appropriate school environments for autistic students.
- Aligned with the previous recommendation, the DE should establish a working group to develop participatory research methods that incorporate autistic people in designing education settings, with a strong emphasis on participation in design and classroom modifications.
- Additional funding and resources should be allocated to Initial Teacher Education modules to ensure modules are in line with a neuroaffirmative perspective, and student-teachers are provided with opportunities to critically develop an understanding of behaviour in terms of self-regulation.

- The NCSE should establish a working group to review current interventions for autistic people and consider how to adapt interventions within a neuroaffirmative lens.

6.5 Theoretical Considerations

This research also poses numerous theoretical considerations. Firstly, this research drew upon Social Cognitive Theory (Bandura, 1988) to support an individualised self-regulation intervention. Social Cognitive Theory (Bandura, 1988), as espoused in CBT interventions for self-regulation, focuses on the cognitive processes needed for regulation, along with the role of social partners in regulation (Kuypers, 2011; Schunk, 2012). The current study has implications for Social Cognitive Theory, finding that CBT interventions should consider the developmental trajectories of students, focusing first on foundational self-regulation skills before moving on to more autonomous self-regulation skills when the child shows developmental readiness (Binns et al., 2019). Additionally, the role of the environment was neglected in Social Cognitive Theory. The current study argues that the environment plays a central role in supporting regulation and must be considered in theory and interventions.

Therefore, the current research study also has implications for the 'Autistic SPACE Framework' (Doherty et al., 2023). This framework adopted a neuroaffirmative lens that sought to provide sensory-friendly and accepting environments in healthcare settings. The current research extends these findings by contextualising them in education settings. The key elements of the study, namely 'Sensory', 'Predictability', 'Acceptance', 'Communication' and 'Empathy' can be extended to education settings. The SASC (Middletown Centre for Autism, n.d.), as used as part of this study could be used in schools to enact the 'Sensory' and 'Predictability' elements. Thereafter, the elements of 'Acceptance', 'Communication', and 'Empathy' need to be enacted in primary schools through staff CPD on the sensory needs of autistic people, along with a whole school inclusive ethos that aligns with the principles of neurodiversity.

This research also has implications for Deci and Ryan's (2008) account of self-regulation. Self-determination theory focuses on the role of emotions in self-regulation, with emotions considered as sources of insight into dysregulation. Within this theory, social partners can support self-regulation by validating a child's emotions and treating emotions in a non-judgemental manner (Roth et al., 2019). However, the relationship between social

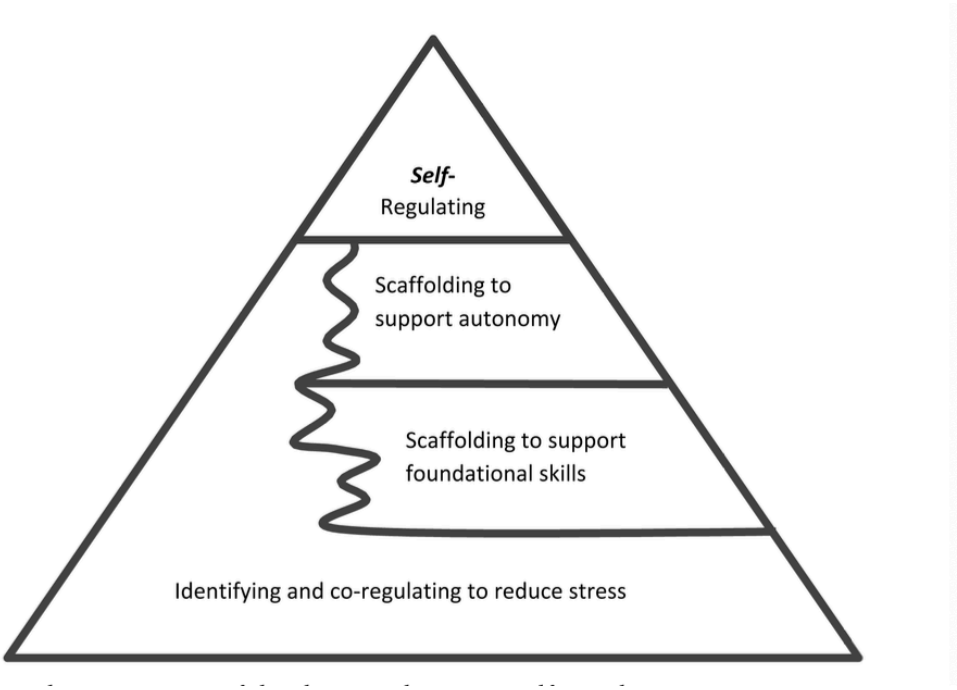
partners and self-regulation was generally restricted to mother-child dyads in empirical research, and Roth et al. (2019) argued that the application to education settings was less clear. The current study found that both the class teacher and parents supported the child's self-regulation by offering co-regulation strategies to support the students. Further research is needed in this area to continue to explore the role of social relationships in regulation.

6.5.1 A New Visual of the Stress, Self-Regulation and Communication Framework

The current study also has numerous implications for the future development of the SSC Framework (Binns et al., 2019). Originally presented in Chapter Two, the SSC Framework offered a staged model of self-regulation, as exemplified in Figure 21.

Figure 21

A Visual Representation of the Stress, Self-Regulation and Communication Framework



Note. Figure from Binns (2019, p. 35).

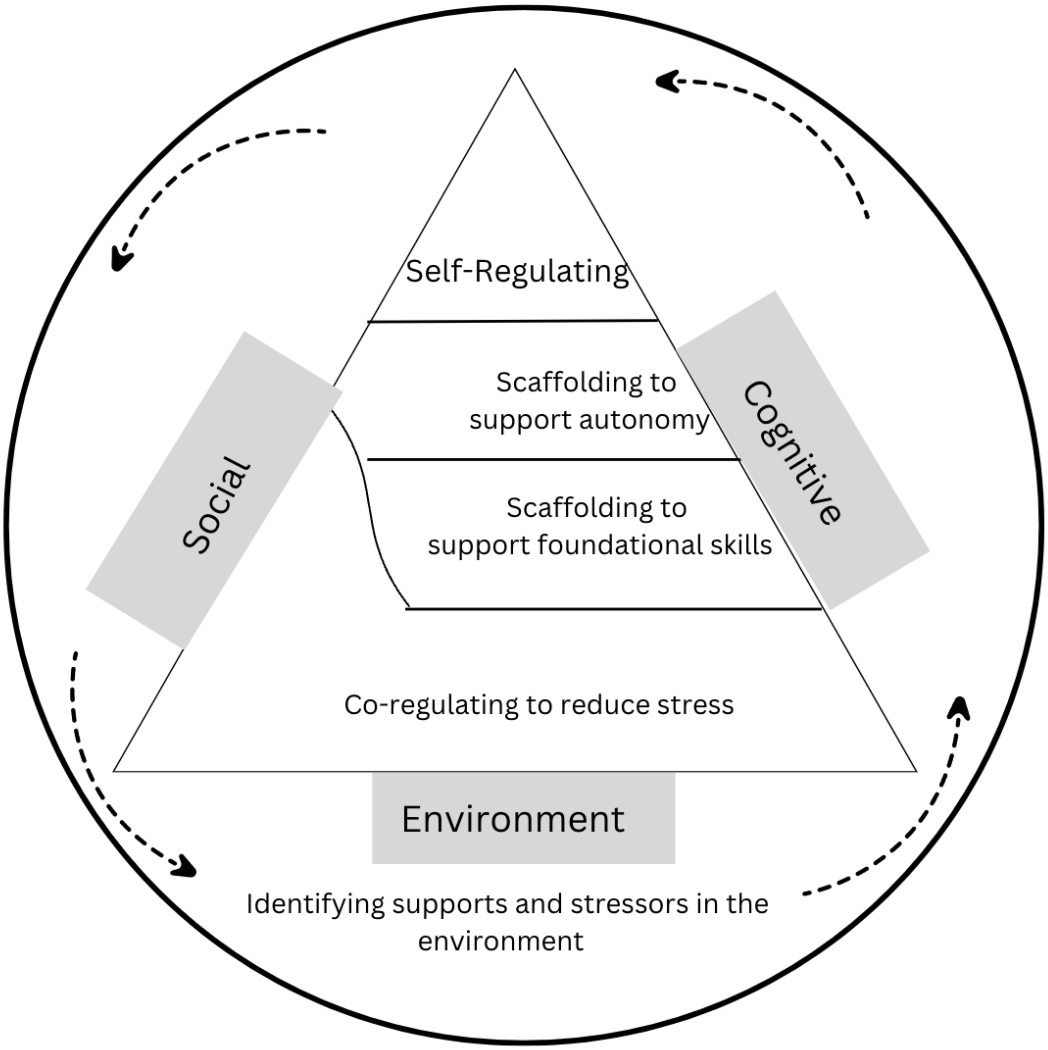
Firstly, it is important to consider that the SSC Framework was a novel framework that was developed by Speech and Language Therapists working with autistic students and prior to this study, had not been tested in empirical settings. The SSC Framework was chosen

for this study as it was the only framework for self-regulation for autistic students that adopted a neuroaffirmative perspective. The findings of the current study support the view of the SSC Framework that foundational self-regulation skills need to be taught before an educator can move on to more autonomous self-regulation skills. Therefore, the SSC Framework is a useful guide for educators in adapting self-regulation interventions for autistic students. Nonetheless, the findings of the current study reveal that modifications can be made to the SSC to support its application to educational settings, as illustrated in Figure 22.

Thus, the current study expanded the first phase 'Identifying and Co-Regulating to Reduce Stress'. In the current study, the SASC (Middletown Centre for Autism, n.d.) was used to identify stressors in the environment. Thereafter, the PSP (Positive About Autism, n.d.) was used to identify individual co-regulation supports for students. Due to the centrality of the environment in the current study, the new visual delineates the environment as a distinct phase concerning self-regulation, which is both the starting point for self-regulation and an ongoing process. Additionally, the new visual includes the headings 'Social' and 'Cognitive' to make the application of the different theoretical perspectives on self-regulation clearer in this model. The current study further revealed that self-regulation is an ongoing and dynamic process. To illustrate the dynamic nature of self-regulation, the updated visual also includes a circle surrounding the 'Environment', 'Social', and 'Cognitive' elements, reflecting that self-regulation develops through the dynamical interactions of the environment, social interactions and individual cognitive factors, and each element cannot be distinguished from the other (Wass, 2023). The current study therefore proposes a new visual to explain self-regulation that synthetizes environmental, social and cognitive perspectives, as illustrated in Figure 22.

Figure 22

A Social-Cognitive-Environmental Model of Self-Regulation, based on the Stress, Self-Regulation and Communication Framework (Binns, 2019)



Note. The Language used in this Figure was adapted from Binns (2019)

6.6 Methodological Considerations of the Current Study and Recommendations for Future Research

Reflecting on the current research study leads to an understanding of the methodological strengths and limitations of this research, that can inform future research.

6.6.1 Strengths

A significant strength of the current study was the choice of a case study design. This design allowed for an in-depth analysis of the individual self-regulation development of six autistic students. The choice of a case study design further allowed an introspection of the environment in which self-regulation develops. Another strength of the current study was the collection of mixed-method data. The reviewed literature presented in Chapter Two collected quantitative data to measure self-regulation. However, the complex and dynamic nature of self-regulation may not be captured in quantitative data alone, so the current study responded to critiques of these studies by adopting a mixed-methods approach. Finally, the choice of reflexive thematic analysis allowed me to reflect on my own experiences and use these reflections to guide my methodological choices and data analysis.

6.6.2 Limitations

Notwithstanding these strengths, it is important to acknowledge several methodological limitations of the current study. Firstly, this study had a limited number of participants so inferential statistical measures were not analysed. Though the case study was representative of a special class setting in Ireland, the heterogeneity of autistic people means that this sample may not represent other autistic children in Ireland.

Moreover, the findings of this study were limited as student voice was not directly measured. At both the pre-intervention and post-intervention stages, I endeavoured to collect child measures of self-regulation. As outlined in Chapter Three, a talking mats approach (Talking Mats, n.d.) was used to adapt the current questionnaires for use with autistic children. However, even after adaptations to the measures were made, the class teacher felt that the questionnaire was not suitable for the children as they seemed to guess most of the questions. Upon reflection, an alternative measure such as photovoice or drawings may have been more suitable for the child participants in this study. Photovoice and drawing are visual-based participatory methods that can help elicit child voice, especially with younger children and children who may not communicate verbally (Ha & Whittaker, 2016; Sudarsan, Hoare & Roberts., 2022). Future research may consider the application of these methodologies to elicit student voice.

6.6.3 Recommendations in Relation to Further Research

- Drawing on findings from this study, future researchers should consider the suitability of mainstream environments for autistic learners. Researchers could consider the role

that Universal Design may play in creating appropriate learning environments for autistic children.

- Future research may want to consider adopting the current intervention in a mainstream classroom to consider how an individualised self-regulation intervention may be implemented in a mainstream class.
- Future research could also consider other measures of child self-regulation, such as the 'Semi-Structured Parent-Child Play Observation' employed by Nowell et al. (2019) which may provide further insights into how self-regulation skills generalise to other behaviours.
- Future research should consider how to incorporate the voices of young autistic students in research, considering the role of novel participatory practices such as photovoice and drawing.
- Future research may consider the role technology and sensory tools play in supporting co-regulation.
- Future research may consider the impact of the pandemic on autistic children in Ireland, particularly in relation to self-regulation and social and communication development.

6.7 Personal Reflection on the Research Journey

This research journey began with my own teaching career, working as a special class teacher with autistic students. Based on my own teaching experience, I wanted to empirically research self-regulation interventions for autistic children in an Irish context. Having reflected on my own positive experience teaching adapted lessons from the ZOR Curriculum, I envisaged incorporating the ZOR lessons into a wider neuroaffirmative research project. Early in the research project, I decided to utilise a case study design. I knew from my own experience that each autistic person is unique, and having read Kanner's (1944) original case studies of autistic people, I wanted to return to an individualised approach. A challenge arose as I was not familiar with qualitative research. On reflection, I realised that I was biased towards experimental designs as 'true science'. This challenge afforded me a new opportunity to delve into the qualitative research world. I discovered Braun and Clarke's (2022) approach to reflexive thematic analysis and decided that this approach would be fitting for my research.

My literature review highlighted that most of the autism research reflects an ableist lens, with many researchers setting stringent requirements on cognitive and linguistic measures for participants to access interventions. My experience as a teacher of autistic students endowed me with a neuroaffirmative perspective, which to me, recognises that each child presents with a unique profile of strengths and needs, and every child has the capacity for development. Within this perspective, I also experienced the importance of a supportive environment for autistic students. At this stage of my research, I decided to adopt a multi-faceted focus for my study, incorporating environmental, social, and cognitive supports. Working with the class teacher implementing the intervention was a positive experience for me. The class teacher was incredibly passionate about supporting her students. While meeting with her to plan lessons, I learnt new perspectives on self-regulation that I was also able to bring into my classroom. In my future practice, it will be important to me to work cooperatively with other teachers and share evidence-based best practice to support all learners.

6.8 Chapter Conclusion

Doherty, McCowan and Shaw (2023) argued that "autism remains nebulous for many practitioners, who are unclear about communication differences, access needs or life experiences common to autistic people" (p. 1). This research adopted a neuroaffirmative viewpoint to provide insights into the self-regulation development of autistic children, a central concern for daily life experiences of autistic people, and long-term academic, social and health outcomes (Hutchinson et al., 2021). The current research study utilised a case study design to explore environmental modifications for self-regulation and an individualised cognitive-based self-regulation intervention. The findings suggest that this intervention was efficacious in supporting the self-regulation development of autistic students in a special class setting in Ireland. These findings are consistent with other research concerning self-regulation interventions for autistic students (Beaumont et al., 2015; Cosetecu et al., 2017; Nowell et al., 2019; Sofronoff et al., 2017; Tan et al., 2018). Reflecting on these findings poses implications for Ireland's ratification of the UNCRPD (United Nations, 2006), including the need to create appropriate environments that support self-regulation, and individualised self-regulation interventions. This comes at a critical time in Ireland's journey towards a vision of full inclusion where all children can be educated together (NCSE, 2024). This research also considered directions for future research, including the need to consider environmental

modifications in mainstream classes and the development of participatory research methods. Finally, it is appropriate to conclude with the voice of a parent of an autistic child in my study, which exemplifies the need to embrace the uniqueness of each autistic person and provide each child with space for regulation.

> *"I think just let them, leave them in their own time so by the time they want to do something, they will do it in their own way, which is going to be amazing."*

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed.).* Washington, D.C.: American Psychiatric Publishing.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.).* Washington, D.C.: American Psychiatric Publishing.

American Psychiatric Association.(1980). *Diagnostic and statistical manual of mental disorders (3rd Edition).* Washington, D.C.: American Psychiatric Publishing.

American Psychological Association. (2020). Bias-free language. https://apastyle.apa.org/style-grammar-guidelines/bias-free-language

American Psychological Association. (2021). Inclusive language guidelines. https://www.apa.org/about/apa/equity-diversity-inclusion/language-guidelines.pdf

Ashburner, J., Rodger, S., & Ziviani, J., (2010). Surviving in the Mainstream: Capacity of Children with Autism Spectrum Disorders to Perform Academically and Regulate Their Emotions and Behaviour at School. *Research in Autism Spectrum Disorders, 4,* 18–27.

AsIAm. (2019). Autism and Language Acceptance. https://asiam.ie/resource/autism-and-language-whats-the-right-word/

Aspiranti, K. B., & Hulac, D. M. (2022). Using fidget spinners to improve on-task classroom behavior for students with ADHD. *Behavior Analysis in Practice, 15*(2), 454-465.

Aspy, R., & Grossman, B. G. (2011). *The Ziggurat model: A framework for designing comprehensive interventions for individuals with high-functioning autism and Asperger Syndrome.* AAPC Publishing.

Aspy, R., & Grossman, B. G. (2022). *The Ziggurat model: A framework for designing comprehensive interventions for individuals with high-functioning autism and Asperger Syndrome.* AAPC Publishing.

Atwood, T. (2004). *Exploring feelings: Cognitive behaviour therapy to manage anxiety.* Future Horizons.

AutismSpeaks. (2023). *Autism diagnosis criteria: DSM-5*. https://www.autismspeaks.org/autism-diagnosis-criteria-dsm-5

Bandura, A. (1988). *Self-regulation of motivation and action through goal systems.* In Cognitive Perspectives on Emotion and Motivation (pp. 37-61). Dordrecht: Springer Netherlands.

Barkley, R. A. (2012). *Executive functions: What they are, how they work, and why they evolved.* Guilford Press.

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): Evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders, 31*, 5-17.

Baumeister, R. F., Tice, D. M., & Vohs, K. D. (2018). The strength model of self-regulation: Conclusions from the second decade of willpower research. *Perspectives on Psychological Science, 13*(2), 141-145.

Baweja, R., Brown, S. L., Edwards, E. M., & Murray, M. J. (2022). COVID-19 pandemic and impact on patients with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 52*, 473-482.

Beaumont, R. (2010). *Secret Agent Society: Solving the mystery of social encounters-Facilitator Kit.* Australia: The Social Skills Training Institute.

Beaumont, R., & Sofronoff, K. (2008). A multi-component social skills intervention for children with Asperger syndrome: The junior detective training program. *Journal of Child Psychology and Psychiatry, 49*(7), 743-753.

Beaumont, R., Rotolone, C., & Sofronoff, K. (2015). The Secret Agent Society Social Skills Program for Children with High-Functioning Autism Spectrum Disorders: A Comparison of Two School Variants. *Psychology in the Schools, 52*(4), 390–402

Belek, B. (2019). Articulating sensory sensitivity: From bodies with autism to autistic bodies. *Medical Anthropology*, *38*(1), 30-43.

Berkman, E. T., Livingston, J. L., & Kahn, L. E. (2017). Finding the "self" in self-regulation: The identity-value model. *Psychological Inquiry, 28*(2-3), 77-98.

Berkovits, L., Eisenhower, A., & Blacher, J. (2017). Emotion regulation in young children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 47*, 68-79.

Bhatta, T. P. (2018). Case study research, philosophical position and theory building: A methodological discussion. *Dhaulagiri Journal of Sociology and Anthropology, 12,* 72-79.

Bhattacharya, K. (2017). *Fundamentals of qualitative research: A practical guide.* Routledge, Taylor & Francis Group.

Bibi, H., & Shabir, M. M. (2022). A critique of research paradigms and their implications for qualitative, quantitative and mixed research methods. *Webology*, *19*(2), 7321-7335.

Binns, A. (2019). Applying a Self-Regulation and Communication Framework to Autism Intervention. *Autism & Developmental Disorders, 17*(2), 34–45.

Binns, A.V., Hutchinson, L.R. & Cardy, J.O., (2019). The speech-language pathologist's role in supporting the development of self-regulation: A review and tutorial. *Journal of communication disorders, 78,* 1-17.

Black, K. R., Lai, M. C., Desrocher, M. E., Lee, V., Sellitto, T., Vashi, N., & Weiss, J. A. (2023). A coping subscale for autistic children: Revisiting the dimensionality of the emotion regulation and social skills questionnaire. *Research in Autism Spectrum Disorders*, *105*, 102167.

Blanc, M., Blackwell, A., & Elias, P. (2023). Using the Natural Language Acquisition Protocol to Support Gestalt Language Development. *Perspectives of the ASHA Special Interest Groups*, 1-8.

Bölte, S. (2022). A more holistic approach to autism using the International Classification of Functioning: The why, what, and how of functioning. *Autism,* 13623613221136444.

Botha, M., & Cage, E. (2022). "Autism research is in crisis": A mixed method study of researcher's constructions of autistic people and autism research. *Frontiers in Psychology, 13,* 7397.

Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners.* London: Sage Publishers.

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis?. *Qualitative Research in Psychology, 18*(3), 328-352.

Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative Psychology, 9*, 3-26.

Brock, M. E., Dynia, J. M., Dueker, S. A., & Barczak, M. A. (2020). Teacher-reported priorities and practices for students with autism: Characterizing the research-to-practice gap. *Focus on Autism and Other Developmental Disabilities, 35*(2), 67-78.

Bronfenbrenner., E. (1979). *The Ecology of Human Development: Experiments by Nature and Design. Cambridge.* Massachusetts: Harvard University Press.

Brown, M. F. (2020). *The Third Teacher: An analysis of aesthetic and intentionality of space in the classroom. Senior Honors Projects, 2020-Current. 32.* https://commons.lib.jmu.edu/honors202029/32

Butterworth, T. W., Hodge, M. A. R., Sofronoff, K., Beaumont, R., Gray, K. M., Roberts, J., & Einfeld, S. L. (2014). Validation of the emotion regulation and social skills questionnaire for young people with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 44*, 1535-1545.

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity, 56*(3), 1391-1412.

Cantor, P., Osher, D., Berg, J., Steyer, L. & Rose, T., 2019. Malleability, plasticity, and individuality: How children learn and develop in context1. *Applied Developmental Science, 23*(4), 307-337.

Carmona-Serrano, N., López-Belmonte, J., Cuesta-Gómez, J. L., & Moreno-Guerrero, A. J. (2020). Documentary analysis of the scientific literature on autism and technology in Web of Science. *Brain sciences, 10*(12), 985.

Carron, P. (2014). *A case for virtue: Aristotle's psychology and contemporary accounts of emotion regulation.* https://philpapers.org/rec/CARACF-5.

Carter, C. V., & Brady, K. (2016). *Parent report of group outcomes (PROGO).* Unpublished manuscript.

Carver, C. S., & Scheier, M. F. (2012). Cybernetic control processes and the self-regulation of behavior. *The Oxford Handbook of Human Motivation,* 28-42.

Charitaki, G., Soulis, S. G., & Tyropoli, R. (2021). Academic Self-Regulation in Autism Spectrum Disorder: A Principal Components Analysis. *International Journal of Disability, Development and Education, 68*(1), 26-45.

Chellappa, S. L. (2023). Neuroaffirming services for autistic people. *The Lancet Psychiatry, 11*(2), 96-97.

Children's Rights Alliance. (2022). *Children's Rights Alliance welcomes Review of Out of School Education Provision and urges Department to act on recommendations without delay.* https://www.childrensrights.ie/resources/press-release-children's-rights-10

Choi, L., & An, J. Y. (2021). Genetic architecture of autism spectrum disorder: Lessons from large-scale genomic studies. *Neuroscience & Biobehavioral Reviews, 128,* 244-257.

City College of New York. (2009). Children with autism need to be taught in smaller groups, experts argue. *ScienceDaily*. www.sciencedaily.com/releases/2009/07/090702110457.htm

Cole, P. M., Ram, N., & English, M. S. (2019). Toward a unifying model of self-regulation: A developmental approach. *Child Development Perspectives, 13*(2), 91-96.

Conklin M., Jairam D. (2021). The effects of co-teaching zones of regulation on elementary students' social, emotional, and academic risk behaviors. *Advanced Journal of Social Science, 8*, 171–192. https://doi-org.libraryproxy.mic.ul.ie/10.21467/ajss.8.1.171-192

Costescu, C. A., Vanderborght, B., & David, D. O. (2017). Robot-enhanced CBT for dysfunctional emotions in social situations for children with ASD. *Journal of Evidence-Based Psychotherapies*, *17*(2), 119-132.

Crooke, P. J., Winner, M. G., & Olswang, L. B. (2016). Thinking socially. *Topics in Language Disorders*, *36*(3), 284-298.

Crooke, P. & Garcia, M. (2021). *Research to Frameworks to Practice: The Social Thinking Methodology-Layers of Evidence.* https://www.socialthinking.com/Articles?name=social-thinking-where-is-the-evidence

Daly, P., Ring, E., Egan, M., Fitzgerald, J., Griffin, C., Long, S., Mc Carthy, E., Moloney, M., O' Brien, T., O'Brien, A., O'Sullivan, S., Ryan, M., Wall, E., Madden, R., Gibbons, S. (2016) *An Evaluation of Education Provision for Students with Autism Spectrum Disorder in Ireland: Research Report No. 21.* http://ncse.ie/wp-content/uploads/2016/07/5_NCSE-Education-Provision-ASD-Students- No21.pdf

de Giambattista, C., Ventura, P., Trerotoli, P., Margari, M., Palumbi, R., & Margari, L. (2019). Subtyping the autism spectrum disorder: comparison of children with high functioning autism and Asperger syndrome. *Journal of Autism and Developmental Disorders, 49*, 138-150.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour.* New York: Plenum.

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology, 49*(3), 182.

Delaney, B. (2020). *Trauma-Informed Approaches in Schools: The Efficacy of the 'Trauma-Sensitive Schools Training Package.* [Unpublished doctoral thesis]. Mary Immaculate College.

Delimata, N. & Bryne, D. (2023). *Exploring the School Experiences of Autistic Children and Young People.* https://asiam.ie/wp-content/uploads/2023/10/Exploring-the-school-experiences-of-Autistic-Children-and-Young-People.pdf

Department of Education and Science (DES). (1993). *Report of the Special Education Review Committee (SERC).* Dublin: The Stationery Office.

Department of Education and Skills (DES). (2017). *Guidelines for primary schools: supporting pupils with special educational needs in mainstream schools.* Dublin: Government Publications.

Department of Education and Skills. (2020). *Educational provision for learners with autism spectrum disorders in special classes attached to mainstream schools in Ireland.* http://edepositireland.ie/bitstream/handle/2262/94102/education-provision-for-learners-with-autism-spectrum-disorder.pdf?sequence=1&isAllowed=y

Department of Education. (2023). *Statement of strategy 2023-2025.* https://www.gov.ie/en/organisation-information/78529-department-of-education-statement-of-strategy/

Dhivyadeepa, E. (2015). *Sampling techniques in educational research*. India: Laxmi Book Publication.

Doherty. M., McCowan S, Shaw. S. (2023). Autistic SPACE: a novel framework for meeting the needs of autistic people in healthcare settings. *Br J Hosp Med.* https://doi.org/10.12968/hmed.2023.0006

Dublin City University. (2023). *Autism-friendly schools project.* https://www.dcu.ie/instituteofeducation/autism-friendly-schools-project

Duckworth, A. L., Gendler, T. S., & Gross, J. J. (2016). Situational strategies for self-control. *Perspectives on Psychological Science, 11*, 35-55.

Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., & Schellinger, K.B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82,* 405-432.

Evans, B. (2013). How autism became autism: The radical transformation of a central concept of child development in Britain. *History of the Human Sciences, 26*(3), 3-31.

Felepchuk, E. (2021). Stimming, improvisation, and COVID-19:(Re) negotiating autistic sensory regulation during a pandemic. *Disability Studies Quarterly, 41*(3).

Florian, L. (2014). What counts as evidence of inclusive education? *European Journal of Special Needs Education, 29*(3), 286-294.

Flynn, N., Murray, C., Forkan, C., & Kealy, C. (2022). Coping with the 'new (ab) normal in school: An EMA study of youth coping with the return to in-person education during the COVID-19 pandemic. *Irish Educational Studies,* 1-19.

Gerring, J. (2016). *Case study research: Principles and practices.* Cambridge University Press.

Gioia, G. A., Isquith, P. K., Retzlaff, P. D., & Espy, K. A. (2002). Confirmatory factor analysis of the behaviour rating inventory of executive function (BRIEF) in a clinical sample. *Child Neuropsychology, 8*(4), 249–257.

Golt, J., & Kana, R. K. (2022). History of autism. *Neuroscience of Autism*, 1-14.

Gough, D. (2007). Weight of evidence: a framework for the appraisal of the quality and relevance of evidence. *Research Papers in Education, 22*(2), 213-228.

Government of Ireland (1998). *The Education Act.* Dublin: Government Publications

Government of Ireland (2004). *The Education for Persons with Special Educational Needs (EPSEN) Act*. Dublin: Government Publications

Government of Ireland. (2000). *Equal Status Act.* Dublin: The Stationary Office.

Government of Ireland. (2001). *The Report of the Task Force on Autism.* Dublin: Government

Government of Ireland. (2018). *Estimating Prevalence of Autism Spectrum Disorders (ASD) in the Irish Population: A review of data sources and epidemiological studies.* https://assets.gov.ie/10707/ce1ca48714424c0ba4bb4c0ae2e510b2.pdf

Government of Ireland. (2020). *Information on Staffing, Supports and Grants to Primary and Post Primary Schools on Setting up a New ASD Class (Including an Early Intervention Class).* https://www.gov.ie/en/publication/07bda-new-asd-classes-staffing-supports-and-grants-information/

Government of Ireland. (2022a). *Education (Provision in Respect of Children with Special Educational Needs) Act 2022.* https://www.oireachtas.ie/en/bills/bill/2022/67/

Government of Ireland. (2022b). *Autism Good Practice Guidance for Schools: Supporting Children and Young People.* https://www.gov.ie/en/publication/8d539-autism-good-practice-guidance-for-schools-supporting-children-and-young-people/

Government of Ireland. (2022c). *School Inclusion Model Group.* https://www.gov.ie/en/organisation-information/school-inclusion-model-group/

Government of Ireland. (2023). *Autism Innovation Strategy: Analysis of Initial Public Consultation Submissions.* https://aim.gov.ie/app/uploads/2023/04/Autism-Innovation-Strategy-Report-April-2023.pdf

Gross, J. J. (2008). Emotion regulation. *Handbook of emotions, 3*(3), 497-513.

Gross, J.J., & Thompson, R.A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 3–24). New York, NY: Guilford Press.

Ha, V. S., & Whittaker, A. (2016). 'Closer to my world': Children with autism spectrum disorder tell their stories through photovoice. *Global Public Health, 11*(5-6), 546-563.

Harvey, C. (2018). *Difference Not Disorder: Understanding Autism Theory in Practice. London*: Jessica Kingsley Publishers.

Health Service Executive. (2018). *Report of the Review of the Irish Health Services for Individuals with Autism Spectrum Disorders.* https://assets.gov.ie/10708/33f312f0421443bc967f4a5f7554b0dd.pdf

Higgins, E., Slattery, C., Perry, J. L., & O'Shea, J. (2019). An evaluation of a group CBT programme for children with a diagnosis of autism spectrum disorder in a school-age disability service. *Educational Psychology in Practice, 35*, 50-66.

Hofmann, W., Friese, M., & Strack, F. (2009). Impulse and self-control from a dual-systems perspective. *Perspectives on Psychological Science, 4*(2), 162-176.

Howe, C., & Griffin, C. (2020). Is Ireland at a crossroads of inclusive education?. *REACH: Journal of Inclusive Education in Ireland*, *33*, 44-56.

Hume K., Steinbrenner J., Odom S., Morin K., Nowell, S., Tomaszewski B., Szendrey S., McIntyre N., Yücesoy-Özkan S., Savage M. N. (2021). Evidence-based practices for children, youth, and young adults with autism: Third generation review. *Journal of Autism Developmental Disorders*, *51*, 4013–4032.

Hutchinson, L. R., Perry, N. E., & Shapka, J. D. (2021). Assessing young children's self-regulation in school contexts. *Assessment in Education: Principles, Policy & Practice, 28*(5-6), 545-583.

Inzlicht, M., Werner, K. M., Briskin, J. L., & Roberts, B. W. (2021). Integrating models of self-regulation. *Annual Review of Psychology, 72*, 319-345.

Irish Human Rights and Equality Commission. (2023). *Submission on the review of the Education for Persons with Special Educational Needs ('EPSEN') Act 2004.* https://www.ihrec.ie/documents/submission-on-the-review-of-the-education-for-persons-with-special-educational-needs-epsen-act-2004/#:~:text=The%20Department%20of%20Education%27s%20review,the%20Rights%20of%20Persons%20with

Irish National Teachers' Organisation. (2022). *Department confirms existence of supersized classes in every county.* https://www.into.ie/2022/08/23/department-confirms-existence-of-supersized-classes-in-every-county/

Jacobson, N. S., & Truax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. In A. E. Kazdin (Ed.), *Methodological issues & strategies in clinical research* (pp. 631–648). American Psychological Association. https://doi.org/10.1037/10109-042

Jahromi, L. B., Bryce, C. I., & Swanson, J. (2013). The importance of self-regulation for the school and peer engagement of children with high-functioning autism. *Research in Autism Spectrum Disorders, 7(*2), 235-246.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child, 2*(3), 217-250.

Kapp, S. K. (2023). Profound Concerns about "Profound Autism": Dangers of Severity Scales and Functioning Labels for Support Needs. *Education Sciences, 13*(2), 106.

Karoly, P. (2010). Goal systems and self-regulation: An individual differences perspective. *Handbook of Personality and Self-regulation*, 218-242.

Kasari, C., Rotheram-Fuller, E., Locke, J., & Gulsrud, A. (2012). Making the connection: Randomized controlled trial of social skills at school for children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry, 53(*4), 431-439.

Kellems, R. O., Charlton, C., Kversøy, K. S., & Győri, M. (2020). Exploring the use of virtual characters (avatars), live animation, and augmented reality to teach social skills to individuals with autism. *Multimodal Technologies and Interaction, 4*(3), 48.

Khogeer, A. A., AboMansour, I. S., & Mohammed, D. A. (2022). The Role of Genetics, Epigenetics, and the Environment in ASD: A Mini Review. *Epigenomes, 6*(2), 15.

Kopp, C. B. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology, 18*(2), 199-214.

Kriescher, S. L., Hulac, D. M., Ryan, A. M., & King, B. L. (2023). Evaluating the evidence for fidget toys in the classroom. *Intervention in School and Clinic, 59*(1), 66-69.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2018). A theory of goal systems. *The Motivated Mind,* 207-250.

Kuypers, L. (2023a). What is regulation? https://zonesofregulation.com/3380-2/

Kuypers, L. (2023b). Building Strong Bonds with a Morning Ritual Using a Zones of Regulation Check-In. https://zonesofregulation.com/part-3-of-3-building-strong-bonds-with-a-morning-ritual-using-a-zones-of-regulation-check-in/

Kuypers, L.M. (2011). *The Zones of Regulation ®: A curriculum designed to foster self-regulation and emotional control.* San Jose, CA: Social Thinking Publishing.

Lalor, A. (2020). *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*. [Doctoral Dissertation, Mary Immaculate College]. Mary Immaculate Research Repository.

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.

Lendrum, A., Humphrey, N., & Wigelsworth, M. (2013). Social and emotional aspects of learning (SEAL) for secondary schools: Implementation difficulties and their implications for school-based mental health promotion. *Child and Adolescent Mental Health, 18*(3), 158-164.

Lopata, C., Thomeer, M. L., Volker, M. A., Lee, G. K., Smith, T. H., Smith, R. A., & Toomey, J. A. (2012). Feasibility and initial efficacy of a comprehensive school-based intervention for high-functioning autism spectrum disorders. *Psychology in the Schools, 49*(10), 963-974.

Lord, C., Charman, T., Havdahl, A., Carbone, P., Anagnostou, E., Boyd, B., & McCauley, J. B. (2022). The Lancet Commission on the future of care and clinical research in autism. *The Lancet, 399*(10321), 271-334.

Love, J.S. (2018). Sensory Spaces: Sensory Learning-An Experimental Approach to Education Our Future Designers to Design Autism Schools. *ArchNet-It-Jar: International Journal of Architectural Research, 12*(3), DOI: https://doi.org/10.26687/archnet-ijar.v12i3.1704

Luyster, R. J., Zane, E., & Wisman Weil, L. (2022). Conventions for unconventional language: Revisiting a framework for spoken language features in autism. *Autism & Developmental Language Impairments, 7*, 23969415221105472.

MacGiolla Phádraig, B. (2007). Towards Inclusion: The Development of Provision for Children with Special Educational Needs in Ireland from 1991 to 2004. *Irish Educational Studies, 26*(3), 289-300.

MacLennan, K., Woolley, C., Heasman, B., Starns, J., George, B., & Manning, C. (2023). "It is a big spider web of things": Sensory experiences of autistic adults in public spaces. Autism in Adulthood. *Autism in Adulthood, 5*(4), 411-422.

Magill-Evans, J., Koning, C., Cameron-Sadava, A., & Manyk, K. (1995). The child

Manning, C., Williams, G., & MacLennan, K. (2023). Sensory-inclusive spaces for autistic people: We need to build the evidence base. *Autism, 27*(6), 1511-1515.

Manning, J., Billian, J., Matson, J., Allen, C., & Soares, N. (2021). Perceptions of families of individuals with autism spectrum disorder during the COVID-19 crisis. *Journal of Autism and Developmental Disorders, 51*(8), 2920-2928.

Martin, C.S. (2016). Exploring the impact of the design of the physical classroom environment on young children with autism spectrum disorder (ASD). *Journal of Research in Special Educational Needs, 16(*4), 280-298.

Mason, B. K., Leaf, J. B., & Gerhardt, P. F. (2023). A Research Review of the Zones of Regulation Program. *The Journal of Special Education, 57*(4), 219-229.

McClelland, M. M., Cameron, C. E., & Dahlgren, J. (2019). The Development of Self-Regulation in Young Children. *Grantee Submission*. https://eric.ed.gov/?id=ED623283

Mesibov, G. B., & Shea, V. (2010). The TEACCH program in the era of evidence-based practice. *Journal of Autism and Developmental Disorders, 40*, 570-579.

Mesibov, G. B., Shea, V., & Schopler, E. (2005). *The TEACCH approach to autism spectrum disorders.* Springer Science & Business Media.

Middletown Centre for Autism. (2023). *What is autism?* https://best-practice.middletownautism.com/what-is-autism/

Middletown Centre for Autism. (n.d.). *Sensory audit for schools and classrooms*. https://sensory-processing.middletownautism.com/sensory-strategies/sensory-audit-for-school-and-classrooms/

Montessori Academy. (2023). *The prepared environment.* https://montessoriacademy.com.au/montessori-education/prepared-environment/

Morawska, A., & Sanders, M. R. (2010). *The child adjustment and parent efficacy scale (CAPES).* Brisbane: Parenting and Family Support Centre.

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry, 20*(8), 1045-1053.

Morgan, L., Hooker, J. L., Sparapani, N., Reinhardt, V. P., Schatschneider, C., & Wetherby, A. M. (2018). Cluster randomized trial of the classroom SCERTS intervention for elementary students with autism spectrum disorder. *Journal of Consulting and Clinical Psychology, 86*(7), 631.

Morris, P. O., Hope, E., Foulsham, T., & Mills, J. P. (2021). Parent-reported social-communication changes in children diagnosed with autism spectrum disorder during the COVID-19 pandemic in the UK. *International Journal of Developmental Disabilities,* 1-15.

Müller, E., & Donley, C. (2019). Measuring the impact of a school-based, integrative approach to play therapy on students with autism and their classroom instructors. *International Journal of Play Therapy*, *28*(3), 123.

Muratori, F., Calderoni, S., & Bizzari, V. (2021). George Frankl: An undervalued voice in the history of autism. *European Child & Adolescent Psychiatry, 30*(8), 1273-1280.

Murphy, M., Thompson, S., Doyle, D. M., & Ferri, D. (2023). Inclusive education and the law in Ireland. *International Journal of Law in Context, 19(*2), 101-121.

National Council for Special Education. (2015). *Supporting Students with Autism Spectrum Disorders In Schools*. https://ncse.ie/wp-content/uploads/2016/07/1_NCSE-Supporting-Students-ASD-Schools.pdf

National Council for Special Education. (2016). *Guidelines for Setting up and Organising Special Classes for Boards Of Management and Principals of Primary and Post-Primary Schools.* http://ncse.ie/wp-content/uploads/2016/08/NCSE-Guides-Special-Classes.pdf

National Council for Special Education. (2019). *Policy advice on Special Schools And Classes: An Inclusive Education for an Inclusive Society?* https://ncse.ie/wp-content/uploads/2019/11/Progress-Report-Policy-Advice-on-Special-Schools-Classes-website- upload.pdf

National Council for Special Education. (2024). *An Inclusive Education for an Inclusive Society: Policy Advice Paper on Special Schools and Classes.* https://ncse.ie/wp-content/uploads/2024/01/Inclusive-Education-for-an-Inclusive-Society.pdf

National Disability Authority. (2022). *Overview of UNCRPD Article 24 in Ireland: Education.* https://nda.ie/education#:~:text=Education%20and%20UNCRPD,-The%20UN%20Convention&text=Article%2024%20states%20that%3A,communities%20in%20which%20they%20live

National Educational Psychological Service. (2007). *Special Educational Needs: A Continuum of Support*. https://assets.gov.ie/40642/674c98d5e72d48b7975f60895b4e8c9a.pdf

Natri, H. M., Abubakare, O., Asasumasu, K., Basargekar, A., Beaud, F., Botha, M., & Zisk, A. H. (2023). Anti-ableist language is fully compatible with high-quality autism research: Response to Singer et al.(2023). *Autism Research, 16*(4), 673-676.

Nigg, J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking, and inhibition for developmental psychopathology. *Journal of Child Psychology and Psychiatry, 58*(4), 361-383.

Noddings, A. (2017a). Supporting sensory-sensitive children in a sensory-intensive world. *Montessori Life, 29,* https://amshq.org/About-Montessori/Montessori-Articles/All-Articles/Supporting-Sensory-Sensitive-Children-in-a-Sensory-Intensive-World

Noddings, A. (2017b). Classroom solutions for sensory-sensitive students. *Montessori Life, 29*(2), 45.

Norwich, B. (2016). Conceptualizing special educational needs using a biopsychosocial model in England: The prospects and challenges of using the international classification of functioning

framework. *Frontiers in Education, 1*(5), https://www.frontiersin.org/articles/10.3389/feduc.2016.00005/full

Nowell, S. W., Watson, L. R., Boyd, B., & Klinger, L. G. (2019). Efficacy study of a social communication and self-regulation intervention for school-age children with autism spectrum disorder: A randomized controlled trial. *Language, Speech, and Hearing Services in Schools, 50*(3), 416-433.

Nuske, H.J., Pellecchia, M., Kane, C., Seidman, M., Maddox, B.B., Freeman, L.M., Rump, K., Reisinger, E.M., Xie, M. & Mandell, D.S., (2020). Self-regulation is bi-directionally associated with cognitive development in children with autism. *Journal of Applied Developmental Psychology, 68*, p.101139.

Nuske, H.J., Shih, W.I., Sparapani, N., Baczewski, L., Dimachkie Nunnally, A., Hochheimer, S., Garcia, C., Castellon, F., Levato, L., Fischer, E. & Atkinson-Diaz, Z.L. (2021). Self-regulation predicts companionship in children with autism. *International Journal of Developmental Disabilities,* 1-11.

O'Brien, P. (2018). Self-determination for primary school children: Theory and practice. *REACH: Journal of Inclusive Education in Ireland, 31*(2), 155-168.

O' Rourke, L. (2023). Exploring the origin of the term Autism. *Irish Psychiatry.* https://irishpsychiatry.ie/blog/the-origin-of-autism-terminology/

O'Leary, S., & Moloney, M. (2020). Understanding the experiences of young children on the autism spectrum as they navigate the Irish early years' education system: Valuing voices in child-centred narratives. *International Journal of Qualitative Methods, 19,* https://doi.org/10.1177/1609406920914696

Oireachtas. (2023). *Final Report of the Joint Committee On Autism.* https://data.oireachtas.ie/ie/oireachtas/committee/dail/33/joint_committee_on_autism/reports/2023/2023-06-14_final-report-of-the-joint-committee-on-autism_en.pdf

Organisation for Economic Co-operation and Development. (2011). *Inclusion of students with disabilities in tertiary education and employment.* Paris: Organisation for Economic Cooperation and Development.

Organisation for Economic Co-operation and Development. (2018). *Social and Emotional Skills: Well-Being Connectedness and Success.* http://www.oecd.org/education/school/UPDATED%20Social%20and%20Emotional%20Skills%20-%20Well-being,%20connectedness%20and%20success.pdf%20(website).pdf

Positive About Autism. (n.d.). *Positive Sensory Plan.* https://positiveaboutautism.co.uk/uploads/9/7/4/5/97454370/positive_sensory_plan_updated_2018_.pdf

Prizant, B. M. (1982). Gestalt language and gestalt processing in autism. *Topics in Language Disorders, 3,* 16-23.

Prizzant, B. (2012). Questions on emotional regulation. *Middletown Centre for Autism Research Bulletin on Autism and Emotional Regulation.* https://www.middletownautism.com/research/research-bulletins?page=4

Prizzant, B. Wetherby, A., Rubin, E., & Laurent, A. (2014). *The SCERTS Model.* https://scerts.com/wp-content/uploads/SCERTS_2pg_3_16.pdf

Quale. (2019). *Effectiveness of Components of the Zones of Regulation on Student Behaviours.* [Masters Dissertation, Minot State University]. ProQuest Dissertations. https://www.proquest.com/docview/2306303699?pq-origsite=gscholar&fromopenview=true&sourcetype=Dissertations%20&%20Theses

Raghunathan, R. S., Musci, R. J., Knudsen, N., & Johnson, S. B. (2023). What children do while they wait: The role of self-control strategies in delaying gratification. *Journal of Experimental Child Psychology, 226,* 105576-105576. https://doi.org/10.1016/j.jecp.2022.105576

Rose, R., & Shevlin, M. (2020). Support provision for students with special educational needs in Irish primary schools. *Journal of Research in Special Educational Needs, 20*, 51-63.

Rosen, N. E., Lord, C., & Volkmar, F. R. (2021). The diagnosis of autism: from Kanner to DSM-III to DSM-5 and beyond. *Journal of Autism and Developmental Disorders, 51*, 4253-4270.

Roth, G., Vansteenkiste, M., & Ryan, R. M. (2019). Integrative emotion regulation: Process and development from a self-determination theory perspective. *Development and Psychopathology, 31*(3), 945-956.

Salter, K., Beamish, W., & Davies, M. (2016). The effects of child-centred play therapy (CCPT) on the social and emotional growth of young Australian children with autism. *International Journal of Play Therapy, 25*(2), 78–90

Samson, A. C., Huber, O. & Gross, J. J. (2012). Emotion Regulation in Asperger's Syndrome and High-Functioning Autism. *American Psychological Association, 12* (4), 659-665.

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.

Schulze, J., Winter, L. A., Woods, K., & Tyldesley, K. (2017). Investigating the significance of social justice in educational psychology practice—A systematic literature review. *Educational and Child Psychology, 34*(3), 57-73.

Schunk, D. H. (2012). Social cognitive theory. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA educational psychology handbook, theories, constructs, and critical issues* (pp. 101–123). American Psychological Association. https://doi-org.libraryproxy.mic.ul.ie/10.1037/13273-005

Scionti, N., Luzi, G., Zampini, L., & Marzocchi, G. M. (2023). Identifying children with self-regulation problems: Factorial structure and psychometric properties of the QUVA-p, a screening tool for preschool teachers. *European Journal of Psychological Assessment: Official Organ of the European Association of Psychological Assessment, 39*(2), 106-113. https://doi.org/10.1027/1015-5759/a000706

Scott, F. J., Baron-Cohen, S., Bolton, P., & Brayne, C. (2002). The CAST (Childhood Asperger Syndrome Test) Preliminary development of a UK screen for mainstream primary-school-age children. *Autism, 6*, 9-31.

Shah, S. S., Shah, A. A., & Khaskhell, N. (2018). Pragmatism research paradigm: a philosophical framework of advocating methodological pluralism in social science research. *Journal of Grassroot, 52*(1). https://www.prdb.pk/article/pragmatism-research-paradigm-a-philosophical-framework-of-a-3709

Shanker, S., (2013). *Calm, Alert, and Learning: Classroom Strategies for Self-Regulation.* Don Mills, ON: Pearson.

Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology, 33(6)*, 906 -916.

Silva, L.M. & Schalock, M., 2012. Sense and self-regulation checklist, a measure of comorbid autism symptoms: initial psychometric evidence. *American Journal of Occupational Therapy, 66*(2), 177-186.

Soares, E. E., Bausback, K., Beard, C. L., Higinbotham, M., Bunge, E. L., & Gengoux, G. W. (2021). Social skills training for autism spectrum disorder: A meta-analysis of in-person and technological interventions. *Journal of Technology in Behavioral Science*, *6*, 166-180.

Social Thinking Evidence. (n.d.). *A Methodology to Infuse Evidence-Based Practices.* https://www.socialthinking.com/evidence

Sofronoff, K., Attwood, T., Hinton, S., & Levin, I. (2007). A randomized controlled trial of a cognitive behavioural intervention for anger management in children diagnosed with Asperger syndrome. *Journal of Autism and Developmental Disorders, 37*(7), 1203-1214.

Sofronoff, K., Silva, J., & Beaumont, R. (2017). The Secret Agent Society Social-Emotional Skills Program for Children with a High-Functioning Autism Spectrum Disorder: A Parent-Directed Trial. *Focus on Autism and Other Developmental Disabilities, 32*, 55–70.

Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behaviour Research and Therapy, 36*(5), 545-566.

Strong-Wilson, T., & Ellis, J. (2007). Children and place: Reggio Emilia's environment as the third teacher. *Theory into practice, 46*, 40-47.

Sudarsan, I., Hoare, K., Sheridan, N., & Roberts, J. (2022). Giving voice to children in research: The power of child-centered constructivist grounded theory methodology. *Research in Nursing & Health, 45*(4), 488-497

Swan, D. (2000). From exclusion to inclusion. *Frontline Magazine.* http://frontline-ireland.com/from- exclusion-to-inclusion/

Swanborn, P. (2010). *Case study research: what, why and how?.* Sage: London.

Sweeney, E. & Fitzgerald, J. (2023). Supporting autistic pupils in primary schools in Ireland: Are autism special classes a model of inclusion or isolation? *Disabilities, 3*(3). https://doi.org/10.3390/disabilities3030025

Talking Mats. (n.d.). *What is a talking mat?* https://www.talkingmats.com/about/what-is-a-talking-mat/

Tan, Y. L., Mazzucchelli, T. G., & Beaumont, R. (2015). An evaluation of individually delivered secret agent society social skills program for children with high-functioning autism spectrum disorders: A pilot study. *Behaviour Change*, *32*(3), 159-174.

Thomson, K., Burnham Riosa, P., & 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*, 3487-3495.

Tiernan, B. (2022). Inclusion versus full inclusion: implications for progressing inclusive education. *European Journal of Special Needs Education, 37*(5), 882-890.

Travers, J. (2023). Special class provision in Ireland: Where we have come from and where we might go. *Education Sciences*, *13*(9), 859.

United Nations Education Scientific and Cultural Organisation. (2017). *A guide for ensuring inclusion and equity in education*. Paris, France: United Nations Education Scientific and Cultural Organisation.

United Nations Education Scientific and Cultural Organisation. (2022). *Setting Commitments: National SDG 4 Benchmarks to Transform Education.* https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmarcdef_0000382076&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_e9f2429d-cb86-4ebf-93dd-80fbf9db423c%3F_%3D382076eng.pdf&locale=en&multi=true&ark=/ark:/48223/pf0000382076/PDF/382076eng.pdf#p101

United Nations Educational, Scientific and Cultural Organisation (UNESCO). (1994). *The Salamanca Statement and Framework For Action*. Spain: Ministry of Education and Science.

United Nations. (2006). *Convention on the Rights Of Persons With Disabilities*. Geneva: United Nations.

United Nations. (2016). *Report of the Committee on the Rights of Persons with Disabilities.* https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/114/97/PDF/G1711497.pdf?OpenElement

Unwin, K. L., Powell, G., & Jones, C. R. (2021). A sequential mixed-methods approach to exploring the experiences of practitioners who have worked in multi-sensory environments with autistic children. *Research in Developmental Disabilities, 118*, 104061.

Unwin, K. L., Powell, G., & Jones, C. R. (2022). The use of Multi-Sensory Environments with autistic children: Exploring the effect of having control of sensory changes. *Autism, 26*(6), 1379-1394.

Usher, E. L., & Schunk, D. H. (2017). Social cognitive theoretical perspective of self-regulation. In *Handbook of self-regulation of learning and performance* (pp. 19-35). Routledge.

Valencia, K., Rusu, C., Quiñones, D., & Jamet, E. (2019). The impact of technology on people with autism spectrum disorder: a systematic literature review. *Sensors, 19*(20), 4485.

Van't Hof, M., Tisseur, C., van Berckelear-Onnes, I., van Nieuwenhuyzen, A., Daniels, A. M., Deen, M.,& Ester, W. A. (2021). Age at autism spectrum disorder diagnosis: A systematic review and meta-analysis from 2012 to 2019. *Autism, 25*(4), 862-873.

Volkmar, F. R., & McPartland, J. C. (2014). From Kanner to DSM-5: autism as an evolving diagnostic concept. *Annual Review of Clinical Psychology, 10,* 193-212.

Waltz, M. (2013). *Autism: A social and medical history.* London: Palgrave Macmilan.

Ware Balch, J., & Ray, D. C. (2015). Emotional assets of children with autism spectrum disorder: A single-case therapeutic outcome experiment. *Journal of Counselling & Development, 93*(4), 429-439.

Wass, S. V. (2023). Allostasis and metastasis: The yin and yang of childhood self-regulation. *Development and Psychopathology, 35*, 179-190.

Wechsler, D. (1999). *Wechsler abbreviated scale of intelligence.* New York, NY: The Psychological Corporation, Harcourt, Brace & Company.

Weiss, J. A., Thomson, K., Burnham Riosa, P., Albaum, C., Chan, V., Maughan, A., & Black, K. (2018). A randomized waitlist-controlled trial of cognitive behaviour therapy to improve emotion regulation in children with autism. *Journal of Child Psychology and Psychiatry, 59*(11), 1180-1191.

Westby, C. (2021). Screen time and children with autism spectrum disorder. *Folia Phoniatrica et Logopaedica, 73*(3), 233-240.

Wiener, N. (1948). *Cybernetics: Control and communication in the animal and the machine.* Cambridge, MA: MIT Press.

Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., & Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders, 45*(7), 1951-1966.

Woolner, P. (2011). Creating individualised optimal learning environments through participatory design. *Educational and Child Psychology, 28*, 9-19.

World Health Organisation. (2019). *Autism Spectrum Disorders.* https://applications.emro.who.int/docs/EMRPUB_leaflet_2019_mnh_215_en.pdf

World Health Organisation. (2023). *Autism: Key Facts*. https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders

World Health Organization. (2007). *International Classification of Functioning, Disability and Health: Children and Youth Version: ICF-CY.* https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health

World Health Organization. (2018). *The International Classification of Diseases, 11th edition* (ICD-11). Geneva, Switzerland: American College of Physicians.

Yin. (2009). *Case study research: designs and methods (4th ed).* London: Sage Publications.

Zeldovich, L. (2018). The evolution of ‘autism’ as a diagnosis, explained. *Spectrum News.* https://www.spectrumnews.org/news/evolution-autism-diagnosis-explained/

Zeman, J. L., Cassano, M., Suveg, C., & Shipman, K. (2010). Initial validation of the children’s worry management scale. *Journal of Child and Family Studies, 19*(4), 381-392.

Appendix A

Rationale for Exclusion of Studies

References	Rationale
Charitaki, G., Soulis, S.-G., & Tyropoli, R. (2021). Academic Self-Regulation in Autism Spectrum Disorder: A Principal Components Analysis. *International Journal of Disability, Development and Education, 68*, 26-45.	This study was excluded as this sample was correlational, involving a questionnaire for special educational teachers.
Laurent, A. C., & Gorman, K. (2018). Development of Emotion Self-Regulation among Young Children with Autism Spectrum Disorders: The Role of Parents. *Journal of Autism and Developmental Disorders, 48*(4), 1249-1260.	This study was excluded as the participants were less than school age and the study took part in the home environment only.
Leo, A. T., Camargo, S. P. H., & Frison, L. M. B. (2019). Communication of students with ASD: A self-regulation of learning based intervention. Psicologia: *Teoria e Prtica, 21*(3), 473-500.	This study was excluded after a screening of the abstract as the outcome measures did not concern self-regulation.
Ni, H.-C., Lin, H.-Y., Chen, Y.-C., Tseng, W.-Y. I., & Gau, S. S.-F. (2020). Boys with autism spectrum disorder have distinct cortical folding patterns underpinning impaired self-regulation: A surface-based morphometry study. *Brain Imaging and Behaviour, 1*4(6), 2464-2476.	This study was excluded after a screening of the abstract as this study is an examination of neural mechanisms of dysregulation in boys and is not an intervention study.
Ros, R., & Graziano, P. A. (2020). A transdiagnostic examination of self-regulation: Comparisons across pre-schoolers with ASD, ADHD, and typically developing	This study was excluded as participants were pre-schoolers.

children. *Journal of Clinical Child and Adolescent Psychology, 49(*4), 493-508.	
Garcia, N. (2006). Profiles of personality, emotional regulation, and adaptive functioning of adults with high-functioning autism spectrum disorders. *ProQuest Information & Learning].* APA PsycInfo.	This study was excluded as this is a correlational study.
Laurent, A. C., & Rubin, E. (2004). Challenges in Emotional Regulation in Asperger Syndrome and High-Functioning Autism. *Topics in Language Disorders, 24*(4), 286-O.	This study was excluded as this is a review article and the date is 2004 which is before the stated time period of the inclusion criteria.
Morie, K. P., Jackson, S., Zhai, Z. W., Potenza, M. N., & Dritschel, B. (2019). Mood Disorders in High-Functioning Autism: The Importance of Alexithymia and Emotional Regulation. *Journal of Autism and Developmental Disorders, 49*(7), 2935-2945.	This study was excluded as this study focuses on co-morbid features of emotional regulation difficulties and did not relate to the outcome measures of the inclusion criteria.
Power, E. M. (2017). Evaluating the effectiveness of biofeedback in improving emotional regulation for a student with autism spectrum disorder. *ProQuest Information & Learning.*	This study was excluded as the study focuses on a biofeedback technique rather than a taught emotional/ self-regulation intervention.
Cheung, P. P. P., Brown, T., Yu, M.-l., & Siu, A. M. H. (2021). The effectiveness of a school-based social cognitive intervention on the social participation of Chinese children with autism. *Journal of Autism and Developmental Disorders, 51(*6), 1894-1908.	This study was excluded as it did not contain a measure of self-regulation.
Cheung, P. P. P., Siu, A. M. H., Brown, T., & Yu, M.-l. (2018). A Social-Cognitive Intervention Program for Adolescents with Autism: A Pilot Study. *Journal of*	This study was excluded as the population was above the population for the current study.

Occupational Therapy, Schools & Early Intervention, 11, 37-48.	
Knight, M., & McCoy, B. (2018). *Understanding social cognition: Theory, perspectives and cultural differences.* Nova Science Publishers.	This study was excluded as this is a book.
Phoebe, C. P. P. (2018). Research evidence of social cognitive intervention: Implications for people with autism. In M. Knight & B. McCoy (Eds.), *Understanding social cognition: Theory, perspectives and cultural differences.* (pp. 31-58). Nova Science Publishers.	This study was excluded as this is a book.
Pinkham, A. E., & Harvey, P. D. (2013). Future directions for social cognitive interventions in schizophrenia. Schizophrenia Bulletin, 39(3), 499-500.	This study was excluded as the subject was schizophrenia rather than autism.
Ware, J. N. (2016). Play therapy for children with autism spectrum disorder: A single-case design. *In Dissertation Abstracts International: Section B: The Sciences and Engineering, 77.*	This study was excluded as it was not peer-reviewed.
Müller, E., & Donley, C. (2019). Measuring the impact of a school-based, integrative approach to play therapy on students with autism and their classroom instructors. *International Journal of Play Therapy, 28*(3), 123–132.	This study was excluded as it did not address the outcome measure.
Schottelkorb, A. A., Swan, K. L., & Ogawa, Y. (2020). Intensive child-centered play therapy for children on the autism spectrum: A pilot study. *Journal of Counselling & Development, 98),* 63–73.	This study was excluded as it did not address the outcome measure.
Salter, K., Beamish, W., & Davies, M. (2016). The effects of child-centred play therapy (CCPT) on the social and emotional growth of young Australian children with	This study was excluded as it did not address the outcome measure.

autism. *International Journal of Play Therapy, 25*(2), 78–90.	
Carrizales, K. E. (2016). Transcendence through play: Child-centered play therapy and young children with autism [ProQuest Information & Learning]. *In Dissertation Abstracts International Section A: Humanities and Social Sciences, 77.*	This study was excluded as it was not peer-reviewed.
Parent, V., Birtwell, K. B., Lambright, N., & DuBard, M. (2016). Combining CBT and Behavior-Analytic Approaches to Target Severe Emotion Dysregulation in Verbal Youth with ASD and ID. *Journal of Mental Health Research in Intellectual Disabilities, 9*(1–2), 60–82.	This study was excluded as one of the participants' was above 12 years old.

Appendix B

Weight of Evidence

Appraisal Framework for Weight of Evidence A, based on (Schulze et al., 2017)

1. Data Gathering

Criterion	Score (Total = 7)			Comment
Clear research question or hypothesis	1	0.5	0	
Appropriate process for participation/ item identification	1	0.5	0	
Appropriate data gathering method	1	0.5	0	
Comprehensive data gathering method	1	0.5	0	
Reduction of bias within participant recruitment/ item selection	1	0.5	0	
Response rate/ item elicitation maximised	1	0.5	0	
Population subgroup data collected (e.g. : participant gender; item context)	1	0.5	0	
High-Strong evidence (3)	Overall score of 5-7.			
Medium-Promising evidence (2)	Overall score of 3-4			
Low-Weak evidence (1)	Overall score of 0-2			

2. Data Analysis

Criterion	Score (Total = 5)			Comment
Missing data analysis	1	0.5	0	
Time trends identified	1	0.5	0	

Geographic considerations	1	0.5	0	
Appropriate statistical analyses (descriptive or inferential)	1	0.5	0	
Multi-level or inter-group analyses present	1	0.5	0	
High-Strong evidence (3)		Overall score of 4-5		
Medium-Promising evidence (2)		Overall score of 2-3		
Low-Weak evidence (1)		Overall score of 0-1		

3. Data Interpretation

Criterion	Score (Total = 5)			Comment
Clear criteria for rating of findings	1	0.5	0	
Limitations of the research considered in relation to initial aims	1	0.5	0	
Implications of findings linked to rationale of research question	1	0.5	0	
High-Strong evidence (3)		Overall score of 3		
Medium-Promising evidence (2)		Overall score of 2		
Low-Weak evidence (1)		Overall score of 0-1		

Criteria for Weight of Evidence B, C and D (Gough, 2007)

Weight of Evidence B (WoE B)

Weight of Evidence B (WOE-B) focuses on the fitness of the evidence for answering the review question (Gough, 2007). A 'high' rating was given to mixed-methods research

Weighting	Criteria
High (3 points)	Mixed-methods research Study outcomes were assessed at multiple points Case-study research The study takes place in a classroom environment with the classroom teacher and parents involved Data triangulation: the study has more than two measures of self-regulation from at least two different sources
Medium (2 points)	Qualitative or quantitative alone The study took place in the classroom but delivered by an external person Data triangulation: the study has at two measures of self-regulation from one source
Low (1 point)	The study takes place outside of a school environment Data triangulation: the study has at least one measure of self-regulation from one source

Weight of Evidence C (WoE C)

Weight of Evidence C (WOE-C) focuses on the relevance of the focus of evidence for the review question (Gough, 2007).

Weighting	Criteria
High	The outcome measures primarily focus on self-regulation in autistic children.
Medium	The outcome measures include an aspect of self-regulation of emotional-regulation
Low	The outcome measures refer to self-regulation or emotional-regulation but focus on another topic of interest

Weight of Evidence D (WoE D): Overall Weight of Evidence

Weight of Evidence D combines the three other criteria, WOE-A, WOE-B, and WOE-C, to create an overall average (Gough, 2007).

Weight Category	**Numerical Rating**
Low	1.6 or lower
Medium	1.7-2.4
High	2.5 or higher

Appendix C

Excerpt from Research Journal

28/07/2022: I am in the process of the literature review search. I notice that a lot of the results around ‘Cognitive Behavioural Therapy’ focus on anxiety outcomes. I wonder how this will affect my search for self-regulation outcomes.

Appendix D

School Principal Information Sheet

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Dear Principal,

I am writing to invite you and your school to participate in my research study. My name is Cora Howe. I am a post-graduate research student at Mary Immaculate College undertaking a masters by research in the Department of Educational Psychology, Inclusive and Special Education. This research project is supervised by Dr Claire Griffin. My research aims to explore an individualised self-regulation intervention for children on the autism spectrum. Self-regulation is important for children's academic, social and emotional needs. I would like to recruit children from a special class for children on the autism spectrum along with their class teacher and parents to partake in the study.

This research will aim to support independent self-regulation by using the Stress, Self-Regulation and Communication Framework. This framework offers a staged approach to supporting self-regulation, starting with co-regulation and moving towards developing independent self-regulation. The framework aims for the children to develop a personal toolbox of strategies to independently regulate their emotions and behaviour.

The research will start by supporting the class teacher and parents to help the children to co-regulate. This will involve the researcher providing strategies and resources to help recognise triggers and modify the child's environment as needed. The researcher will then support the class teacher to teach independent self-regulation skills, using the Zones of Regulation curriculum. The Zones of Regulation is a curriculum designed to help children to recognise their state of alertness by categorising them into four coloured zones. The Zones of Regulation lessons will comprise of six weekly one-hour self-regulation lessons. The researcher will provide the class teacher with lessons plans and resources to teach these lessons. The lessons will comprise of a warm-up, storytime, activity and wrap-up. Parents will also be provided with an overview of each lesson and activities they can do at home to further support their child's self-regulation.

What are the benefits and risks of this research?

The study is designed to help children to gain skills of self-regulation. This includes identifying triggers, selecting personal calming strategies and strategies to increase alertness in less-preferred activities. This can help children to engage in academic and social activities. The Zones of Regulation curriculum will additionally help the children to recognise and learn about their emotions and identify the facial expressions and emotions of others. The Zones of Regulation curriculum offers a common language and visuals that can be used at home and in school to help support the children's self-regulation.

There are no obvious risks to this study. However, the researcher will mitigate against potential risks in the study. The study will take place in the child's classroom and will be delivered by the class teacher to help the children to feel comfortable. The class teacher and parents will be provided with information before each session to help identify any risks for their children. Additionally, the class teacher and parents will be provided with strategies to support the children if they experience any negative feelings during the study including providing a safe place in the classroom, an alternative activity and supportive language to use with children.

What will teachers have to do?
As mentioned above, the teachers will teach the Zones of Regulation curriculum to their class. Teachers will also be asked to complete a short questionnaire at three stages in the study. Teachers will be invited to complete descriptions of the classroom environment and pupil's sensory profiles. Teachers will also be invited to take part in an interview at the end of the study.

What will parents have to do?
Parents will be provided with resources and ideas to support children's self-regulation at home, including visuals, Zones of Regulation language and ideas for self-regulation toolboxes at home. The parents will be provided with an overview of each session and ideas to further support the learning from each session at home. The parents will also be asked to complete a short questionnaire at three stages in the study and invited to participate in an interview at the end of the study.

What will students have to do?
The students will be asked to participate in lessons from the Zones of Regulation. The students will also be asked to complete one questionnaire about their emotional management at three stages in the study.

What happens if I want to withdraw from the project?
Participants have a right to withdraw at any stage of the project without a reason or consequence.

What if a child does not want to take part in the project?
If a child does not consent to taking part in the project or is unable to do so, a suitable activity will be chosen by the class teacher. This may comprise of an independent activity such as life skills, fine-motor work or a sensory activity. The researcher will provide the class teacher with examples and resources to choose from based on the child's interests and developmental stage.

Anonymity and Confidentiality

All information and data collected will be anonymised and stored securely. A random ID number will be generated for each participant to maintain anonymity. Paper data will be stored in a locked filing cabinet and soft data will be stored on a password protected computer file. In accordance with the MIC Record Retention Policy, all anonymised research data will be stored indefinitely.

How will information be used/ disseminated?

The results of this study will be used in the results section of my thesis project. Additionally, the data may be used for presenting findings at relevant conferences and in the process of publishing the study. The results will include anonymised questionnaire data and anonymised interview data.

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

16150368@micstudent.mic.ul.ie Cora Howe (Principal Researcher)

Claire.Griffin@mic.ul.ie Claire Griffin (Project Supervisor)

This research study has received Ethics approval from the Mary Immaculate College Research Ethics Committee (MIREC) (quote reference number when you have received it). If you have any concerns about this study and wish to contact an independent authority, you may contact:
Mary Collins, MIREC Administrator, Mary Immaculate College, Limerick
Telephone: 061-204980 E-mail: mirec@mic.ul.ie

Yours sincerely,

_____

Cora Howe (Post-Graduate Researcher)

Appendix E

School Principal Consent Form

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Informed Consent Form for the School Principal

- I have read and understand the Principal Information Letter outlining the nature of the research project.
- I understand what the project is about, and what the results will be used for
- I am fully aware of all of the procedures and of the risks and benefits associated with the study
- I know that my school's participation is voluntary and that I can withdraw from the project at any stage without giving any reason
- I am aware that all data arising from the research will be anonymised to ensure that the school and participants are not identifiable
- I consent for my school to participate in the research project.

Signed: _____ Date: _____

Print Name:

Appendix F

Class Teacher Information Sheet

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Dear teacher,

My name is Cora Howe. I am a post-graduate research student at Mary Immaculate College undertaking a masters by research in the Department of Educational Psychology, Inclusive and Special Education. My research aims to explore an individualised self-regulation intervention for children on the autism spectrum. Self-regulation is important for children's academic, social and emotional needs. This research project is supervised by Dr Claire Griffin. I am writing to invite you and your class to participate in the research.

What does the intervention involve?
The research will aim to support independent self-regulation by offering a staged approach to self-regulation. The research will start by supporting co-regulation, which will involve the researcher providing strategies and resources to help recognise triggers and modify the child's environment as needed. The next stage of the research will involve teaching independent self-regulation skills, using the Zones of Regulation curriculum. The Zones of Regulation is a curriculum designed to help children to recognise their state of alertness by categorising them into four coloured zones. The Zones of Regulation lessons will comprise of six weekly one-hour self-regulation lessons. No formal training is needed to teach this curriculum and it is designed to be inclusive of a variety of children's developmental levels, strengths and needs. The researcher will provide you with an overview of each session, a lesson plan and the resources needed to teach each lesson. The lessons will comprise of a warm-up, storytime, activity and wrap-up.

What are the benefits and risks of this research?
The study is designed to help children to gain skills of self-regulation. This includes identifying triggers, selecting personal calming strategies and strategies to increase alertness in less-preferred activities. This can help the children to engage in academic and social activities. The Zones of Regulation curriculum will additionally help the children to recognise and learn about their emotions and identify the facial expressions and emotions of others. The Zones of Regulation curriculum offers a common language and visuals that can be used at home and in school to help support the children's self-regulation.

There are no obvious risks to this study. However, the researcher will mitigate against potential risks in the study. The study will take place in the child's classroom and will be delivered by you to help the children to feel comfortable as you know the children best. You and the children's parents will be provided with an overview of each session to help to identify any risks for the children. Additionally, the researcher will provide ideas and resources to help support children who experience any negative feelings or reactions during the study including alternative activities.

What will I have to do?
You will be provided with resources and ideas to use within your classroom to help support children's self-regulate as you deem appropriate. You will also be asked to teach six lessons from the Zones of Regulation curriculum over the six weeks. Additionally you will be given one short questionnaires to complete at three stages in the study and invited to participate in an interview at the end of the study.

What will my students have to do?
Your students will be asked to participate in lessons from the Zones of Regulation over the course of six weeks. Your students will also be asked to complete one questionnaire about their emotional management at three points in the study.

What happens if I want to withdraw from the project?
Participants have a right to withdraw at any stage of the project without a reason or consequence.

What if a child does not want to take part in the project?
If a child does not consent to taking part in the project or is unable to do so, you will be supported by the researcher to choose a suitable alternative activity for the child. This may involve an independent activity, fine-motor work or sensory activities. You will be provided with a variety of resources to meet different children's interests and developmental levels.

Anonymity and Confidentiality
All information and data collected will be anonymised and stored securely. A random ID number will be generated for each participant to maintain anonymity. Paper data will be stored in a locked filing cabinet and soft data will be stored on a password protected computer file. In accordance with the MIC Record Retention Policy, all research data will be stored for the duration of the project plus three years.

How will information be used/ disseminated?
The results of this study will be used in the results section of my thesis project. Additionally, the data may be used for presenting findings at relevant conferences and in the process of publishing the study. The results will include anonymised questionnaire data and anonymised interview data.

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

16150368@micstudent.mic.ul.ie Cora Howe (Principal Researcher)

Claire.Griffin@mic.ul.ie Claire Griffin (Project Supervisor)

This research study has received Ethics approval from the Mary Immaculate College Research Ethics Committee (MIREC) (quote reference number when you have received it). If you have any concerns about this study and wish to contact an independent authority, you may contact:
Mary Collins, MIREC Administrator, Mary Immaculate College, Limerick
Telephone: 061-204980 E-mail: mirec@mic.ul.ie

Yours sincerely,

_____

Cora Howe (Post-Graduate Researcher)

Appendix G

Class Teacher Consent Form

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Informed Consent Form for Teachers

- I have read and understand the participant information sheet
- I understand what the project is about, and what the results will be used for
- I am fully aware of all of the procedures involving myself, and of the risks and benefits associated with the study
- I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason
- I am aware that my results will be kept confidential
- I am happy for my class/ students to take part in the study

Signed: _____ Date: _____

Print Name:

Appendix H

Parent Information Form

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Dear Parents/ Guardians,

My name is Cora Howe. I am a post-graduate research student at Mary Immaculate College undertaking a masters by research in the Department of Educational Psychology, Inclusive and Special Education. My research aims to explore an individualised self-regulation intervention for children on the autism spectrum. Self-regulation is important for children's academic, social and emotional needs. This research project is supervised by Dr Claire Griffin. I am writing to invite you and your child to participate in the research.

What does the intervention involve?
The research will aim to support independent self-regulation by offering a staged approach to self-regulation. The research will start by supporting co-regulation, which involves parents/ guardians or teachers identifying the child's triggers, helping them to recognise their emotions and adjusting the child's environment to reduce stressors. The researcher will provide you with resources and ideas to help your child to co-regulate. The next stage of the research will involve teaching independent self-regulation skills, using the Zones of Regulation curriculum. The Zones of Regulation is a curriculum designed to help children to recognise their state of alertness by categorising them into four coloured zones. The Zones of Regulation lessons will comprise of six weekly one-hour self-regulation lessons. The researcher will provide the class teacher with lessons plans and resources to teach these lessons. The lessons will comprise of a warm-up, storytime, activity and wrap-up. You will also be provided with an overview of each lesson and activities you can do at home to further support their child's self-regulation.

What are the benefits and risks of this research?
The study is designed to help children to gain skills of self-regulation. This includes identifying triggers, selecting personal calming strategies and strategies to increase alertness in less-preferred activities. This can help the children to engage in academic and social activities. The Zones of Regulation curriculum will additionally help the children to recognise and learn about their emotions and identify the facial expressions and emotions of

others. The Zones of Regulation curriculum offers a common language and visuals that can be used at home and in school to help support the children self-regulation.

There are no obvious risks to this study. However, the researcher will mitigate against potential risks in the study. The study will take place in the child's classroom and will be delivered by the class teacher to help the children to feel comfortable. You and the class teacher will be provided with an overview of each session before the lesson is delivered, to help to identify any risks for your child. You can use the Zones of Regulation language and ideas for calming strategies to help your child if they experience any negative feelings during the study.

What will I have to do?
You will be provided with resources and ideas to support your child's self-regulation at home, including visuals, Zones of Regulation language and ideas for self-regulation toolboxes at home. You will also be provided with an overview of each session and ideas to further support the learning from each session at home. You will also be asked to complete one short questionnaire at three stages in the study and invited to participate in an interview at the end of the study.

What will your child have to do?
Your child will be asked to participate in lessons from the Zones of Regulation over the course of six weeks. Your child will also be asked to complete one questionnaire about their emotional management at three stages in the study.

What will teachers have to do?
As mentioned above, the teachers will teach the Zones of Regulation curriculum to their class. Teachers will also be asked to complete a short questionnaire at three stages in the study. Teachers will be invited to complete descriptions of the classroom and children's sensory profiles. Teachers will also be invited to take part in an interview at the end of the study.

What happens if I want to withdraw from the project?
Participants have a right to withdraw at any stage of the project without a reason or consequence.

What if a child does not want to take part in the project?
If a child does not consent to taking part in the project or is unable to do so, a suitable activity will be chosen by the class teacher.

Anonymity and Confidentiality
All information and data collected will be anonymised and stored securely. A random ID number will be generated for each participant to maintain anonymity. Paper data will be stored in a locked filing cabinet and soft data will be stored on a password protected computer file. In accordance with the MIC Record Retention Policy, all anonymised research data will be stored indefinitely.

How will information be used/ disseminated?
The results of this study will be used in the results section of my thesis project. Additionally, the data may be used for presenting findings at relevant conferences and in the process of

publishing the study. The results will include anonymised questionnaire data and anonymised interview data.

Thank you for taking the time to read this. I would be grateful if you would consider your participation in the project. Please do not hesitate to contact me or my supervisor if you have any questions at:

16150368@micstudent.mic.ul.ie Cora Howe (Principal Researcher)

Claire.Griffin@mic.ul.ie Claire Griffin (Project Supervisor)

This research study has received Ethics approval from the Mary Immaculate College Research Ethics Committee (MIREC) (quote reference number when you have received it). If you have any concerns about this study and wish to contact an independent authority, you may contact:
Mary Collins, MIREC Administrator, Mary Immaculate College, Limerick
Telephone: 061-204980 E-mail: mirec@mic.ul.ie

Yours sincerely,

_____

Cora Howe (Post-Graduate Researcher)

Appendix I

Parent Consent Form

(For Child's Participation in Research)

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Informed Consent Form for Parents/ Guardians

- I have read and understand the Parent/ Guardian Information Sheet
- I understand what the project is about, and what the results will be used for
- I am fully aware of all of the procedures involving my child and of the risks and benefits associated with the study
- 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 am aware that my child's results will be kept confidential
- I am happy to give my permission for my child to take part in the intervention

Signed: _____ Date: _____

Print Name:

(For Parent/ Guardian Participation)

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

Informed Consent Form for Parents/ Guardians

- I have read and understand the Parent/ Guardian Information Sheet
- I understand what the project is about, and what the results will be used for
- I am fully aware of all of the procedures involving myself and of the risks and benefits associated with the study
- 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 my results will be kept confidential
- I am aware that my interview will be anonymised to ensure that my child, his/her school community and I will not be identifiable in results.
- I agree to the audio recording of my interview. I understand that this audio recording will be immediately deleted following anonymised transcription of the interview.
- I am happy to give my permission to take part in the intervention

Signed: _____ Date: _____

Print Name:

Opt-out Form

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum

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:

Print name of parent/guardian

Signature of parent/ guardian

Date:

Appendix J

Child Information Sheet

I can use the Zones to help me to manage my emotions and actions

Hello! My name is Cora.

I want to tell you about a research project I am doing. Research projects help us learn new things. We can test new ideas. For my project, I want to find out how to help children to learn about their emotions.

In this sheet, I am going to give you some information and invite you to take part in the study. After, you can chose if

you want to participate or not. I have also talked about this with your teacher and your parent.

Do I have to do this project?

You do not have to take part in this research project if you do not want to. It is totally up to you. If you decide not to be in the research, it is okay. No one will be mad or disappointed with you if you say no. If you say "yes" now, you can change your mind later and that is still okay.

What is going to happen during the project?

If you decide to take part in the project, you will be asked to do two things:

1. Take part in six lessons to teach you about your emotions. These lessons will take place in your classroom with your teacher.

2. Fill out one questionnaire that will ask you questions about your emotions.

Will anything bad happen?

This research project is safe. You can stop at anytime by telling your teacher or your parent/ guardian.

Could this research help me?
This project may help you to learn more about your emotions and what makes you feel good or bad. Someday, we hope it will help other children to learn about their emotions too.

Who will know about the project?
I will not tell other people that you are in this research. I won't share information about you to anyone who is not part of this research project.

Will I find out about the results?
When my project is finished, I will give you a sheet that tells you what I found out.

Who can I talk to or ask questions to?
You can ask questions at any time. Just tell your teacher or your parent/ guardians that you have questions. You can talk to them about the project before you decide if you want to take part.

Thank you,
Cora

Appendix K

Child Consent Form

Child Assent Form (Children at a Beginner Reader Level)

My feelings

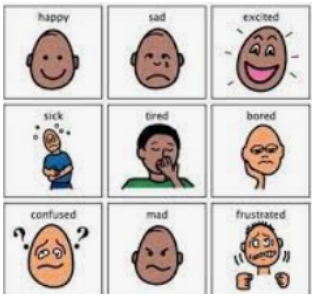
My name is : _ _ _ _ _ _ _ _ _ _ _ _ _

Tick

I am happy

to learn about

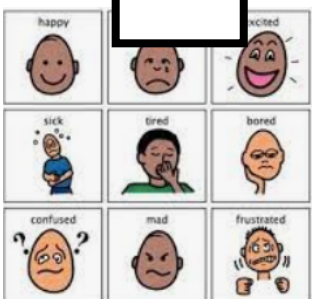
my feelings.



yes

I am write feelings.

no



happy to about my

yes

no

I know that I can say stop or use a stop card.

yes

no

☐ ☐

Child's signature: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Print name: _____

Date: _____

Child Consent Form (for Children Who Can Read Independently)

BRIATHAR DÉ MO LÓCHRANN
MIC
MARY IMMACULATE COLLEGE
COLÁISTE MHUIRE GAN SMÁL

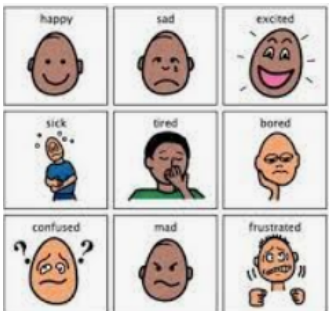
My Feelings

My name is _____

Please **tick** ✓ **yes** or **no**

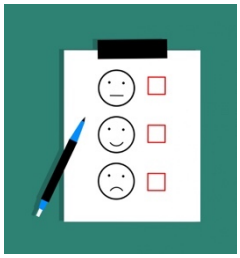
Are you happy to learn about your feelings with your teacher?

yes no



Are you happy to answer some questions about your feelings?

yes no



I understand that I can say stop at any time or use a stop card.

yes

no

☐ ☐

Signed: _____ **Date:** _____

Print name:

If the Child is a Non-Reader:

Please read this form to the child

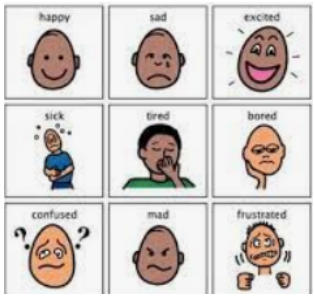
BRIATHAR DÉ MO LÓCHRANN
MIC
MARY IMMACULATE COLLEGE
COLÁISTE MHUIRE GAN SMÁL

My feelings

My name is : _ _ _ _ _ _ _ _ _ _ _ _ _

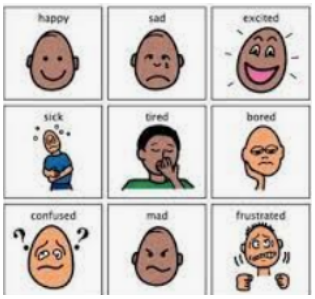
Tick

I am happy to learn about my feelings.



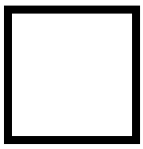
yes ☐ no ☐

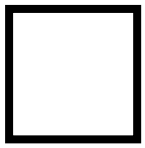
I am happy to write about my feelings.



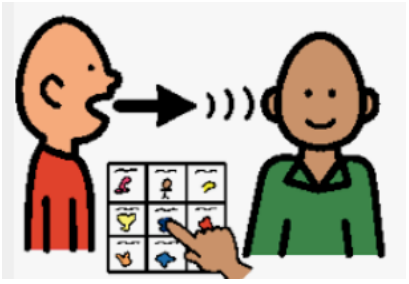
yes

no





I know that I can say stop or use a stop card.



yes

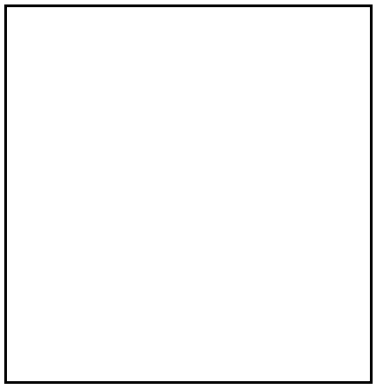
no

I have witnessed the accurate reading of the assent form to the child, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness _____ AND Thumb print of participant

Signature of witness _____

Date _____



I have accurately read or witnessed the accurate reading of the assent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given assent freely.

Print name of researcher _____

Appendix L

Teacher Questionnaire

The Emotional Regulation and Social Skills Questionnaire- 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 ID number: _____ **Date:** _____

	Skill/ Behaviour	***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
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	0	1	2	3	4

	that they are interested in					
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 M

Parent Questionnaire

The Emotional Regulation and Social Skills Questionnaire- 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 student's behaviour at the moment. Consider how often your child 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 ID number: _____ **Date:** _____

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

Mother Father Guardian Other *(Please specify):*

	Skill/ Behaviour	***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 and disappointment	0	1	2	3	4
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 way	0	1	2	3	4
17	Asks other children if s/he can play with them in a friendly way	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 well when s/he makes a mistake	0	1	2	3	4
24	Copes well when s/he loses a game	0	1	2	3	4
25	Apologises when s/he has done something	0	1	2	3	4

	wrong, or hurt someone's feelings					
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

Appendix N

Sensory Audit For Schools and Classrooms

Sensory Audit for Schools and Classrooms

VISUAL

Pointer	Evidence to look for	Current Situation	Possible action (if needed)
Classroom illumination is suitable for pupils on the autism spectrum.	Fluorescent lights are regularly checked and changed. (Flickering lights can be very disturbing.)		
	The effects of light coming into the room through blinds and creating distracting patterns are minimised.		
	Light reflecting on objects such as metal or shiny surfaces in the classroom is minimised.		
The classroom is orderly and not cluttered so that pupils can make sense of the environment.	The impact of wall displays is considered. (Busy and cluttered wall displays can be distracting).		
	Designated areas for specific activities to give clarity to the classroom organisation.		
	Pupils have the opportunity to work at a workstation to focus their attention, if necessary.		

NOISE and SOUNDS

Pointer	Evidence to look for	Current Situation	Possible action (if needed)
Sounds from classroom equipment are kept to a minimum.	Televisions, videos, audio systems and computers are switched off when not in use to avoid a mains hum.		
	Fluorescent lights are checked regularly so that they do not hum.		
There are strategies in place to reduce noise when rooms are in use.	Classrooms are carpeted to lessen noise created by the movement of people, chairs and desks.		
	The acoustics of the gym, hall and halls are checked and modified to lessen echo.		
	Hallways are carpeted to lessen the noise created by movement through the corridors.		
Sounds from outside the classroom do not cause problems within classrooms.	Windows are suitably soundproofed so that the noise of passing traffic is not a nuisance.		
There are agreed strategies in place when noise becomes too much for individual pupils.	There is a quiet room available which provides a calm place for pupils to relax.		
Pupils are warned if a loud noise or bell is going to sound.	Strategies are put in place to support pupils who find loud noises or fire bells very difficult to tolerate.		

SMELL

Pointer	Evidence to look for	Current Situation	Possible action (if needed)
Smells within the classroom are kept to a minimum.	The smell of paints, glue, clay and cleaning fluids is minimal.		
	Staff are aware that the smell of perfumes and deodorants may be distressing.		
	Staff are aware that pupils may react to the smell of others.		
Smells from outside the classroom are monitored and reduced, where possible	Alternative toileting arrangements are allowed (e.g. possible use of staff or disabled toilets).		
	The smell of cooking from the cafeteria or food technology rooms is reduced.		

TOUCH and FEEL

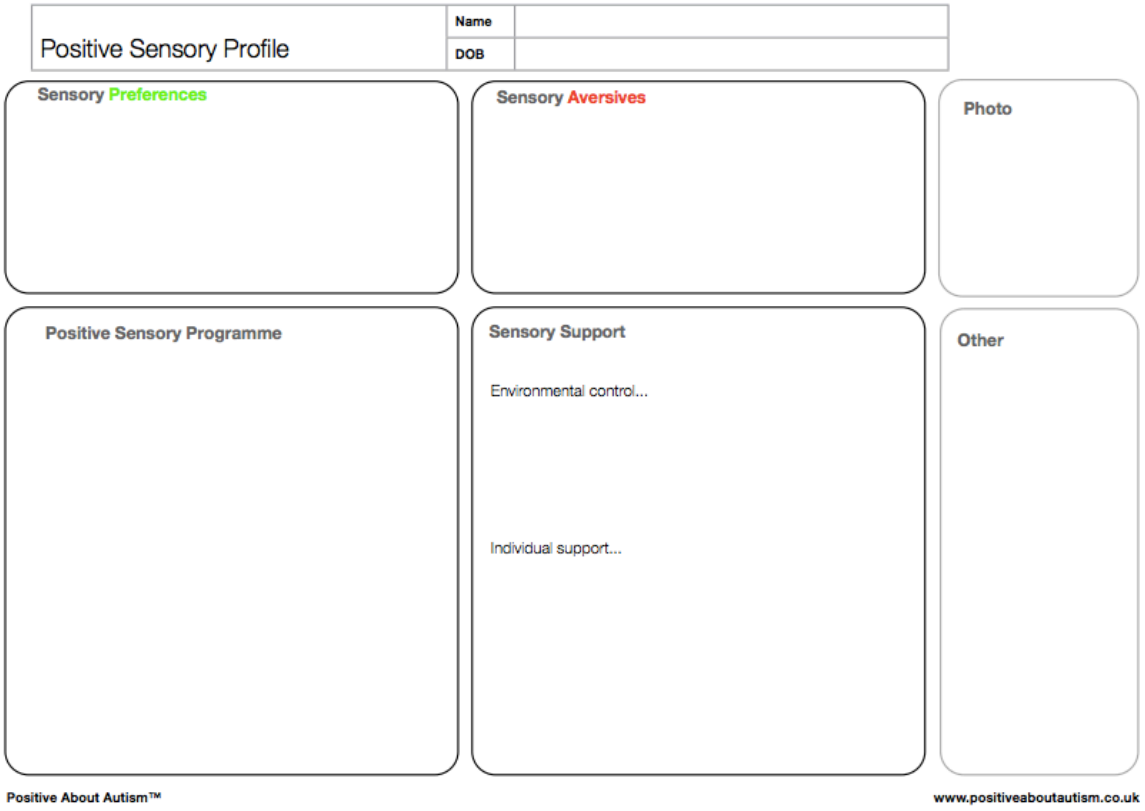
Pointer	Evidence to look for	Current Situation	Possible action (if needed)
Uncomfortable clothing (seams, inflexible or itchy fabrics) is avoided, where possible, unless there are safety issues	Variations of the school uniform offer enough flexibility to enable pupils to be able to wear clothing they find comfortable.		
	Willingness of the school to adapt the school uniform (e.g. wear a sweatshirt, a necktie loosely or one that pins on).		
Alternative arrangements are made for pupils who find writing to be physically painful.	Willingness of the school to allow some work or homework to be typed.		
	Possible use of an 'Alpha Smart' or laptop for written work.		
Seating is comfortable.	Padding is used to make hard chairs more comfortable.		
	Pupils are allowed to sit on carpet squares if the floor is not carpeted.		
	Height of tables and chairs is appropriate for pupils.		

GENERAL SENSORY ISSUES

Pointer	Evidence to look for	Current Situation	Possible action (if needed)
Pupils are encouraged to let others know if they are finding a sensory aspect of the environment distressing.	Pupils know that they can speak to someone about concerns.		
	Pupils have a designated person or mentor to talk to.		
Pupils are relaxed when moving through corridors. (Pupils can become anxious in busy corridors due to noise, dislike of crowds and worry about being touched).	Pupils are allowed to leave the classroom slightly earlier or later than peers to avoid noisy corridors/crowds.		
Classroom organisation takes into account the individual needs of pupils.	Classroom organisation and individual seating plan takes into consideration individual sensory concerns (e.g. A pupil with a fascination with light reflection does not sit by the window).		
	Pupils who become anxious by the close proximity of others are allowed ample space around their seat.		
Dinner halls and queuing systems do not cause distress (due to the noise levels, smells and crowds).	Pupils are allowed to enter the dinner hall before or after peers to avoid queuing and crowds.		
	An adult or buddy may escort a pupil to and within the dinner hall.		
A system of support is available for pupils experiencing sensory overload.	Learning breaks are allowed when necessary.		
	There is a designated place and a clear system/routine for pupils to follow if they feel they need to withdraw due to sensory overload to 'chill out.'		

Appendix O

Positive Sensory Profile



Appendix P

Strategies from Stress, Self-Regulation and Communication Framework

Coregulating to reduce stressors

Examples of strategies:

- Modify the environment
- Modulate exposure of sensory information
- Add elements of predictability
- Be warm and responsive
- Read and acknowledge the child's intent
- Validate children's feelings and their right to experience a range of emotions
- Reduce the cognitive load
- Follow the child's lead
- Acknowledge that our ability to self-regulate helps us to be an effective co-regulator

Scaffolding to support development of foundational capacities

Zones of Regulation Sessions 1-3:

- Creating wall posters of the zones
- Zones bingo
- The zones in video
- The zones in me
- Understanding different perspectives
- Me in my zones
- How do I feel?

Scaffolding to support development of foundational capacities

Zones of Regulation Sessions 4-6:

- My zones across the day
- Caution! Triggers ahead

- Exploring tools for calming
- Exploring sensory support tools
- Exploring tools-Thinking strategies
- The tool box
- When to use yellow zone tools

Appendix Q

Co-Regulation Strategies from the Stress, Self-Regulation and Communication Framework

Examples of Co-Regulatory Strategies to Support Biological Stressors

Modify the Environment

You can use the sensory audit of the classroom to help you to modify the environment. We can support the children by removing parts of the environment that can evoke a stress responses (e.g. loud noises, visual clutter). Other examples might include reducing the number of toys available in a space or setting up a sensory break tent in a busy classroom.

Modulate exposure of sensory information

This might include modulating the volume of our own voices and modulating the speed and way in which we present information. We can also support the children to slow down their movements if necessary to have more time to process visual information.

Add elements of predictability

Familiar routines can reduce stress. This may include using visuals or sound effects to help a child form patterns and anticipate a sequence of events. Novelty can be incorporated into routines. The novel aspects can be incorporated into a predictable sequence.

Examples of Co-regulatory Strategies to Support Emotion Stressors

Be warm and responsive

Read, acknowledge and respond to all forms of a child's communication attempts (e.g. movements, facial expressions, shifting eye gaze, sounds, word approximations, and words).

A warm and soothing voice can help the children to understand that their emotions can be calmed with the help of a caregiver.

Validate children's feelings and their right to experience a range of emotions

It is important to validate and acknowledge children's emotions. We can help children by encouraging socially acceptable ways of communicating emotions, rather than distractions or invalidations. We can also validate children's feelings by joining in with children's selected themes in pretend play. We can support children by acknowledging and/ or empathizing with the child to express that you understanding what the child is communicating.

Add elements of predictability

Use predictable routines or contexts to support learning. Use visuals as an aid.

Acknowledge that our ability to self-regulate helps us to be an effective co-regulator

It is important that we can regulate our own emotions. If we respond to a child's frustration with frustration, this can impede co-regulation. Responding in a calm manner can support the child to gradually return to a calm state.

Examples of Co-regulatory Strategies to Support Cognitive Stressors

Reduce cognitive load

We can reduce the cognitive load of tasks by making simple alterations such as slowing down the presentation of auditory information or reducing the amount of information presented. We can also use visuals to support comprehension of information presented auditorily.

Follow the child's lead

It is important that children are provided with opportunities to pursue goals that are meaningful to them.

Examples of Co-regulatory Strategies to Support Social Stressors

Modify the environment

Modify the environment to promote social engagement (e.g. sitting in circles rather than rows to promote inclusion with peers).

Add elements of predictability

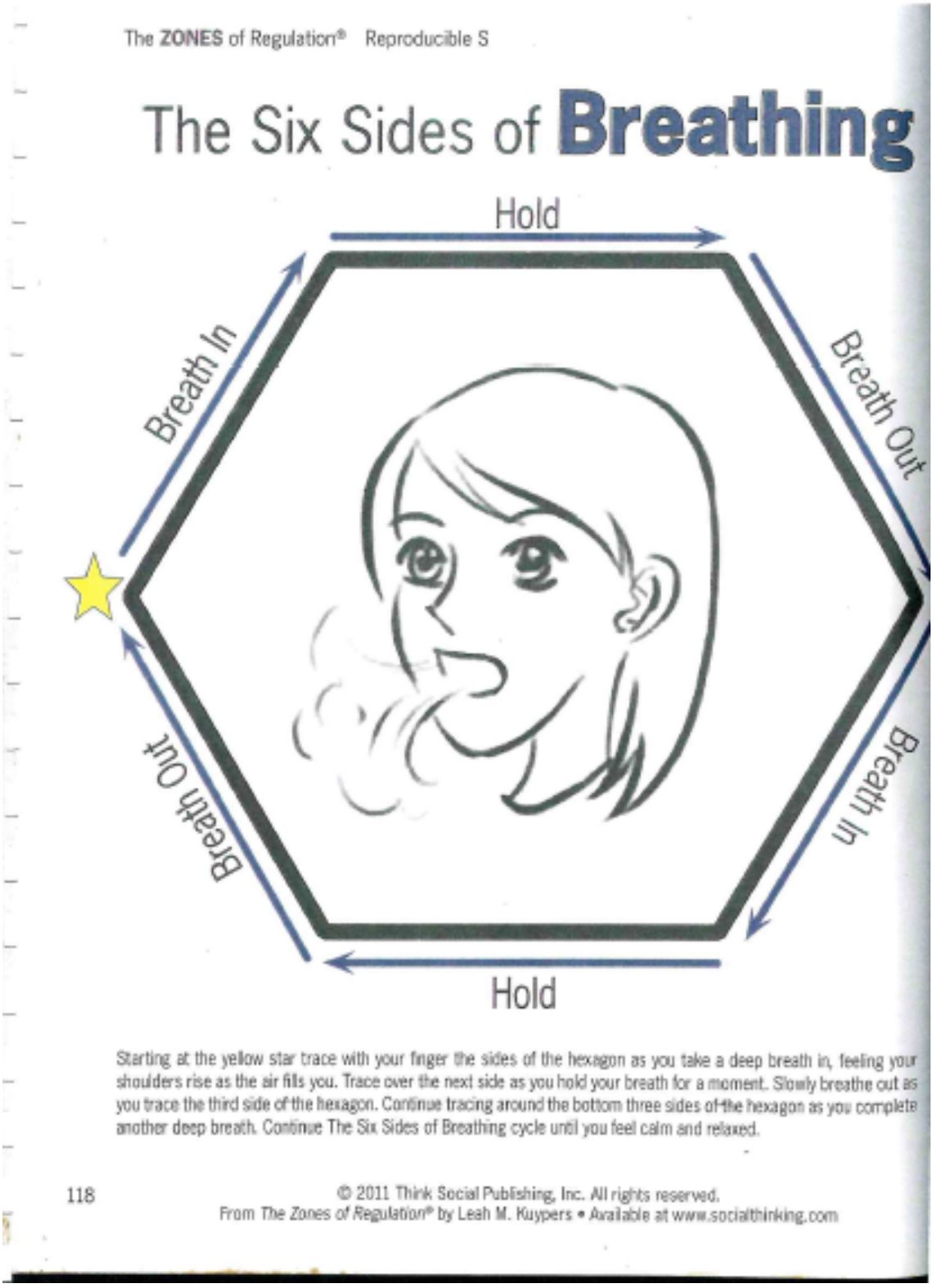
Set the stage by helping a child understand what to expect from an upcoming group activity or novel social context.

Follow the child's lead

Use the child's interests as a context for motivating or enhancing interaction with peers.

Appendix R

Example Visuals from the Zones of Regulation



The **ZONES** of Regulation® Reproducible 5

The Six Sides of **Breathing**

Hold

Breath In

Breath Out

Breath Out

Breath In

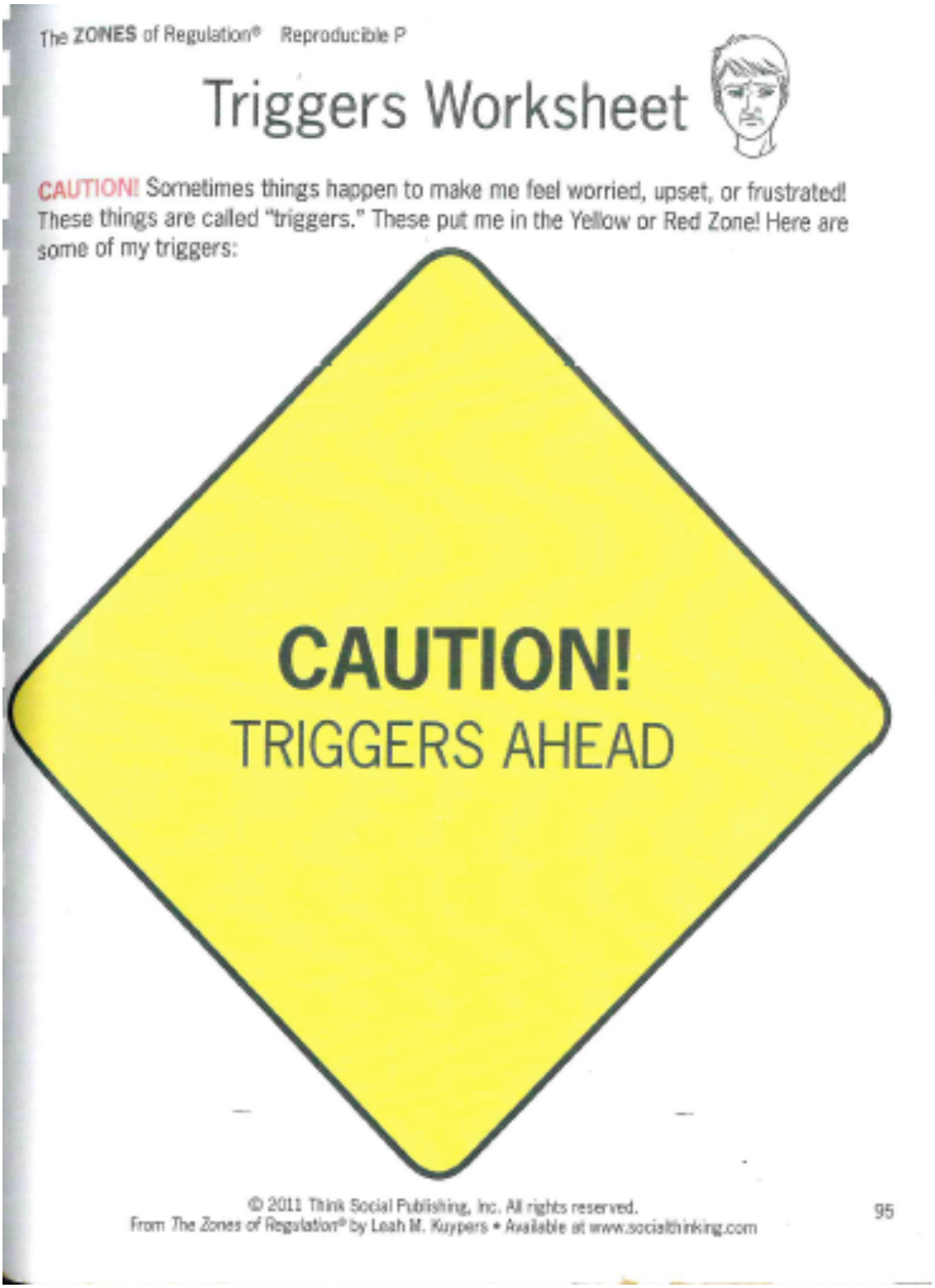
Hold

Starting at the yellow star trace with your finger the sides of the hexagon as you take a deep breath in, feeling your shoulders rise as the air fills you. Trace over the next side as you hold your breath for a moment. Slowly breathe out as you trace the third side of the hexagon. Continue tracing around the bottom three sides of the hexagon as you complete another deep breath. Continue The Six Sides of Breathing cycle until you feel calm and relaxed.

118

ZONES Tools Menu

Example of an Adapted Visual for the Students in the Study



The ZONES of Regulation® Reproducible P

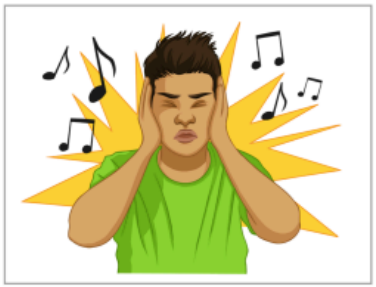
Triggers Worksheet

CAUTION! Sometimes things happen to make me feel worried, upset, or frustrated! These things are called "triggers." These put me in the Yellow or Red Zone! Here are some of my triggers:

CAUTION!
TRIGGERS AHEAD

95

Triggers



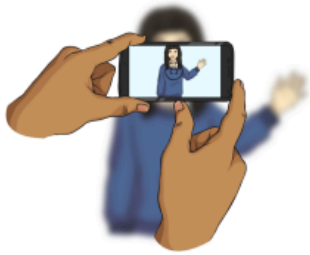
loud noises

storm

waiting

writing

rain



flashing lights

Triggers

too cold

too warm

school jumper

being told "Stop"

lining up

yard

Appendix S

Example Lesson Plan

Lesson 1: Introduction to the Zones

Lesson Activities	Goal
Learning the vocabulary of the Zones	Increase emotion vocabulary and recognition of facial expressions.

Overview:
This activity introduces students to the four zones used to categorise the different emotions and states of alertness people experience while creating visuals to display in the classroom. Students work on increasing their vocabulary of emotions and recognition of facial expressions.

Materials

- ☐ One copy of the Zones of Regulation visual per student
- ☐ Zones of Regulation song: https://www.youtube.com/watch?v=FeYn6r0MEjU
- ☐ Video read-aloud of the book 'How I Feel': https://www.youtube.com/watch?v=MSdSWlfCpJ8

Lesson A : Introduction to the Language of the Zones
Step 1: Preparation

- ☐ Hang the Zones wall posters in the classroom where students can easily read them
- ☐ Write this schedule on the classroom board:
  1. Welcome
  2. Learn about the Zones
  3. Wrap-up

Step 2: Welcome

- ☐ Welcome the children
- ☐ Sing the Zones of Regulation song with the children: https://www.youtube.com/watch?v=FeYn6r0MEjU

Step 3: Lead-in

- Get students interested by asking them if they believe they can categorize the ways we feel and act into four groups or zones. Introduce the concept of the zones with the wall posters for a visual:
    - There are four zones that we will use to describe how our brain and body feel.
    - When you're in the Blue Zone, your body is running slow, such as when you are tired, sick, sad, or bored.
    - The Green Zone, like a green light, is when you are 'good to go'. If you are in the Green Zone, you may feel happy, calm, and focused.
    - The Yellow Zone describes when you start to lost control, such as when you are frustrated, overwhelmed, silly, wiggly, excited, worried, anxious, or surprised. It is a good idea to use caution when you are in the Yellow Zone.
    - The Red Zone is reversed for extreme emotions such as terror, uncontrolled anger, aggression and elation. When you in the Red Zone, you are out of control, have trouble making good decisions, and must STOP.
    - Explain to the children that they can start to think about what zone they are in

Step 4: Wrap-up

- Give the students an opportunity co check-in how they are feeling at the present time and to identify their zone

Lesson B: Recognising the Zones

Step 1: Preparation

- Write this schedule on the classroom board:
  1. Welcome
  2. Storytime
  3. Wrap-up

Step 2: Welcome

- Welcome the children

- Sing the Zones of Regulation song with the children: https://www.youtube.com/watch?v=FeYn6r0MEjU

Step 3: Storytime

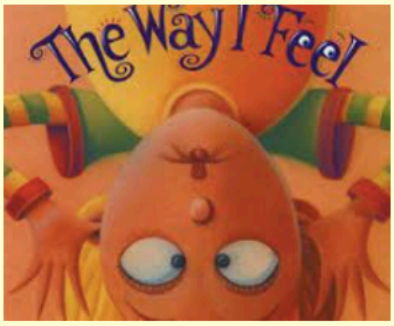
- Tell the students that you will use the book to help them to learn how they can use zones to describe how they feel
- Using the book 'The Way I Feel' (available at : https://www.youtube.com/watch?v=MSdSWlfCpJ8), read to the students each description of how the character feels.
- Before you reveal the character's emotions, have students guess the emotion and which zone the character is in
- As you read the book, have students glue each relevant emotion picture onto the wall posters of the zones (e.g. silly-yellow, disappointed-yellow, frustrated-yellow, bored-blue, proud-green).
- After the book is finished, reiterate that it is okay that students are in different zones at different times; this is expected and part of being who we are

Step 4: Wrap-up

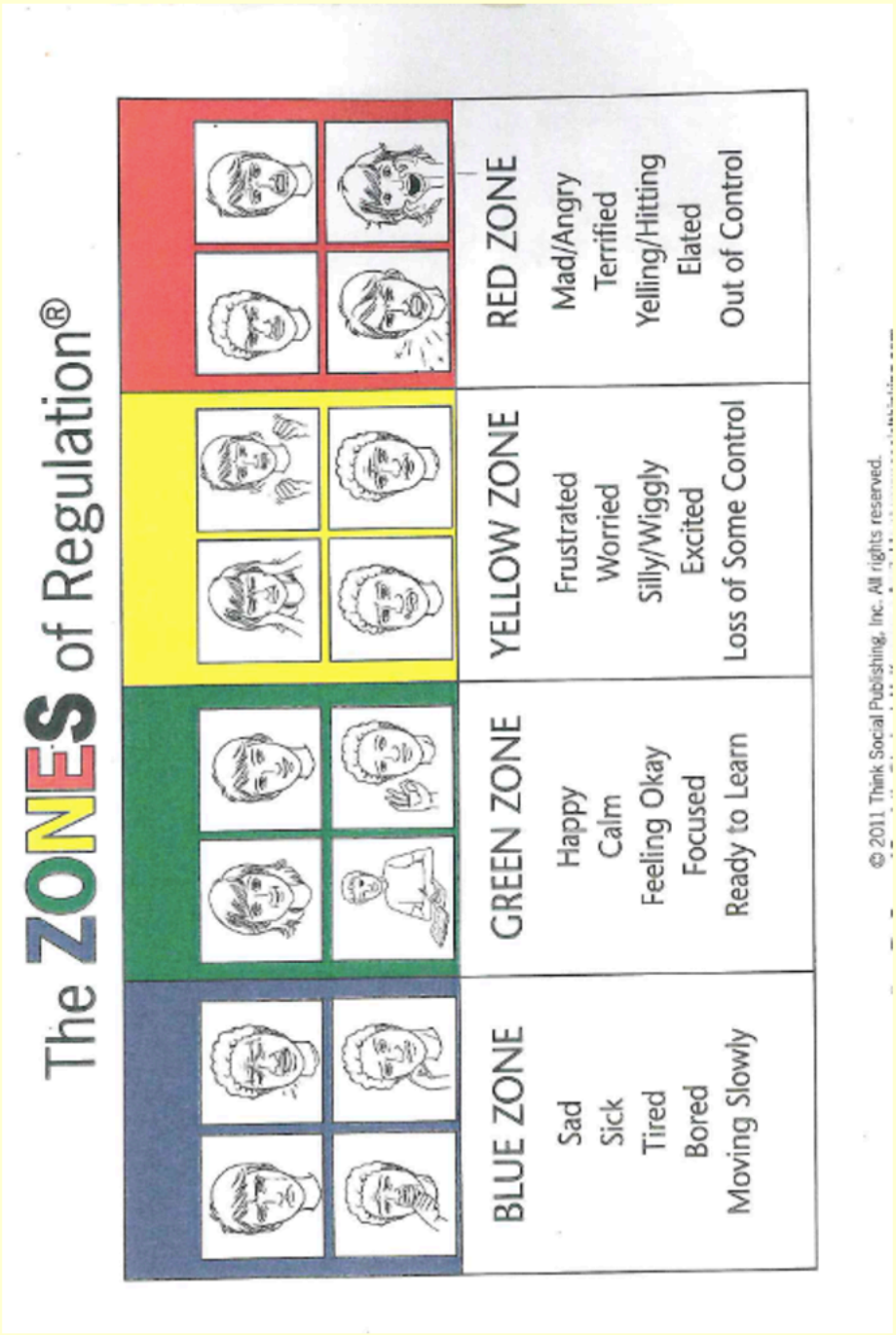
- Give the students an opportunity co check-in how they are feeling at the present time and to identify their zone

Home Learning

- Students will be provided with copies of the Zones of Regulation visuals for at home.



Resource 3: Copy of the Zones of Regulation Visual



Appendix T

Interview Schedule

Parent Semi-Structured Interview Schedule

Background Information

1. Tell me a little about X… (if need prompting personality, hobbies/ interests)

Child's school experience

1. What kind of an experience has primary school be in general for X.. to date?
2. How does X.. communicate to you how they feel about school?
3. When is X..at his/her happiest in school?
4. Are there are circumstances in school which create any unhappiness for X..?

Child's self-regulation at home

1. When does X..become upset at home?
2. How does X… deal with feeling upset?
3. What strategies does X…use at home to regulate their emotions?
4. To what extent does X..communicate his/her feelings at home?

Experience of the Zones of Regulation Intervention

1. Did you receive any support for self-regulation at home before this intervention?
2. What was your knowledge/ experience of the Zones of Regulation before this intervention?
3. To what extend does X use the Zones of Regulation language at home?
4. Could you tell me about your child's 'tools' or strategies they use to regulate themselves
5. What have you found beneficial about this study?
6. Were there any parts of the intervention you did not find helpful?

Teacher Semi-Structured Interview Schedule

Background Information

1. How long have you been teaching in a special class?

Children's sensory school experience

1. Are there any elements of the physical or sensory school environment that cause difficulty for your students?
2. Are there are elements of the physical or sensory school experience that help your students?

Children's social school experience

1. What barriers are there to the children's socialisation
2. How do your students cope with winning/losing
3. How do the children regulate themselves in a social environment

Children's academic school experience

1. Are there any barriers to the children academic work based on their ability to regulate?
2. What strategies do your children use if they are engaging in a less preferred activity?

Experience of the Zones of Regulation Intervention

1. Describe your experience of supporting the children to co-regulate
2. What was your knowledge/ experience of the Zones of Regulation before this intervention?
3. To what extend does your class use the Zones of Regulation language in school?
4. What strategies do your students use?
5. How did your students work together during the intervention?
6. Were there any parts of the intervention that were particularly beneficial to the children?
7. Were there any parts of the intervention that did not benefit the children?

Appendix U

Child Questionnaire

ID Number: _____

Children's Emotion Management Scale: ANGER

Instructions: Please circle the response that best describes your behaviour 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 sad.	**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

Instructions: Please circle the response that best describes your behaviour 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 o**ften** feel this way

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 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 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 behaviour 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 o**ften** 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 but 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 V

Mary Immaculate Research Ethics Committee Form

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MARY IMMACULATE COLLEGE
COLÁISTE MHUIRE GAN SMÁL

MIREC-5

Research Ethics Committee

MIREC Final Decision Form

APPLICATION NUMBER:	A22-046

1. PROJECT TITLE

An Exploration of an Individualised Self-Regulation Intervention Using the Stress, Self-Regulation and Communication Framework (SSC) for Children on the Autism Spectrum.

2. APPLICANT

Name:	Cora Howe
Department / Centre / Other:	EPISE
Position:	Postgraduate Researcher

3. DECISION OF MIREC CHAIR (✓)

☐	Ethical clearance through MIREC is not required and therefore the applicant need take no further action in this regard.
✓	Ethical clearance is required and is hereby granted by the Chair without need for referral to the MIREC committee.
☐	Ethical clearance for a funding application or a similar purpose is granted by the Chair ***pro tem*** without need for referral to the MIREC committee. However, the applicant must subsequently seek ethical clearance from MIREC prior to embarking on any related project work involving human participants or their data.
☐	Ethical clearance is granted following review of the application by the MIREC committee.
☐	Ethical clearance is not granted following review of the application by the MIREC committee.

4. REASON(S) FOR DECISION

I have reviewed this application and I am satisfied it meets MIREC requirements.

The Safeguarding Statement is fit-for-purpose. It is clear from your DPIA, that the level of risk involved provides no likelihood or severity of potential harm to the Data Subject.

The application is therefore, approved.

5. SIGNATURE OF MIREC CHAIR

Name (Print):	Dr Marie Griffin
Signature:	
Date:	10th October 2022