An Investigation into the Impact of a Mindfulness-Based Intervention on the Anxiety of Primary-Aged Children Diagnosed with Autism Spectrum Disorder

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Contents

Abstract

There is growing recognition of the role schools can, and should have, in supporting children and young people's mental health (Department of Health (DoH) & Department of Education (DfE), 2017). Evidence suggests potential benefits of utilising mindfulness-based interventions with children in primary schools to reduce anxiety (e.g. van de Weijer-Bergsma et al., 2014). However, there is a noticeable lack of research investigating the application of mindfulness-based interventions within children diagnosed with Autism Spectrum Disorder (ASD), who appear particularly vulnerable to experiencing anxiety (van Steensel et al., 2011). Accordingly, this study presents an investigation into the impact of a teacher delivered mindfulness-based intervention on the anxiety of children diagnosed with ASD.

A mixed methods design was adopted. Single case experimental designs were used to investigate the impact of the intervention on the anxiety-related behaviours of five children diagnosed with ASD (aged between 5 and 11 years) attending specialist settings. Pre and post parent and teacher report measures were also collected relating to the children's anxiety. After delivery of the intervention, the perceptions of the participating children and teachers were gathered via semi-structured interviews.

The results suggested there was no observable or significant change in participant anxiety as a result of the intervention. The children appeared to generally enjoy the intervention, although they did not see themselves continuing the mindfulness activities. Thematic analysis of the teachers' perceptions suggested the intervention taught relevant skills and in particular, there were perceived benefits of mindful breathing. However, challenges related to the complexity of the intervention, alongside specific challenges for children with ASD, were highlighted.

The findings should be interpreted in light of methodological limitations, and consequently, due to the weaknesses identified and the limited prior study in this area, further research is required. Nevertheless, the study adds to our understanding about the potential efficacy of utilising teacher delivered mindfulness-based interventions with children diagnosed with ASD.

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List of Figures

List of Tables

Glossary of Abbreviations

Abbreviation	Description
ASD	Autism Spectrum Disorder
BPS	British Psychological Society
DfE	Department for Education
DoH	Department of Health
EHCP	Education, Health and Care Plan
EP	Educational Psychologist
EPS	Educational Psychology Service
ICD	International Classification of Diseases
NAS	National Autistic Society
NHS	National Health Service
PSHE	Personal, Social and Health Education
RCI	Reliable Change Index
RCT	Randomised Control Trial
SCED	Single Case Experimental Design
TEP	Trainee Educational Psychologist
ToM	Theory of Mind
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

1 Introduction

1.1 Context for the Current Research

The mental health and wellbeing of children and young people is at the forefront of public, academic and political discourse (Children's Commissioner, 2017; DoH & DfE, 2017). Figures indicate that one in five children experience a mental health difficulty before the age of 11 (Place2Be, 2016) and evidence suggests these children are at an increased risk of negative life outcomes, such as poor educational attainment and reduced employment prospects (DeSocio & Hootman, 2014; Goodman et al., 2011; Green et al., 2005). Anxiety is reported to be becoming increasingly common with younger children (NSPCC, 2017), and specific groups of children, such as those diagnosed with ASD, seem to be particularly vulnerable (van Steensel et al., 2011).

As a result of the growing concern about children and young people's mental health there is an increased emphasis on the need for early intervention and the role that schools can have in supporting difficulties in this area (DoH & DfE, 2017). Accordingly, the government has pledged additional funding to schools to prioritise mental health (DoH & DfE, 2017). It is therefore imperative that educational professionals are aware of how they can best support those pupils presenting with mental health needs.

1.2 Focus of the Research and Unique Contribution

The purpose of the current research was to investigate the impact of a teacher-delivered mindfulness-based intervention on the anxiety of children with a diagnosis of ASD.

There is very limited prior research that evaluates the impact of mindfulness-based interventions on wellbeing outcomes specifically within ASD populations (Semple 2019). Due to high levels of comorbidity found between ASD and anxiety (van Steensel et al., 2011), and the increased emphasis on the role that schools can have in supporting children and young people's mental health (Children's Commissioner, 2017; DoH & DfE, 2017), this was deemed a pertinent area for further research.

This research aimed to explore the impact of the intervention on children's anxiety levels and also explore the perceptions of those involved (children and teachers). This

was to allow for a more comprehensive understanding of the use of mindfulness-based interventions with children and young people with ASD to be achieved.

1.3 Personal and Professional Interest

The study was conducted by a trainee educational psychologist (TEP) undertaking professional doctoral training at the University of Nottingham. The research was conducted under the supervision of the TEP's placement local authority and the University of Nottingham, where the researcher received regular supervision.

Throughout their academic and professional career, the researcher has been interested in emotional well-being. The TEPs interest specifically in this area developed from previous professional roles working with children and young people diagnosed with ASD, both in education and within the wider community. Many of the children and young people seemed vulnerable to experiencing anxiety which appeared to have wider implications for their engagement with education. This created an interest in the potential role that educational professionals may have in reducing anxiety and promoting the positive mental health of children and young people who are diagnosed with ASD.

The TEP also has a professional and personal interest in the potential uses and benefits of mindfulness.

1.4 Structure of the Thesis

The thesis is divided into four further chapters organised as follows:

- Chapter 2: The *Literature Review* provides a summary of areas of literature that are pertinent to this research. The chapter will also define the key concepts used within the thesis. A systematic review is provided within a wider review of the literature, leading to the rationale and research questions for the current study.
- Chapter 3: The *Methodology* presents an account of the methodology, design and implementation of the current research with consideration of alternative paradigms and designs. Threats to reliability and validity and ethical issues are discussed.

- Chapter 4: The *Results* reports the quantitative and qualitative data separately. First, the analysis of the single case experimental design data will be presented, followed by the qualitative analysis of the data gathered through semi-structured interviews with the participating children and teachers.
- Chapter 5: The *Discussion* provides a summary and interpretation of the research results in relation to previous research in this area. Review of the reliability and validity of the current study will be provided with consideration for the methodological strengths and limitations. A discussion related to the implications of the findings for professional practice and potential avenues of future research will be provided.

2 Literature Review

2.1 Introduction

The aim of this chapter was to explore research and theory related to the topic of study. The review begins with a discussion of the current national context related to children and young people's mental health and wellbeing. The chapter will move on to define ASD and highlight literature related to the relationship between ASD and anxiety.

The review will then describe 'mindfulness' with reference to possible benefits of its use to promote wellbeing. Research related to the use of mindfulness-based interventions with children and young people will be described and following this a systematic review is undertaken to evaluate the use of mindfulness-based interventions in schools to reduce anxiety in primary school aged children (4 to 11 years). After, the limited research that has explored the use of mindfulness-based interventions with children and young people diagnosed with ASD will be reviewed.

Finally, the review will conclude by describing the rationale for the current study, including the unique contribution to the literature base, before the research questions and hypotheses are outlined.

2.2 Mental Health and Wellbeing of Children and Young People

2.2.1 The Current Context

It is now recognised that good mental health is vital for our overall health and wellbeing. The World Health Organization (WHO) defines 'Health' as 'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity' (WHO, 2014). Accordingly, in recent years the mental health and wellbeing of children and young people has been at the forefront of public, academic and political discourse (Children's Commissioner, 2017; DoH & DfE, 2017). In particular, there appears to be greater awareness and understanding that mental health difficulties widely affect children and young people. The most recent government funded research into the prevalence of mental health difficulties in children and young people in England, estimated that one in eight met the criteria for at least one mental health disorder (NHS Digital, 2018). Figures also suggest that one in five children experience

a mental health difficulty before the age of 11 (Place2Be, 2016); and 50% of long-term mental health difficulties are exhibited before the age of 14 (YoungMinds, 2017). Moreover, anxiety has been identified as one of the most prevalent mental health difficulties experienced by children and young people, and figures suggest that it is becoming increasingly common with younger children (NSPCC, 2017). It is also important to note that any figures reporting mental health difficulties are likely to underestimate the prevalence, as many children and young people may be experiencing difficulties that they have not reported or sought support for.

The impact of mental health needs on other areas of an individual's functioning is widely documented within research. Evidence suggests that children and young people who experience mental health difficulties are at increased risk of school absence, poor educational attainment and reduced employment prospects (DeSocio & Hootman, 2014; Goodman et al., 2011; Green, et al., 2005). The government recognises the potential impact of mental health difficulties and has published a number of policy papers and strategies in the last decade relating to mental health and wellbeing, for example 'No Health without Mental Health' strategy (DoH, 2011) and 'Future in Mind' (DoH & NHS England, 2015). The 'Future in Mind' strategy, in particular, highlighted the need for services to work collaboratively to enable more accessible and tailored support (DoH & NHS England, 2015). However, there have been calls for the government to prioritise early mental health intervention and provide greater support and provision within school settings to promote positive mental health in children and young people (Children's Commissioner, 2017; YoungMinds, 2017). In line with this, the government recently published a Green Paper related to changing children and young people's mental health provision. Within this paper, the government pledged additional funding for schools to support children's wellbeing and resilience, which includes incentivising schools to identify a Designated Senior Lead to oversee mental health (DoH & DfE, 2017).

2.2.2 The Role of Schools

In recent years, the role schools may have in the promotion of positive wellbeing and mental health has become of increasing interest, and as highlighted above, has been addressed within government policy (DoH & DfE, 2017). In the recent government

Green Paper, it details that, '*there is clear evidence that schools and colleges can, and do, play a vital role in identifying mental health needs at an early stage'* (p.4, DoH & DfE, 2017). The promotion of children's social and emotional skills in schools is argued to be particularly important during the transition period from childhood to adolescence (Schonert-Reichl & Lawlor, 2010). This is because a number of cognitive, physical, social and emotional changes occur during this time, and therefore it is felt to be a critical developmental stage for building resilience against mental health difficulties (Schonert-Reichl & Lawlor, 2010).

The understanding that schools can support children and young people's wellbeing was also highlighted within earlier government strategies, such as 'The Social and Emotional Aspects of Learning' materials that were shared with all primary and secondary settings (DfE, 2005). The materials were promoted as a whole school approach to promoting positive wellbeing. Alongside whole school teaching, the recent government Green Paper reported that evidence-based interventions for mild to moderate levels of mental health difficulties can be delivered by trained and supervised non-clinical staff and lead to outcomes comparable to those of a trained therapist (DoH & DfE, 2017). Therapeutic interventions delivered by regular school staff can also overcome barriers to intervention from outside professionals; such as cost and waiting times (Barrett & Pahl, 2006). As such, this highlights the potential role that well trained and supervised school staff could play in supporting mental health on both a whole school preventative level, as well as addressing early difficulties through a graduated response.

2.2.3 The Role of EPs

It is widely suggested within the EP community that the profession is in a key position to promote children and young people's mental health through a range of services they typically offer to schools (Mackay, 2007; Atkinson et al., 2011; Greig et al., 2016). These services may include support at the individual, group or systemic level such as; delivering direct interventions, upskilling school staff through training, signposting to appropriate services or supervising school led interventions. EPs understanding of mental health needs alongside their understanding of school settings is argued to

place them in a unique position to provide early interventive support (Atkinson et al., 2011; Greig et al., 2016).

Despite recognition by the profession that supporting children and young people's mental health is a key part of the EP role, research has indicated that EPs report challenges to service delivery in this area (Atkinson et al., 2014). In a large-scale survey conducted in the UK, EPs reported opportunities, time pressures, lack of adequate training and supervision as barriers to delivering therapeutic interventions (Atkinson et al., 2014). Similar findings were also reported more recently within a Scottish survey where EP services reported lack of time and staffing as the main barriers to carrying out mental health interventions (Greig et al., 2019). However, a key theme within this research was that services felt they had a key role in supporting those with mental health needs and providing guidance to schools (Greig et al., 2019).

Outside of the EP profession, there appears to be less acknowledgement of the role of an EP to support children and young people's mental health. For example, Greig et al. (2016) highlight that within government guidance and policy there has been little recognition of the role of an EP in supporting children and young people's mental health needs. However, in a recent guidance document for schools called '*Mental Health and behaviour in schools*' written by the DfE, the role that EPs can have in supporting children and young people's mental health is described (DfE, 2018). The document details that EPs are well placed to advise and provide support for emerging mental health needs (DfE, 2018). Therefore, this could reflect a shift in the understanding and acknowledgement of the role of an EP in the area of mental health.

2.3 Autism Spectrum Disorder

This research project aims to explore the use of an intervention with children and young people with a diagnosis of ASD. As such, this section defines and discusses the prevalence of ASD in children and young people. The relationship between ASD and anxiety will also be explored.

2.3.1 Definition

ASD (or autism; often used interchangeably) is a neurodevelopmental disorder that is characterised by a typical pattern of behaviours in the areas of social interaction, communication and imagination (Wing & Gould, 1979). The Diagnostic and Statistical Manual 5th edition (American Psychological Association, 2013, p.50) describe ASD as:

- '*Persistent deficits with social communication and social interaction…*'
- '*Restricted, repetitive patterns of behaviour, interests or activities…*' such as rigid thinking and sensory needs.

Difficulties within both areas must be present from early development. The 'spectrum' aspect of the diagnosis represents that individuals can present with a wide range of behaviours across these two areas (Wing, 1993). Although not part of the criteria for diagnosis, hyperactivity, difficulties with attention and anxiety (to name a few) are recognised as common difficulties experienced by individuals with ASD (Mayes et al., 2011).

In addition to differences with behavioural presentation, there is diversity in cognitive ability of those diagnosed with ASD. 'The International Classification of Diseases' 11th edition (WHO, 2018b; 6A02) outlines that individuals along the spectrum exhibit a full range of intellectual functioning and language abilities, ranging from average or high intelligence to profound disability. The severity and range of difficulties (related to ASD specifically, and intellectual skills) is recognised to impact other areas of functioning, such as educational and occupational outcomes (WHO, 2018a). There seems to be growing evidence to suggest that there is genetic component to the aetiology of ASD (Hens, 2019). However, despite extensive research, no specific genetic or biological markers have yet been identified.

Possibly due to the heterogenous nature of those diagnosed with ASD, there is debate within the literature about whether ASD is a useful construct (Waterhouse et al., 2016). Hens (2019) suggests that providing a label enables individuals to relate to others and have a shared understanding of their experience. Within the literature, a number of different terms are used to describe those who have received a diagnosis of ASD, for example 'autism', 'autistic' and 'autistic spectrum condition'. This terminology has been widely debated by academics, professionals and those within the ASD

community. In particular, there has been discussion about the connotations attached to the use of medicalised language, such as ‘condition’ or ‘disorder’ (Kenny et al., 2016). Recent research has explored the preferences of individuals within the community and of those providing professional support. Based on a survey of over 3000 people within the UK, the authors concluded that there is no one accepted term to describe those who have been diagnosed and that differences in preference appear to be entrenched (Kenny et al., 2016).

For consistency within this research, the decision was made to use the term ‘ASD’ throughout. The researcher recognises that this term has been criticised for its use of medicalised language. Nevertheless, due to the lack of consensus about terminology the researcher’s rationale for this term was:

- To be in line with the UK’s terminology for diagnosis (6A02; WHO, 2018a); and,
- The term is predominantly used within the Local Authority in which the research was conducted.

2.3.2 Prevalence

The WHO (2018a) estimates that worldwide one in 160 children meet the criteria for ASD; however, it is important to recognise that there will be cultural variation. There is no regularly updated record of the number of individuals diagnosed with ASD in the UK. The National Autistic Society (NAS) (2013) report that the most recent estimates gathered from the 2011 census found that 1.1% of the population had a diagnosis of ASD. Gender differences have been reported with an estimated male to female ratio of 3:1 (NAS, 2013). However, there appears to be growing opinion that girls may be better at ‘masking’ their difficulties, and therefore less likely to receive a diagnosis (NAS, 2013). According to the WHO (2018a), globally the prevalence of ASD appears to be on the rise, which is felt to be related to improved awareness and reporting, and better diagnostic measures.

2.3.3 The Relationship between Anxiety and ASD

2.3.3.1 Anxiety

Anxiety can generally be described as the feeling of fear or worry (Gaigg et al., 2018). It is an innate and adaptive human emotion which serves to protect us from perceived

threats (Muris, 2014). Anxiety activates a number of physiological responses, such as increasing our heart rate, to help us deal with potentially threatening situations (Gaigg et al., 2018). Throughout development, humans naturally experience anxiety to support their survival. For example, separation anxiety is common for infants around 9 months of age (Muris, 2014). Concerns can arise when the feelings of anxiety are so frequent and intense that they interfere with everyday life. These feelings can impede other areas of children's lives such as their interactions with others and performance within school (Muris, 2014).

Within the UK, anxiety can be diagnosed as a disorder when the symptoms meet a particular threshold. Children and young people can be diagnosed with various types of anxiety such as 'generalised anxiety disorder' and 'social anxiety disorder' (ICD-11, WHO, 2018b). Anxiety 'disorders' are identified as one of the most prevalent mental health difficulties experienced by children and young people, and figures suggest that they are becoming increasingly common with younger children (NSPCC, 2017). Moreover, if left untreated, anxiety disorders identified within childhood tend to persist into adulthood (Muris, 2014). In a recent survey conducted by the NHS, 7.2% of 5 to 19-year olds in England were estimated to meet the criteria for an anxiety disorder (NHS Digital, 2018). The survey also suggested that anxiety disorders are more prevalent in females than males (NHS Digital, 2018).

Although anxiety can be categorised and diagnosed as a 'disorder', it can also be understood from a dimensional perspective, whereby individuals experience symptoms of anxiety on a continuum (Kessler, 2002). This definition acknowledges that all individuals may experience anxiety to varying degrees. Kessler (2002) discusses that many individuals may not meet a clinical cut off for a disorder; however, their symptoms would benefit from treatment and support. This thinking aligns with the emphasis on early intervention to support mental health needs (Children's Commissioner, 2017; YoungMinds, 2017). Within this study, anxiety is understood from a dimensional perspective.

2.3.3.2 Anxiety in the ASD population

Individuals with ASD appear to have a heightened vulnerability to experience anxiety, compared to the typically developing population (van Steensel et al., 2011; van Steensel & Heeman, 2017). A range of studies have explored the comorbidity between ASD and anxiety and have indicated comorbidity figures ranging from 35 to 84% (Rotheram-Fuller & MacMullen, 2011). One large systematic review included 2,121 children with ASD and reported that 36.9% met the diagnostic criteria for an anxiety disorder (van Steensel et al., 2011). This figure is quite startling, and there is growing consideration that anxiety may be an underlying difficulty that individuals with ASD experience (Ghaziuddin, 2005). This is due to a number of characteristics of 'typical' ASD presentation being also recognised as symptoms of anxiety; such as experiencing extreme distress to change and difficulties adjusting to new people (Ghaziuddin, 2005). However, despite this apparent overlap in symptoms, it is suggested that it is important that ASD and anxiety are understood as independent co-occurring difficulties to ensure that individuals receive access to support (Gaigg et al., 2018).

Research suggests that anxiety can present similarly in children and young people with ASD and 'typically developing' children (Kerns et al., 2014). However, there is growing recognition that for some children and young people with ASD, anxiety can present differently (Kerns et al., 2014; Ozsivadjian et al., 2012). Evidence suggests that children and young people with ASD are more likely to display anxiety through externalising behaviours such as aggression or repetitive/stereotyped behaviours (Kerns et al., 2014, Lecavalier et al., 2014; White et al., 2009). Ozsivadjian et al. (2012) explored this by holding focus groups with 17 parents of children with ASD. A major theme within the data was that parents described that anxiety in their children was displayed through challenging behaviour and avoidance/withdrawal. The authors suggested that the expression of anxiety through behaviour could be related to the children's difficulties with understanding and verbalising their emotions. Similarly, Lecavalier et al. (2014) suggest that 'anxiety-driven behaviours' may be more likely to occur in those individuals with ASD and lower cognitive functioning, due to difficulties expressing their anxiety verbally. It is important to recognise that although Ozsivadjian et al. (2012) study has high ecological validity as it was conducted within a UK context, the small sample limits the generalisability of the findings.

Due to the potential differences in presentation, authors have queried the methods that are used to identify anxiety in individuals with ASD (Kerns et al., 2014). The methods that are commonly used are standardised on 'typically developing' children; therefore, researchers have suggested that these may not be reliable measures of anxiety within an ASD population (Kerns et al., 2014; Ozsivadjian et al., 2012). Moskowitz et al. (2017) suggest that any assessment for anxiety within an ASD population must be multi-method using a variety of tools (e.g. observation, interviews and questionnaires) and not simply reliant on self-report measures.

2.3.4 Possible Explanations for the Relationship between ASD and Anxiety

There are a number of possible theoretical explanations for the high incidence of anxiety experienced by individuals with ASD. Due to the scope of this research, these cannot all be explored within this review. Two possible explanations will now be briefly outlined; however, these are not exhaustive.

2.3.4.1 Theory of Mind

Theory of Mind (ToM) refers to the ability to attribute mental states to oneself and others (Premack & Woodruff, 1978). It allows an individual to understand that other people have their own intentions, wishes and views and that these may be different to theirs (Baron- Cohen et al., 1985). ToM is recognised as crucial for successful social interaction as it supports us to understand and predict behaviour (Hezel & McNally, 2014). It is suggested that ToM begins to develop around the age of 4 years old in 'typically developing' children (Baron-Cohen et al., 1985). However, a large body of literature suggests that weaknesses in ToM are evident from a young age in children with ASD (Baron-Cohen et al., 1985; Yirmya et al., 1998).

Difficulties with ToM have been found to be associated with increased anxiety in children with ASD (Lei & Ventola, 2018). Furthermore, research indicated that adults diagnosed with social anxiety perform worse on ToM tasks than those without a diagnosis of anxiety (Hezel & McNally, 2014). As such, it is postulated that weaknesses related to ToM can lead to anxiety as the individual is unable to predict what might happen in social situations (Lei & Ventola, 2018). However, it is important

to note that there have been criticisms of the methods used to explore ToM, such as the reliance on the laboratory based 'false-belief task' (Bloom & German, 2000).

2.3.4.2 Sensory Processing

Within the ASD population, there appears to be a very high incidence (up to 90%) of sensory processing difficulties, as compared to the general population (Tomchek & Dunn, 2007; Baker et al., 2008). Sensory processing describes the ability to take in, organise and make sense of the different kinds of sensory input received by the brain (Schoen et al., 2009). Our brains are constantly receiving sensory information from both our external (e.g. sounds) and internal (e.g. body temperature) environment (Gaigg et al., 2018), This information is filtered by the brain to enable us to make sense of our world. Sensory processing is understood to be imperative to function optimally in our daily environments (Baker et al., 2008). Difficulties with sensory processing suggest that the brain is struggling to filter, make sense and predict what might happen. Sensory processing difficulties are postulated to therefore lead to anxiety because the individual is not able to make sense of what is happening in their environment (South & Rodgers, 2017). It could also be hypothesised that this relationship could be bi-directional; sensory processing difficulties might lead to feelings of anxiety or if an individual is anxious, their heightened physiological state could lead to difficulties processing sensory information.

2.4 Mindfulness

2.4.1 What Is It?

'Mindfulness' is a term that originated from Buddhist thinking and meditation practice which has received a great amount of attention in recent years (Davis & Hayes, 2011). The most widely accepted definition of mindfulness appears to come from Kabat-Zinn (1994) where mindfulness is described as 'paying attention in a particular way: on purpose, in the present moment, and non-judgmentally' (*p. 4*). In addition to this, Davis and Hayes (2011) describe that mindfulness is generally understood to be an awareness of your own psychological state *or* the practice that promotes this awareness. Mindfulness is therefore assumed to be an active process, whereby the individual learns to direct and focus their attention to what is happening in the moment, resulting in increased awareness of one's thoughts, feelings and bodily sensations

(Tang et al., 2007). This increased awareness, and ability to focus attention is suggested to promote cognitive processes and functions that are important for academic achievement, and social emotional functioning, including self- regulation, attention and anxiety (Zelazo & Lyons, 2012). As such, mindfulness advocates argue that everyone would benefit from increasing their ability to be 'mindful' to enhance their cognitive flexibility and ability to regulate their emotions (Williams & Kabat-Zinn, 2013).

2.4.2 Mindfulness Based-Interventions with Children and Young People

Mindfulness-based interventions appear to be an increasingly popular intervention to use with children and young people (Zoogman et al., 2014). Within the public arena, many mindfulness-based interventions have been specifically designed for children. Across these interventions, common themes have been identified, such as techniques that focus on attention through breathing, the role of body movements and focusing on thoughts and feelings (Zenner et al., 2014). Despite the apparent interest in utilising mindfulness-based interventions with children and young people, research investigating the efficacy continues to be in its infancy, especially in comparison with adult populations (Weare, 2013).

More recently several reviews of research in this area have been conducted (Carsley et al., 2018; Felver et al., 2016; Zenner et al., 2014; Zoogman et al., 2014). Zoogman et al. (2014) completed a meta-analysis of the use of mindfulness-based interventions within a youth population. Twenty studies were included, and the authors reported that most of these were conducted in schools; however, there was no description of who delivered the interventions. The findings varied from large to small effects, and the authors established that larger effects were found for wellbeing factors (such as anxiety) as compared to cognitive factors (such as attention). One potential criticism of this meta-analysis is that the number of included studies was relatively small (n= 20), which will decrease the statistical power of the effect sizes generated. It is also important to note that literature searches were completed in 2011. It is likely that since 2011 there has been more research conducted in this area which is therefore not included in their analysis.

A systematic review that included 24 studies looking at mindfulness-based interventions in schools, provided encouraging results and reported that mindfulness-based interventions appear to reduce stress and improve resilience (Zenner et al., 2014). The authors reported that the majority of interventions were delivered by outside instructors rather than teachers. Two thirds (*n*= 16) of the included research was conducted with secondary school pupils (Zenner et al., 2014). A review of the current evidence base suggests that the majority of the studies looking at the effectiveness of mindfulness-based intervention for children and young people is conducted in secondary schools (Felver et al., 2016), therefore less seems to be known about the effectiveness of utilising mindfulness-based interventions to promote children's wellbeing in primary school.

In more recent meta-analysis, the authors explored whether interventions are more effective at particular developmental periods, e.g. 'middle childhood' (6-10 years), 'early adolescence' (11-14 years) and 'late adolescence' (15- 18 years) (Carsley et al., 2018). The authors reported that overall mindfulness-based interventions were found to be helpful with small to moderate effect sizes for all age groups. However, the analysis identified the largest effect sizes within the late adolescence stage. It has been argued that varied responses to mindfulness may be due to late adolescence being a period of increased brain plasticity where they are more responsive to the intervention (Roeser & Pinola, 2014). As such, the authors highlight that it will be important for educational professionals to consider developmental levels when implementing mindfulness-based interventions with younger children.

However, contrary to this, Zelazo and Carlson (2012) argue that during the later years of elementary school (approximately 9-12 years of age) a number of developmental changes such as neural and mental organisation take place that support an individual's self-reflective capacity. Moreover, with 50% of long-term mental health difficulties being exhibited before the age of 14 (YoungMinds, 2017), authors have suggested that learning that takes place in the later years of primary school (approximately to 9-12 years) is critical for building resilience against later mental health difficulties (Schonert-Reichl & Lawlor, 2010). Therefore, it appears important for further research to be conducted that explores whether mindfulness-based

interventions can be appropriately adapted to support positive wellbeing and reduce anxiety in younger children.

2.4.3 Mindfulness-based Interventions Delivered by Teachers

As previously described, much of the research exploring the impact of mindfulness-based interventions with children and young people is reported to have been conducted within school settings (Zoogman et al., 2014). However, most of the interventions within the research base appear to have been delivered by outside professionals rather than regular teaching staff (Zenner et al., 2014). Considering the increased emphasis on schools' role in promoting positive mental health (DoH & DfE, 2017), it seems important to explore research that investigated mindfulness-based interventions delivered by teachers.

Based in the UK, the Mindfulness in Schools Project (MiSP) is a not-for-profit charity that provides mindfulness training for schools (MiSP, 2020). Educational settings can purchase training for their teachers to deliver mindfulness curriculums (e.g. 'Paws b' for primary school pupils and 'dot b' for secondary school pupils). There are a number of prerequisites that the teachers require to be able to access the training to deliver the curriculum to their students, including; prior access to an 8-week mindfulness course with demonstration of a further two to three months personal mindfulness practice (MiSP, 2020). As such, the teachers delivering the curriculum should have a high level of skill and experience of mindfulness. However, the length of training and costs related to this, may be considered a potential barrier for some teachers.

Research has explored the feasibility and impact of the MiSP curriculums (Kuyken et al., 2013; Vickery & Dorjee, 2016). With a large sample (>500) of 12 to 16 year olds, the MiSP curriculum was delivered over a 9-week period (Kuyken et al., 2013). Self-report measures were collected at baseline, post and follow up (approximately two to three months after the intervention). The researchers reported that, relative to the controls, children who received the MiSP curriculum reported fewer depressive symptoms and lower stress at follow up (Kuyken et al., 2013). The seven teachers involved in the research were also asked to rate their experience of teaching the curriculum on a ten-point Likert scale. Their mean ratings were as follows; 'pupil

interest' 7.6, 'pupil understanding of mindfulness' 6.8 and 'enjoyment of teaching' 8.6. These figures seem to suggest that the teachers generally enjoyed teaching the curriculum; however, they were not entirely confident that the pupils fully understood mindfulness.

Vickery and Dorjee (2016) later explored the use of the 'Paws b' curriculum with children aged between 7 and 9 years old in three UK primary schools. The majority of children reported that they liked practising mindfulness in school (76%). Negative affect (as measured by child self-report) was found to significantly decrease, but it is important to note that there were no significant changes in child reported emotional awareness or positive well-being. The authors concluded that the information gathered indicated that 'Paws b' can be feasibly delivered by primary-school teachers as part of the regular curriculum. Both this study and Kuyken et al. (2013) benefitted from the use of a control group to limit the threats to internal validity. However, weaknesses include the lack of random assignment of the groups and reliance on self-report measures. Nevertheless, these findings provide encouraging evidence for the potential benefits of teacher delivered mindfulness.

Research has also explored pupil and class teacher perceptions of the 'Paws b' curriculum (Thomas & Atkinson, 2017). Following the delivery of the curriculum by a trained teacher from the same the school, eight children participated in focus groups and three class teachers engaged in semi-structured interviews. A number of themes and subthemes were identified within the data (Thomas & Atkinson, 2017). In summary, the findings highlighted that the majority of the pupils enjoyed the curriculum and reported being better able to self-regulate and that they felt more relaxed in school. Both the class teachers and pupils felt that the curriculum was accessible and feasible. Moreover, the class teachers were also able to provide examples of how the curriculum seemed to help pupils with anxiety (Thomas & Atkinson, 2017). However, class teachers identified some potential adaptations they would recommend to the curriculum, such as differentiation and delivery over shorter sessions. Although the intervention was not delivered directly by the class teachers, this research adds to our understanding of the perceived feasibility and utility of the use of mindfulness-based interventions delivered by school staff.

An alternative mindfulness-based curriculum has been developed within America and is also now available within the UK. The MindUP curriculum (The Hawn Foundation, 2011) aims to teach mindfulness skills to promote children's cognitive, social and emotional development. Three versions of the curriculum can be purchased online that are designed for different age ranges (approximately 4-7 years; 8-11 years and 11-14 years) (The Hawn Foundation, 2011). Additional training can also be accessed from MindUP, although this is not required to access the curriculums. In the development stages of the MindUP curriculum, Schonert-Reichl and Lawlor (2010) conducted a quasi-experimental study to explore the impact of the curriculum on a number of wellbeing outcomes. 246 participants aged between 9 and 13 years old were included in the research. A wait-list control group was used, with no randomisation, and self-report and teacher-report measures were taken before and after the intervention. Prior to delivering the curriculum, six teachers attended a 1-day training session where the 10 lessons of the curriculum were outlined. The teachers then delivered the curriculum to their class over 10 weeks. The researchers reported that in contrast to the control group, teacher reports of children's social and emotional competence and children's self-reports of optimism and positive affect significantly improved. However, there were some mixed findings, as no significant improvement for negative affect or self-concept (as measured by self-report) was found. A possible limitation to this study is that information was not gathered at a follow up stage, so little is known about whether any benefits were sustained. Furthermore, there is a risk of potential participant bias due to some of the measures being collected from the teachers who also delivered the intervention.

More recently, a randomised control trial (RCT) including 99 participants was conducted in Canada (Schonert-Reichl et al., 2015). The study aimed to explore whether the MindUP curriculum would improve stress regulation and social and emotional functioning of 'upper elementary' aged children (9-11 years old). Teachers, with no training of mindfulness, delivered the MindUP curriculum to their classes over a 12-week period. Self-report and peer-report measures related to wellbeing and pro-social behaviour were taken before and after the curriculum was delivered. Compared to the control group, significant improvements in wellbeing and pro-social behaviour were found. Also, a moderate effect size (.55) was reported for the social and emotional measures (Schonert-Reichl et al., 2015). Both this and the early research

conducted by Schonert-Reichl and Lawlor (2010) provides emerging evidence of the potential benefits of the MindUP curriculum on children and young people's mental health. However, no peer-reviewed research was identified that investigated the impact of the MindUP curriculum within a UK context. Therefore, caution should be taken when attempting to generalise the findings.

2.5 Systematic Literature Review

2.5.1 Review Approach

A systematic literature review refers to a set of processes used to integrate different types of evidence in order to establish what is known from existing research and how it is known (Gough, 2007). The approach allows the reviewer to decide whether research findings, in a particular area, are consistent and generalisable (Gough, 2007). Furthermore, the approach is argued to increase the reliability and validity of a literature review as the approach:

- Provides comprehensive investigation of the literature available in the area of interest;
- The quality of the literature is reviewed;
- The literature is synthesised following a detailed and explicit approach; and,
- Rigorous and transparent processes are used throughout. (Robson, 2002).

Gough (2007) described the following as stages of a systematic literature review:

1. *Formulate research question and develop protocol*
2. *Define studies to be considered (inclusion criteria)*
3. *Search for studies (search strategy)*
4. *Screen studies (check they meet the inclusion criteria)*
5. *Describe studies (systematic map of the research)*

In addition, Gough (2007) developed the 'Weight of Evidence' framework, which is used to assess the quality and relevance of research during the synthesis and review process (see table 2-1). Both of these were the approaches utilised within this review.

Table 2-1: A table describing the Weight of Evidence framework for use in applied research (Gough, 2007).

Weight of Evidence A	Generic, non-review specific judgement about quality of evidence e.g. generally accepted criteria by those who generally use and produce evidence.
Weight of Evidence B	Review specific judgement about the appropriateness of a specific form of evidence for answering the current review question e.g. the relevance of research design.
Weight of Evidence C	Review specific judgement about the relevance of the focus of the evidence for the review question e.g. type of sample, method of data gathering or analysis.
Weight of Evidence D	Overall assessment of the extent that a study contributes evidence to answering a review question, typically a combination of A, B and C.

Initially, the researcher aimed to utilise a systematic approach to review the current literature related to the use of mindfulness-based interventions, delivered in school settings, with children and young people diagnosed with ASD to reduce anxiety. The researcher attempted to be exhaustive with the search terms; particularly for ASD due to the varied terminology within the literature. Truncation symbols were used to enable variations to be identified (e.g. autism, autistic, autism-spectrum disorder and autism-spectrum condition) (see table 2-2). However, no peer-reviewed and published studies that met the criteria were identified during the initial search and screening process (figure 2-1).

Six studies were identified that utilised mindfulness-based interventions with children and young people with ASD; however, these were all conducted in clinical or home settings and only one reported the impact on anxiety specifically. The reference lists of these papers were also reviewed; however, no peer-reviewed school-based research was identified.

As such, the decision was made to explore an alternative question using a systematic approach; to investigate the current evidence base for the efficacy of mindfulness-based interventions to reduce anxiety with primary school aged children. It was felt that this would be a more appropriate focus for the *systematic literature review*. The

systematic literature review adopts a post-positivist approach by focusing on the evidence base for the *effects* of mindfulness-based interventions. Following on from this the studies exploring the use of mindfulness within an ASD youth population will be discussed from a pragmatic standpoint, to enable learning related specifically to the use of mindfulness-based interventions within that population.

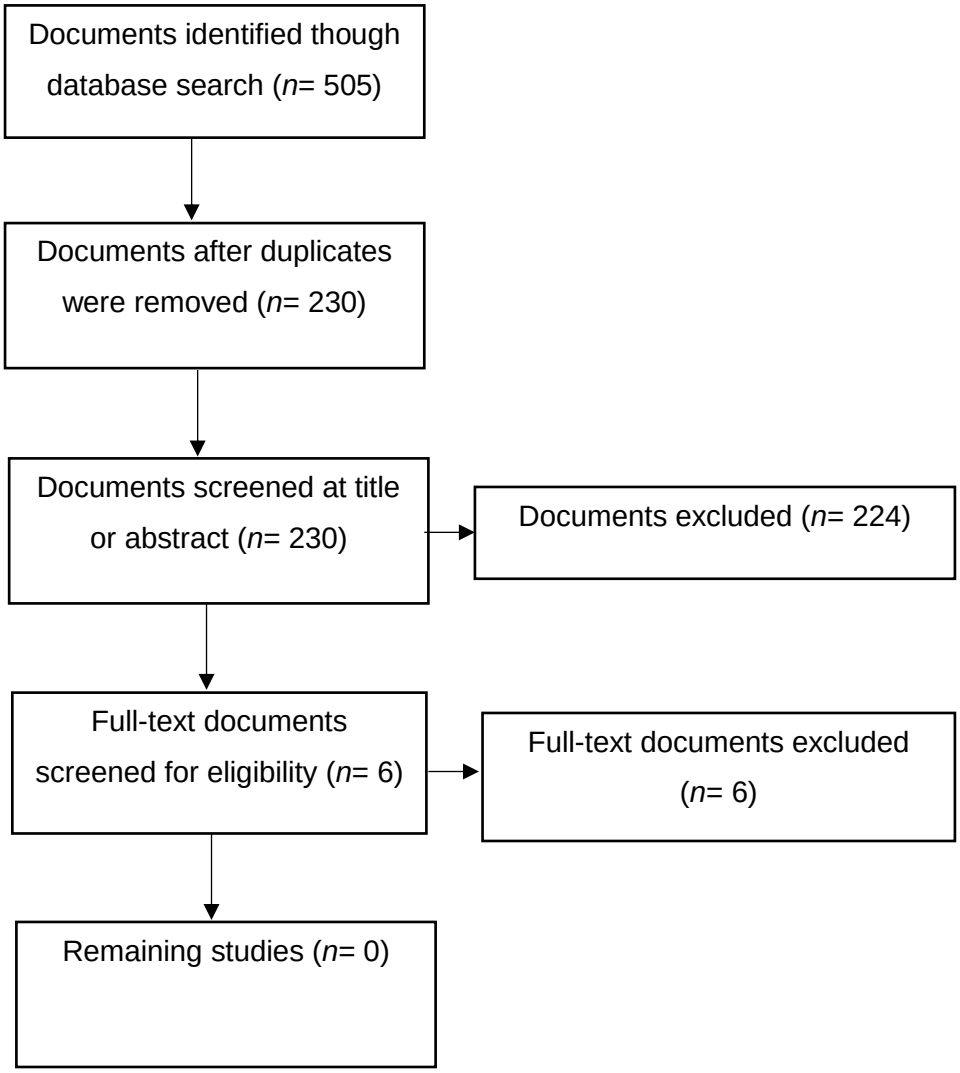
Therefore, this review aimed to explore the following question:

- *What is the evidence base for the use of mindfulness-based interventions in schools to reduce the anxiety of primary school aged children (4 to 11 years old)?*

Table 2-2: A table to show the initial searches completed.

Database searched	***Search terms***	***Number of documents***
PSYCHinfo	autis* AND mindfulness AND anxiety AND school*	4
	autis* AND mindfulness* AND anxiety	25
	autis* AND mindfulness	131
Web of Science	autis* AND mindfulness AND anxiety AND school*	3
	autis* AND mindfulness* AND anxiety	48
	autis* AND mindfulness	113
Scopus	autis* AND mindfulness AND anxiety AND school*	3
	autis* AND mindfulness* AND anxiety	47
	autis* AND mindfulness	131

Figure 2-1: A flow diagram of the search and screening process (from PRISMA: Moher et al., 2009).



2.5.2 Review Criteria

The inclusion and exclusion criteria for selection are outlined in table 2-3 alongside the justification for the criteria.

Table 2-3: A table to show the criteria for reviewed studies.

Feature	***Inclusion criteria***	***Exclusion criteria***	***Rationale***
Type of Publication	Peer reviewed journal.	Any other source than a peer-reviewed journal (e.g. un-published dissertations, books, non-peer reviewed journals).	To ensure that the included research was of high quality.
Language of Publication	English/ translated to English.	All other languages.	To ensure the research was accessible.
Research Design	The study reports some quantitative data. The study reports pre-and post-comparison data.	The study does not report any quantitative data. The study only includes a baseline or a post measure with no comparison.	To enable the impact on anxiety to be explored.
Participant Sample	Primary school, elementary or kindergarten aged children were included (if aged between 4 years and 11 years old). Both targeted and universal samples.	The participants did not include children aged between 4 years and 11 years old.	The rationale for this age range is that less appears to be known about the impact of mindfulness interventions on this particular age group. Studies that were conducted at elementary schools were also included within this review to acknowledge the differences between educational systems across countries without excluding relevant research within the focused age range.

Feature	***Inclusion Criteria***	***Exclusion Criteria***	***Rationale***
Intervention	A mindfulness intervention is implemented in a school-based setting.	Any other intervention is implemented (e.g. yoga). The intervention takes place anywhere other than school e.g. clinical setting.	This review aimed to investigate how mindfulness can be implemented within a school environment.
Outcome measures	Quantitative measures of anxiety levels.	The outcomes do not measure anxiety levels.	To allow for the impact on anxiety to be explored.

2.5.3 Search Strategies

Systematic searches were conducted between the 16th July 2019 and 19th July 2019. Three key databases were accessed; PSYCHinfo, Web of Science and Scopus. No year or language restrictions were applied when searching the databases.

The key terms searched were:

- 'school*' (* allowing for variations such as school-based) AND
- 'mindfulness' AND
- 'anxiety'

These simple search terms were utilised to help identify a broad range of literature. The search terms did not include a term specific to the target age group as it was felt that the term 'school' narrowed the literature sufficiently at this stage.

Table 2-4: A table to show the database searches.

Database searched	***Search terms***	***Number of documents***
PSYCHinfo	school* AND mindfulness AND anxiety	220
Web of Science	school* AND mindfulness AND anxiety	172
Scopus	school* AND mindfulness AND anxiety	153

2.5.4 Results

The literature searches described earlier yielded 545 documents that were then screened for eligibility. Figure 2-2 outlines the search and screening process. Fifteen

papers fully met the criteria and are included within this review. Further description of the selected papers can be found in table 2-5. A number of studies investigated the impact of a mindfulness intervention on various dependent variables. Due to the research question for this this review, only the measures and outcome relating to participant anxiety are reported.

Figure 2-2: A flow diagram of the search and screening process (from PRISMA: Moher et al., 2009).

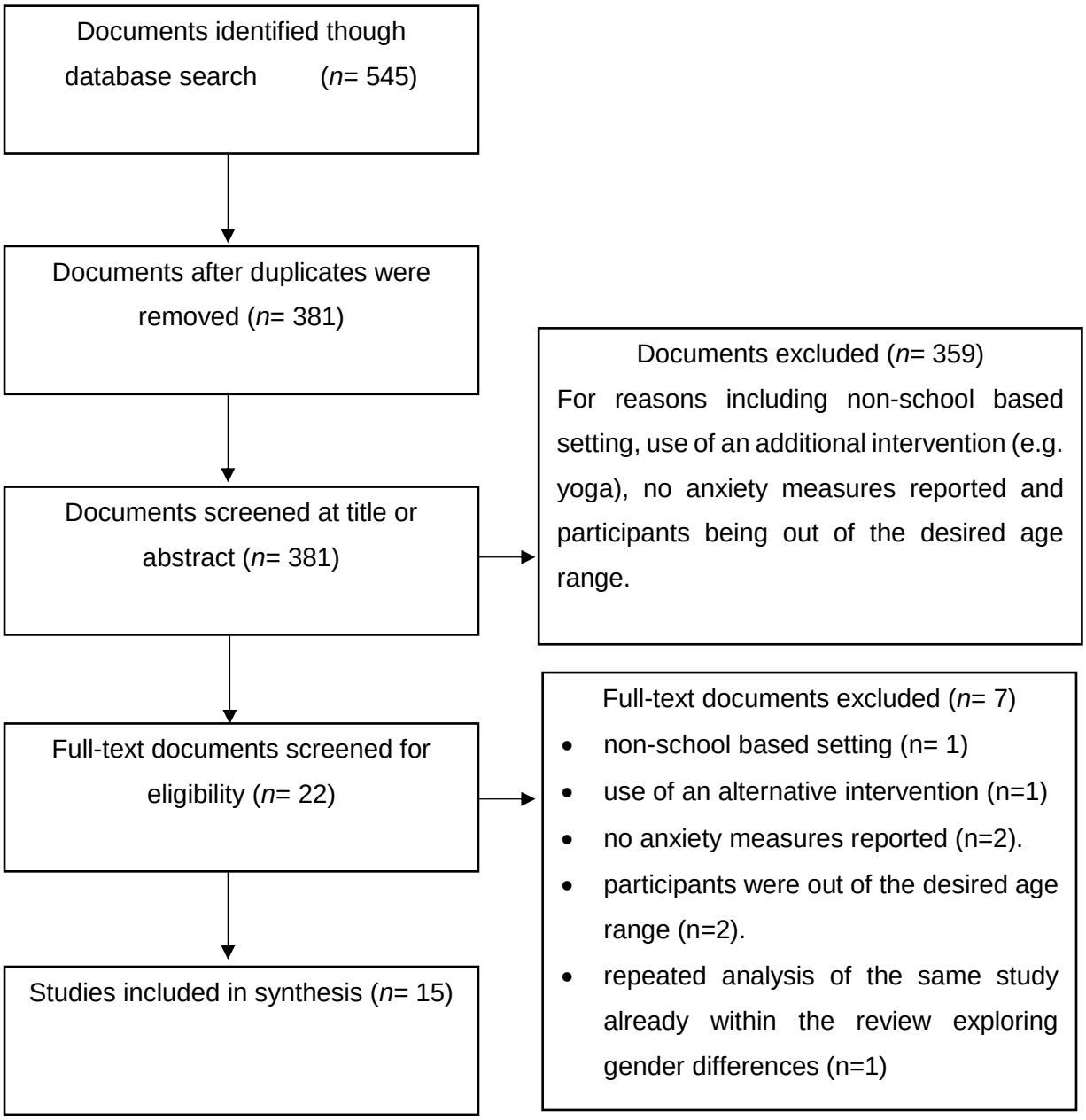


Table 2-5: A table to describe the included studies.

Study	***Participants***	***Intervention***	***Design***	***Anxiety measure***	***Outcome*** ***Effect size is reported as Cohen's d unless otherwise stated***	***Limitations***
Alampay et al. (2019) A Pilot Randomised Controlled Trial of a Mindfulness Program for Filipino Children. *Philippines*	Elementary (*n*=92; 9-12 years old) and high school students (total *n*=186) aged 9-16 years old (109 females, 77 males). *Inclusion criteria:* some behavioural or emotional difficulties.	Manualised curriculum developed by researchers based on mindfulness-based cognitive therapy. 8 weekly sessions (75 minutes) delivered in groups by trained teachers and guidance counsellors. Two additional sessions: an initial session to build rapport and closing session.	RCT including active control group. Baseline, post-intervention and 2-month follow up. Intervention (*n*=87) Active control (*n*= 99) Nine groups of children for each condition. Active control engaged in 'handicrafts' (e.g. making bracelets).	*Self-report:* State-Trait Anxiety Inventory for Children (STAI-C).	Mean anxiety scores slightly reduced for the intervention group (baseline *M*= 2.11, post-intervention *M*= 2.08 and follow up *M*= 1.99), however there was no significant differences between changes in anxiety levels in the intervention group vs the active control.	Groups were not equivalent. Generalisability to Western/ UK context.
Britton et al. (2014) A Randomized Controlled Pilot Trial of Classroom-Based	Sixth grade pupils attending elementary school (11-12 years old).	6-week daily mindfulness meditation practice including the teaching of; - breath awareness; - awareness of thoughts and feelings, and; - body sweeps. Led by history teachers.	RCT with active control group. Active control received 6-week curriculum on ancient African history.	*Self-report:* An adapted version of the STAI-C.	There was a significant decrease in anxiety levels from the baseline to post intervention for both groups (intervention and active control).	Potential risk of diffusion of treatment as both groups were from the same school.

Study	Participants	Intervention	Design	Anxiety measure	Outcome *Effect size is reported as Cohen's d unless otherwise stated*	Limitations
Continued. Britton et al. (2014) Mindfulness Mediation Compared to an Active Control Condition in Sixth-Grade Children. *USA*	*n*= 101 (55 males, 46 females).		Randomly assigned, two classes received the intervention in the autumn term, with the remaining two classes receiving the intervention in the spring term. Baseline and post measures were taken.		No significant difference between the improvements with the intervention vs the active control group. *Effect size:* Total affect disturbance *d*= .63 positive affect *d*= .81	No follow-up measures were taken.
Carsley et al. (2015) Effectiveness of a Classroom Mindfulness Colouring Activity for Test Anxiety in Children. *Canada*	Elementary school (Grades four to six) *M* age 10.92 years old. *n*= 52 53.8% female. .	Completion of a structured colouring task (mandala) before a spelling test.	RCT Students randomly assigned to either the mandala condition or a free colouring condition. Pre and post measures (immediately before the colouring task and after).	*Self-report:* State-Trait Anxiety Inventory for Children State form (STAIC-S).	A significant decrease between anxiety scores pre-colouring and post colouring was found for the intervention and control condition.	Relatively small sample affecting generalisability. No teaching of mindfulness principles.

Study	***Participants***	***Intervention***	***Design***	***Anxiety measure***	***Outcome*** ***Effect size is reported as Cohen's d unless otherwise stated***	***Limitations***
Carsley & Heath (2019) Evaluating the Effectiveness of a Mindfulness Colouring Activity for Test Anxiety in Children. *Canada*	Elementary school (Grades four to six) *n*= 154. 49.4% female.	Completion of a structured colouring task (mandala) before a spelling test.	RCT Students randomly assigned to either the mandala condition or a free colouring condition. Pre and post measures (immediately before the colouring task and after).	*Self-report:* STAIC-S.	Consistent with the above research (Carsley et al., 2015) a significant decrease between anxiety scores pre-colouring and post colouring was found for the intervention and control condition.	No teaching of mindfulness principles. No follow up or examination of longer-term impact of engaging in structured colouring tasks.
Crescentini et al. (2016) Mindfulness-Orientated Mediation for Primary School Children: Effects on Attention and Psychological Well-Being. *Italy*	31 primary school students from two classes aged between 7-8 years old. Males *n*= 15 Females *n*= 16	8-week intervention of 'mindfulness orientation mediation' delivered by external trainers. Three meetings a week increasing in time from 10 minutes per meeting to 30 minutes. Focused on: - mindfulness breathing, - mindfulness of body parts, and; - mindfulness of thoughts.	RCT Two classes randomly assigned to intervention or active control. Active control involved the same structure (3 meetings a week, for 8 weeks). The activities consisted of reading and commenting on different chapters of a book. Pre and post measures.	*Teacher report:* Child-Behaviour Checklist-Teacher Report Form (CBCL-TRF) which includes an anxiety sub-scale.	Significant effect for the reduction of internalizing problems (anxiety scale contributes) post intervention. *Anxiety means:* *Intervention:* Pre: 59.88 Post: 59.19 *Control:* Pre: 54.53 Post: 54.53	Relatively small sample size. No independent anxiety measure used; only included a sub-scale.

Study	***Participants***	***Intervention***	***Design***	***Anxiety measure***	***Outcome*** ***Effect size is reported as Cohen's d unless otherwise stated***	***Limitations***
Dove & Costello (2017) Supporting Emotional Well-Being in Schools: A Pilot Study into the Efficacy of a Mindfulness-Based Group Intervention on Anxious and Depressive Symptoms in Children. *Australia*	Grade six students from three primary schools. 9-10 years old *n*= 57 37 males, 20 females.	6-week child mindfulness programme 'The Robust, Resilient, Ready-to-go' 1-hour session which included whole group and smaller group activities (three to five children). Delivered by researchers.	Within-subjects repeated measures design, with pre and post measures.	*Self-report:* Revised Children's Anxiety and Depression Scale (RCADS).	Although not significant, a decline in all negative emotional symptoms (RCADS) was found post interventions. *Effect sizes:* SAD*: d= .12.* SP: *d= .17* GAD: *d= .17.* PD: *d= .24* OCD: *d= .14.* MDD: *d= .14*	No control group, repeated measures lower the internal validity. No follow up measures to explore long term effects.
Etherington & Costello (2018) Comparing Universal and Targeted Delivery of a Mindfulness-Based Program for Anxiety in Children. *Australia*	66 students in grades five and six (aged between 9 and 12 years old) attending two schools. Males: *n*= 39 Females: *n*= 27	'The Robust, Resilient, Ready-to-go' programme. Eight sessions (6 core sessions, 2 booster sessions) delivered over 16 weeks. Delivered by mental health professionals. 1-hour session.	Within-subjects repeated measures design, with pre and post measures. 46 pupils received the 'universal' intervention (whole class) at one school setting. 20 pupils identified as 'at risk' of social and emotional adjustment (including anxiety) from another school.	*Self-report:* RCADS.	Significant decrease in anxiety levels post intervention for those in the targeted group (*effect size d*= .73) and for those in the universal group (*effect size d*= 1.10) who were categorised as high anxiety. For those who were categorised as 'low-to-average anxiety' there was no significant change.	No control group, repeated measures lower the internal validity. No follow up measures to explore long term effects. Fidelity of the intervention is not considered.

Study	*Participants*	*Intervention*	*Design*	*Anxiety measure*	*Outcome* *Effect size is reported as Cohen's d unless otherwise stated*	*Limitations*
Lam (2016) School-Based Cognitive Mindfulness Intervention for Internalizing Problems: Pilot Study with Hong Kong Elementary Students. *Hong Kong*	20 students with high internalizing problems (aged 9-13 years) from seven elementary schools. Females *n*= 11 Males *n*= 9	Nine 80-minute weekly group sessions adapted from mindfulness-based cognitive therapy. Delivered after school in a classroom by two psychologists.	RCT with a wait-list control. 10 participants randomly assigned to each group. Pre, post and follow up measures.	*Self-report and parent report:* RCADS and The Child Behaviour Checklist (CBCL).	Small to medium effect sizes were found for various anxiety symptoms (ranging from *d*= .24 to .54). Anxiety symptoms (such as generalised anxiety) were significantly lower after the intervention and gains were maintained at three-month follow up for most anxiety symptoms.	Generalisability to Western/ UK culture? No independent anxiety measure; only included a sub-scale. RCT design with small group.
Malboeuf-Hurtubise et al. (2017a) Mindfulness-Based Intervention in Elementary School Students with Anxiety and Depression: A Series of n-of-I Trials on Effects and Feasibility. *Canada*	Three elementary students from grades three and four (aged 9 and 10 years) with diagnosed anxiety and/or depression. Two males, one female.	Based on mindfulness-based cognitive therapy, an eight-week mindfulness intervention was delivered on a weekly basis for one hour. A trained therapist led the sessions.	Single-subject experimental A-B-A design 10 data points at each; baseline, intervention and follow up.	*Teacher report and self-report:* Items from the Behavioural Assessment System for Children (BASC-2) which includes anxiety as a sub-scale.	The results did not clearly indicate that the intervention had a clinically significant impact on anxiety. Significant differences in anxiety were observed for one participant (as reported by teacher), however this was not maintained during follow-up.	Design and small sample limits generalisability. Lack of control group. No independent anxiety measure used; only included a sub-scale.

Study	***Participants***	***Intervention***	***Design***	***Anxiety measure***	***Outcome*** ***Effect size is reported as Cohen's d unless otherwise stated***	***Limitations***
Malboeuf-Hurtubise et al. (2017b) A Mindfulness-based Intervention Pilot Feasibility Study for Elementary School Students with Severe Learning Difficulties: Effects on Internalized and Externalized Symptoms From an Emotional Regulation Perspective. *Canada*	14 students from elementary settings aged 9-12 years with special education needs. Participants were from a special education class. Males *n*= 6 Females *n*= 8	8-week mindfulness meditation intervention was delivered (in French) to the whole class. Based on mindfulness-based cognitive therapy and mindfulness-based stress reduction principles and delivered by a therapist and social worker. Weekly sessions for 1 hour.	Quasi-experimental one group pre and post-test design.	*Teacher report and self-report:* BASC-2.	*Self-report:* Significant differences were found in levels of anxiety pre and post intervention. *M*= Pre: 13.80 Post: 11.00 Effect size *d*= .34 *Teacher report:* Differences observed in M, but significant. *M*= Pre: 1.42 Post: 1.07 Effect size *d*= .08	Small sample affecting generalisability, and no control group. No independent anxiety measure used; only included a sub-scale.
Moreno-Gomez & Cejudo (2019) Effectiveness of a Mindfulness-Based Social Emotional Learning Program on Psychosocial Adjustment and	74 Kindergarten children from one setting aged between 4 and 6 years old (*M*= 5.08).	MindKinder programme delivered by teaching team. A psycho-educational group intervention consisting of 6 weekly sessions of 15 minutes for 6 months.	Quasi-experimental design, pre, post and follow up (6 months) measures with a control group. The control group would receive the intervention the following academic year.	*Teacher report:* BASC-2.	*Mean:* Pre: 5.06 Post: 4.25 Follow up: 4.21 *Post intervention:* anxiety levels were significantly reduced. Small effect *d*= .23	Potential for bias, teacher rating anxiety and delivering the intervention. No independent anxiety measure

Study	*Participants*	*Intervention*	*Design*	*Anxiety measure*	*Outcome* *Effect size is reported as Cohen's d unless otherwise stated*	*Limitations*
Continued. **Moreno-Gomez & Cejudo (2019)** Neuropsychological Maturity in Kindergarten Children. *Spain*	Males *n*=39 Females *n*=35	Teaching focuses on: - mindfulness mediation; - visualisation techniques, - mandalas, and; -body awareness.			*Follow-up:* Anxiety levels sustained. Small effect *d*= .22	used; only included a sub-scale.
Napoli et al. (2005) Mindfulness Training for Elementary School Students: The Attention Academy. *USA*	Second and third grade pupils at two elementary schools. Ages not reported *n*= 228 (120 males, 108 females).	Two trainers provided mindfulness intervention using the 'Attention Academy Program'. Sessions were run bimonthly for 45 minutes over a 24-week period.	RCT Random allocation to either an intervention or control condition with 114 participants in each. The control condition participated in reading or other quiet activities. Pre- and post-measures were collected.	*Self-report:* An adapted version of the Test Anxiety Scale (TAS).	Statistically significant results were found for TAS pre-to post test. There was a decrease in test anxiety scores. *Effect size:* *d*= .39	No follow up measures were taken to explore long term impact.

Study	*Participants*	*Intervention*	*Design*	*Anxiety measure*	*Outcome* *Effect size is reported as Cohen's d unless otherwise stated*	*Limitations*
Parker et al. (2014) The Impact of Mindfulness Education on Elementary School Students: Evaluation of the Master Mind Program. *USA*	Two elementary schools. 9-11 years old *n*= 111 (47 males, 64 females). Fourth and fifth grade pupils.	The 'Master Mind' programme was delivered by class teachers for four weeks, 15 minutes a day for 20 consecutive school days. Class teachers received 8 hours of Master Mind training.	RCT with wait list control. Each school was randomly assigned to the intervention group (*n*= 71) or wait-list control group (*n*= 40). Wait-list control received their regular curriculum for the 4-week period.	*Teacher report:* Behaviour Checklist-Teachers Report Form (C-TRF).	Females had lower anxiety problems at post-test compared to females in the control condition. No significant differences observed for males. *Effect sizes:* Anxiety problems *d*= .23 Boys *d*= .27. Girls *d*= .62	No independent anxiety measure used; only included a sub-scale. Potential threat as the teachers reported anxiety and delivered the intervention.
Semple et al. (2005) Treating Anxiety with Mindfulness: An Open Trial of Mindfulness Training for Anxious Children. *USA*	5 students (3 males, 2 females) attending an elementary school (aged 7-8 years old).	A 6-week programme developed from adult mindfulness-based cognitive therapy and mindfulness-based stress reduction programmes. one session weekly for approximately 45 minutes delivered in a small group by researchers. Participants were chosen based on school observations of anxiety symptoms.	Ideographic approach. Pre and post-test measures.	*Self-report measures and teacher report:* The Multidimensional Anxiety Scale for Children (MASC), STAIC-S and CBCL-TRF.	No analysis of self-reported anxiety was provided in the paper. Three of the participants: a reduction in anxiety was found (as measured by a change in T-scores using the CBCL-TRF) One participant: there was an increase in anxiety (as measured by the CBCL-TRF) Post -data was missing for one participant.	Design leads to threats to external and internal validity e.g. small sample, no control and limited data points (only pre and post). No independent anxiety measure used; only included a sub-scale. No consideration of intervention fidelity.

Study	*Participants*	*Intervention*	*Design*	*Anxiety measure*	*Outcome* *Effect size is reported as Cohen's d unless otherwise stated*	*Limitations*
van de Weijer-Bergsma et al. (2014) The Effectiveness of a School-Based Mindfulness Training as a Program to Prevent Stress in Elementary School Children. *The Netherlands*	Third, fourth and fifth grade pupils from three elementary schools. 8-12 years old. *n*= 199 (110 females, 89 males).	'MindfulKids' training. A trainer visited each class for twelve 30-minute sessions over 6 weeks. The classroom teacher attended the sessions and they then delivered 5-minute exercises with the classes on the other school days.	RCT with wait list control. Each class was assigned randomly to an intervention group or a waitlist control group. Measures were taken at baseline (1), pre-test (2), post-test (3) and follow up (4). The immediate intervention group received their intervention between time 1 and 2, and the waitlist received their intervention between time 2 and 3.	*Parent report:* Screen for Child Anxiety Related Emotional Disorders **(**SCARED-71)	Anxiety symptoms decreased significantly. However, effect sizes were small. The difference between pre-test to follow-up was significantly larger than the baseline to pre-test difference for anxiety symptoms. *Effect sizes:* <u>Baseline (vs pre-test)</u> Anxiety symptoms *r*=.007 <u>Post-test (vs pre-test)</u> Anxiety symptoms *r*=-.163 <u>Follow-up (vs post-test)</u> Anxiety symptoms *r*=-.369 * the paper outlines that the regression coefficients have been standardised and therefore should be interpreted as effect sizes *r*, with 0.1 (small), 0.3 (medium) and 0.5 (large).	Potential risk of diffusion of treatment as all within the same school.

2.5.5 Synthesis of Results

2.5.5.1 Study Characteristics

The studies included in this review were conducted in various parts of the world; the USA (Britton et al., 2014; Napoli et al., 2005; Parker et al., 2014; Semple et al., 2005), Canada (Carsley et al., 2015; Carsley & Heath, 2019; Malboeuf-Hurtubise et al., 2017a; Malboeuf-Hurtubise et al., 2017b), Australia (Dove & Costello, 2017; Etherington & Costello, 2018), the Netherlands (van de Weijer-Bergsma et al., 2014), the Philippines (Alampat et al., 2019), Hong Kong (Lam, 2016), Italy (Crescentini et al., 2016) and Spain (Moreno-Gomez & Cejudo, 2019). However, none of the included studies were based in schools within the UK. No date restrictions were placed on the searches; however, the majority of the studies were conducted in the last 5 years, except Napoli et al. (2005) and Semple et al. (2005).

RCT designs were adopted by the majority of the studies (nine out of the fifteen). This increases the validity of the evidence base as RCTs are considered the 'gold standard' in real world experimental research (Robson, 2002). The studies that utilised a RCT design, varied between whether they used a control group (Napoli et al., 2005), an active control group (*whereby the comparison group engaged in an alternative activity such as crafts*) (Alampay et al., 2019; Britton et al., 2014; Carsley et al., 2015; Carsley & Heath; 2009; Crescentini et al., 2016) or a waitlist control group (Lam, 2016; Parker et al., 2014; van de Weijer-Bergsma et al., 2014). The remaining included studies employed a quasi-experimental design (Malboeuf-Hurtubise et al., 2017b; Moreno-Gomez & Cejudo, 2019), a within-subjects repeated-measures design with pre-and post-comparison measures (Dove & Costello, 2017; Etherington & Costello, 2018), single case experimental design (Malboeuf-Hurtubise et al., 2017a) and case study (Semple et al., 2005). The lack of control group within these other studies impacts on the ability to draw causal conclusions about the effectiveness of mindfulness on anxiety (Robson, 2002).

There was a noticeable difference in the sample sizes across the studies, with the smallest sample consisting of three participants (Malboeuf-Hurtubise et al., 2017a) and the largest having 228 participants (Napoli et al., 2005). All studies included both male and female participants. Most of the studies employed a universal approach by

delivering the intervention to whole classes, or by randomly assigning participants to groups. Five studies targeted participants based on specific criteria; diagnosed anxiety and/or depression (Malboeuf-Hurtubise et al., 2017a), identified to have high internalising problems (Lam, 2016), some behavioural or emotional symptoms (Alampay et al., 2019), recognised by school to be displaying anxiety symptoms (Semple et al., 2005) and children with identified special educational needs (Malboeuf-Hurtubise et al., 2017b). One study investigated the impact of a mindfulness-based intervention delivered to a targeted group of children identified as being 'at risk', as well as a universal (whole-class) approach (Etherington & Costello, 2018).

The majority of the studies explored the use of mindfulness-based interventions with children at the latter end of primary school. Only one study explored the use of a mindfulness-based intervention with children aged 6 years old and younger. It Is hypothesised that this is likely to be due to their developmental level and the possible difficulties of developing a mindfulness-based intervention that is accessible for them.

All of the studies used previously developed scales to measure pupil anxiety such as the STAI-C and RCADS. The majority used self-report measures (Britton et al., 2014; Carsley et al., 2015; Dove & Costello, 2017; Napoli et al., 2005) and others utilised measures that involved the parents (van de Weijer-Bergsma et al., 2014) or teachers completing the scales (Parker et al., 2014). Four of the studies utilised two report measures, e.g. parent and self-report (Lam, 2016; Malboeuf-Hurtubise et al., 2017a; Malboeuf-Hurtubise et al., 2017b; Semple et al., 2005). The use of scales to measure a construct such as anxiety could be seen as somewhat reductionist and all of the studies could have benefitted from triangulating the information from alternative sources or through capturing measures from three sources, e.g. child, parent and teacher, to improve the validity of the measure.

2.5.5.2 Intervention Characteristics

The reviewed studies explored the impact of a range of different mindfulness interventions. Two studies (Carsley et al., 2015; Carsley & Heath, 2019), did not conduct what may be described as a 'full' intervention. These studies investigated the impact of a 15-minute mindfulness-based colouring activity on pupils' pre-and post-

levels of anxiety on one occasion. This task, although it has some links to mindfulness principles, varied greatly to the other interventions utilised within this review. The other interventions were all conducted over a longer period of time (four weeks to twenty-four weeks) and consisted of the teaching of mindfulness skills.

A number of similarities in relation to the core aspects or principles were noted across the interventions; such as, breath awareness, awareness of thoughts and feelings and awareness of sensations in the body (Britton et al., 2014 Crescentini et al., 2016; Dove & Costello, 2017; Etherington & Costello, 2018; Lam, 2016; Malboeuf-Hurtubise et al., 2017a; Malboeuf-Hurtubise et al., 2017b; Moreno-Gomez & Cejudo, 2019; Napoli et al., 2005: Parker et al., 2014; van de Weijer-Bergsma et al., 2014). As such, these appear to be the core aspects of mindfulness-based interventions delivered to children and young people. A few differences between the interventions were also apparent; with some incorporating learning around understanding relationships (Dove & Costello, 2017; Etherington & Costello, 2018; Parker et al., 2014) or 'mindful movements' such as yoga (Lam, 2016; Malboeuf-Hurtubise et al., 2017a; Malboeuf-Hurtubise et al., 2017b; Napoli et al., 2005; Semple et al., 2005).

All of the 'full' interventions were structured in some way; either each session followed the same format, or pre-set session plans that the teacher/trainer worked through were provided. Some of the studies specifically used structured and manualised programmes that have been developed specifically to be used with children and young people (Alampay et al., 2019; Dove & Costello, 2017; Etherington & Costello, 2018; Moreno-Gomez & Cejudo; 2019; Napoli et al., 2005; Parker et al., 2014; van de Weijer-Bergsma et al., 2014). Those that were manualised with set session plans, could be argued, to be more replicable in other school situations as this would ensure that all pupils are receiving the same intervention across different times and locations.

There was also variation in how frequently the interventions were delivered. Of the thirteen 'full' interventions, some involved daily access (Britton et al., 2014; Parker et al., 2014), one involved six sessions a week (Moreno-Gomez & Cejudo, 2019), whilst others were accessed once a week (Alampay et al., 2019; Dove & Costello, 2017; Lam, 2016; Malboeuf-Hurtubise et al., 2017a; Malboeuf-Hurtubise et al., 2017b; Semple et al., 2005), twice a week (van de Weijer-Bergsma et al., 2014) or three times

a week (Crescentini et al., 2016). Lastly, two interventions were delivered every other week (Etherington & Costello, 2018; Napoli et al., 2005). The total intervention time varied considerably between approximately 4.5 hours (Semple et al., 2005) and 39 hours (Moreno-Gomez & Cejudo, 2019).

The majority of the interventions were delivered by someone from the research team (Crescentini et al., 2016; Dove & Costello, 2017; Etherington & Costello, 2018; Lam, 2016; Malboeuf-Hurtubise et al., 2017a; Malboeuf-Hurtubise et al., 2017b; Napoli et al., 2005; Semple et al., 2005; van de Weijer-Bergsma et al., 2014). However, a few of the interventions were delivered by teachers, who either had previous training in the area of mindfulness, or who received training on the intervention as part of the study (Alampay et al., 2019; Britton et al., 2014; Moreno-Gomez & Cejudo; 2019; Parker et al., 2014).

2.5.5.3 Impact on Anxiety

Nine of the fifteen included studies found a statistically significant results on the reduction of anxiety post-intervention (Britton et al., 2014; Carsley et al., 2015; Carsley & Heath, 2019; Crescentini et al., 2016; Etherington & Costello, 2018; Lam, 2016; Moreno-Gomez & Cejudo, 2019; Napoli et al., 2005; van de Weijer-Bergsma et al., 2014). Three studies reported statistically significant results for aspects of their studies; females only (Parker et al., 2014), self-report not teacher report (Malboeuf-Hurtubise et al., 2017b) and for three of the four participants (Semple et al., 2005). Two studies did not find a statistically significant result; however, reported that there was a decline in mean anxiety symptoms after the intervention (Alampay et al., 2019; Dove & Costello, 2017). One study could not conclude that the intervention had a significant impact on anxiety as an effect was only found for one of the three participants and this was not maintained at follow up (Malboeuf-Hurtubise et al., 2017a).

Effect sizes were not reported by all of the studies; however, for those that reported effect sizes, a large effect was reported by two studies (Cohen's *d* =1.10: Etherington & Costello, 2018; Cohen's *d* = .81: Britton et al., 2014). The other studies found smaller effects, with the smallest pre-to post effect size being r = .163 (van de Weijer-Bergsma

et al., 2014). Interestingly, this study found a larger effect on their follow up measure (r = .369), which was a measure of anxiety collected 7 weeks after the intervention. This may be indicative of the potential long-term effects that the intervention could have on anxiety levels.

There was no observable difference in outcomes when comparing the outcomes of the 'full' interventions delivered by teachers versus those delivered by the researchers. Seven of the nine studies where researchers delivered the intervention found a statistically significant result (Crescentini et al., 2016; Etherington & Costello, 2018; Lam, 2016; Malboeuf-Hurtubise et al., 2017b; Napoli et al., 2005; Semple et al., 2005; van de Weijer-Bergsma et al., 2014), whereas three of the four interventions that were delivered by teachers, reported significant differences post intervention (Britton et al., 2014; Moreno-Gomez & Cejudo; 2019; Parker et al., 2014). The remaining study reported changes in mean anxiety scores although this reduction was not significantly different (Alampay et al., 2019). Therefore, this suggests that interventions delivered by trained teachers can be as effective as outside researchers or professionals. However, it is important to note that two of the studies that utilised teachers to deliver the intervention (Moreno-Gomez & Cejudo; 2019; Parker et al., 2014) have an increased risk of bias due to the teachers delivering both the intervention and reporting on participant anxiety.

2.5.6 Quality Assessment

The included studies were appraised using Gough's (2007) Weight of Evidence Framework. For each area of the Weight of Evidence Framework (e.g. A, B, C) a judgement was made as to whether the study was considered to be of '*Low*', '*Medium*' or '*High*' quality. Based on these assessments, an overall judgement (D) of the quality of each study was made. This judgement assessed the quality of the research with consideration of the focus of the review question. The criteria and calculations used to make these judgements are presented in Appendix 1. The results of this assessment are presented in table 2-6.

Table 2-6: A table displaying the Weight of Evidence judgements.

Study	Weight of Evidence A	Weight of Evidence B	Weight of evidence C	Weight of evidence D (overall judgement)
Alampay et al. (2019)	Medium	High	High	High
Britton et al. (2014)	High	Medium	High	High
Carsley et al. (2015)	Medium	Medium	Low	Low
Carsley & Heath (2019)	Medium	Medium	Low	Low
Crescentini et al. (2016)	Medium	Medium	Medium	Medium
Dove & Costello (2017)	Medium	Low	High	Medium
Etherington & Costello (2018)	Medium	Low	High	Medium
Lam (2016)	Medium	Medium	Medium	Medium
Malboeuf-Hurtubise et al. (2017a)	High	Medium	Medium	Medium
Malboeuf-Hurtubise et al. (2017b)	High	Low	Medium	Medium
Moreno-Gomez & Cejudo (2019)	High	Medium	High	High
Napoli et al. (2005)	Medium	Medium	High	Medium
Parker et al. (2014)	Medium	Medium	High	Medium
Semple et al. (2005)	Medium	Low	Medium	Medium
van de Weijer-Bergsma et al. (2014)	High	High	High	High

2.5.7 Conclusion

This review aimed to explore the evidence base for the use of mindfulness-based interventions in schools to reduce the anxiety of primary school aged children (4 to 11 years old).

A number of differences across the included studies were apparent, particularly in relation to the study design, delivery of the intervention (e.g. frequency, duration and content) and the self-report measures used to assess anxiety. These differences make it more challenging to draw firm conclusions from the evidence. However, nine studies reported significant changes in anxiety levels post intervention, with three more reporting significant changes for aspects of their studies. As such, this is indicative of the potential emerging evidence base for the use of mindfulness to improve primary school aged children's anxiety. Moreover, the assessment using the Weight of Evidence indicated that the majority of the studies that have been conducted in this area are of '*Medium*' or '*High*' quality. This provides further support for the potential strength of the current research that has been conducted.

The collective range of studies show the varied ways in which mindfulness principles may be positively implemented within schools and with children aged between 4 and 11 years. Within the current mental health agenda and focus on schools to promote children and young people's resilience and wellbeing (DoH & DfE, 2017), these findings are encouraging. As none of the included research was conducted within the UK, it highlights the need for more empirical evidence to establish whether the observed findings can be generalised to a UK population.

2.6 Mindfulness-Based Interventions with an ASD Population

This section will highlight research which explores the use of mindfulness-based interventions with children and young people who are diagnosed with ASD.

Research was identified that explored the use of mindfulness-based interventions with adolescents with ASD who were displaying aggressive behaviour (Singh et al., 2011; Singh et al., 2019). Singh et al. (2011) explored the effectiveness of a mindfulness-based intervention with three adolescents (aged 14-17) to reduce aggressive

behaviour. Mothers were taught a mindfulness-mediation intervention and asked to deliver this to their child five times a week for 30 minutes. The intervention phase varied from 17 to 24 weeks, as the intervention continued until no aggressive behaviour had been observed for four weeks. At a three year follow up, parents reported that aggression occurred approximately once a year. Although this study had a small sample, the longitudinal nature of the study highlighted the potential maintenance of improvements. This highlights the potential benefits for this population of mindfulness practice over an extended period of time. Nevertheless, it is important to recognise that there is an increased threat to the internal validity of the study due to the natural maturation of the participants.

A similar study was conducted more recently by Singh et al. (2019) where a mindfulness programme called 'Surfing the Urge' was developed. The participants received two weeks of mindfulness training at their home, before being asked to practice the skills themselves. Again, the sample size was limited (three participants aged 16-17 years old), however the results were also positive for all participants. Repeated measures were taken for a period of up to 31 weeks and the three participants demonstrated significant changes in their aggressive behaviour, to the extent that all three were taken off their prescribed medication. Both of these studies highlight the possible benefits of mindfulness to manage aggressive behaviour. Furthermore, it is recognised that anxiety in those with ASD can present itself through externalising behaviour (Kerns et al., 2014, Lecavalier et al., 2014 & White at al., 2009). Therefore, although no measures of anxiety were taken, it could be hypothesised that there may also have been a reduction in anxiety and that the mindfulness could have helped children with ASD to manage anxiety in alternative ways.

Some studies have explored the efficacy of teaching mindfulness to both parents and children with ASD simultaneously. For example, a study conducted in the Netherlands evaluated a 9-week group mindfulness-based intervention delivered in a non-educational setting with parents and their children (*n*= 23, aged 11-23 years) (de Bruin et al., 2015). A range of self-report and parent measures were collected at pre, post and follow up. The results appeared mixed, with reported changes in quality of life and a decrease in rumination, however no changes in worry for the participating

adolescents (de Bruin et al., 2015). This study was partially replicated by similar researchers in 2018 (Ridderinkhof et al., 2018). Using the same mindfulness-intervention the researchers explored the impact of the intervention on a larger sample, including younger children (*n*= 45, aged 8-19 years). Impact measures used were all self-report or parent report measures. Following the 9-week intervention, the researchers reported a significant improvement with children's emotional and behavioural functioning, including internalising, externalising and emotional wellbeing as reported by both children and their parents (Ridderinkhof et al., 2018). The improvements remained at 2-month follow up, however only partially at 1-year follow up. Although studies were conducted in a clinical setting outside of the UK, the findings highlight the possible positive outcomes of also teaching parents of children with ASD mindfulness. By teaching parents alongside children this may encourage additional opportunities to practice and potentially also encourage parental learning about how to respond and interact with their children at times of upset or distress. Nevertheless, there are some limitations to the research designs of both of these studies. For example, they only used only questionnaire measures and no objective measures were taken. There was also no comparison group within these studies which has implications on the internal validity of the study; whether we can say for certain that any changes were related to the engagement with the mindfulness-based intervention, rather than another extraneous variable.

The only study identified to have measured the impact of a mindfulness-based intervention on anxiety in children and young people with ASD was conducted in Australia. Hwang et al. (2015) explored the efficacy of training mothers to deliver mindfulness-based interventions to their children. Six participants aged between 8 years and 15 years engaged in mindfulness practice with their mother over a 12-month period. A weekly content guide was provided, and online group meetings and social media were used to support practice. Child anxiety was measured using a parent report of 'problem behaviours' that included a sub-scale for anxiety. The researchers reported that analysis at the group level revealed a significant reduction in in anxiety and thought problems for the participants (Hwang et al., 2015). There were, however, differences when looking at the individual children's data. The individual differences observed suggest that the use of mindfulness-based interventions may be more beneficial for some children and young people with ASD

than others. The ASD population is recognised to be a heterogenous group and therefore some of the differences in response to the intervention could be related to this. However, the differences could have also been related to differences in 'delivery' of the teaching, as there would have likely been variation in the way the skills were being taught and practised by the mothers. As there in no comparison group within the study, it is also not clear whether simply providing dedicated time for mother and child interaction would have led to similar outcomes. It is important to recognise some of threats and potential limitations of the research design. There is a risk of bias within this study as the mothers delivered the intervention and reported about their child's behaviour. Furthermore, there is increased risk related to statistically analysing group level data on such a small sample. Due to the small sample, alternative approaches could have been considered such as a repeated measures design or a qualitative study which gathered the parents and young people's perceptions of the intervention and any improvements in anxiety levels.

An article published by a parent which discussed his experience of teaching his twin sons with ASD mindfulness techniques was also found (Russell, 2011). Although no measures related to any possible change were taken, the paper is an interesting read. The case study describes how the author became interested in mindfulness to support his own wellbeing, and how over time he wanted to explore the potential benefits for his children. Russell (p.213, 2011) described how 'many of the proven benefits' were precisely what his children needed help with; for example, anxiety, empathy and attention. However, when attempting to find research and sources to support him, Russell (2011) described his surprise to find that there was virtually none specifically related to children and young people with ASD. The author discusses how he used research related more generally to mindfulness and sources for how to teach children mindfulness to develop a programme to teach his children. Although at the time of writing the paper, Russell (2011) reported that it was still early when considering the potential positive effects, he commented on the improvements he felt he observed relating to anxiety, emotional regulation, executive functioning and sleep routines. Generalisability of these findings would be considered low; however, the perceived improvements indicate the potential benefits on a range of wellbeing outcomes for children with ASD. The paper also highlights the limited prior research in this area, and the potential ways in which parents and professionals could draw on alternative

literature to support them when utilising mindfulness-based interventions with children and young people with ASD.

In addition to the research identified through the initial systematic searches, a Doctorate thesis was identified that had been completed in the UK. The research explored experiences of children with ASD who were accessing a mindfulness-based intervention (Lambert, 2015). The researcher developed the intervention and incorporated additional strategies (e.g. visual aids) to make the intervention accessible for the children. After the intervention, interviews were conducted with the children, and they reported feelings of empowerment and resiliency, and positive changes to their experiences of having worries (Lambert, 2015). This research highlights the potential benefits as perceived by the children and young people, and it also has greater ecological validity than some studies as it was conducted within a UK educational context. A potential limitation when considering the study in relation to the current research topic is that no measurable data was gathered relating to any observable change in wellbeing. Although it is hard to say with certainty whether the intervention had a measurable change on the children and young people's wellbeing, the children's views, especially related to their feelings of empowerment are particularly interesting and indicative of benefits of the use of approach for this population.

A relevant systematic review published earlier this year was found when exploring the literature related to mindfulness and ASD (Semple, 2019). Semple (2019) reviewed literature related to the use of yoga and mindfulness for youths with ASD. Eight studies were identified, many of which explored the use of yoga techniques rather than mindfulness. The author reported that each of the studies describe positive outcomes on wellbeing factors, however, there are a number of limitations with the current evidence base (e.g. small number of studies and small samples used).

To summarise, in comparison to 'typically developing' populations there appears to be limited research specifically exploring the use of mindfulness-based interventions with children and young people with ASD. Nonetheless, the research that was identified did not describe any specific challenges to implementing mindfulness-based interventions with children and young people who are diagnosed with ASD. In contrast,

the current evidence base is felt to highlight the various ways in which mindfulness-based interventions have been used with children and young people with ASD, such as through parent delivery or simultaneous parent and child teaching. Nevertheless, it was surprising to find only one piece of research (Lambert, 2015) that had utilised a mindfulness-based intervention within a school setting specifically for children recognised with ASD, highlighting a gap in the current literature base.

The literature described also suggests that a number of positive outcomes have been recognised by those who have used mindfulness-based interventions with children and young people with ASD. These include perceived reductions in anxiety (Hwang et al., 2015) and aggressive behaviour (Singh et al., 2011; Singh et al., 2019), improvements with sleep, emotional regulation and executive functioning (Russell, 2011) and feelings of empowerment and resiliency (Lambert, 2015), indicating potential benefits for a range of wellbeing factors. However, in terms of the area of focus for this research, more research is required to draw firm conclusions about the efficacy of using mindfulness-based interventions to specifically reduce anxiety in children and young people with ASD within a school setting.

2.7 Summary

This literature review has highlighted the current focus on supporting the mental health and wellbeing of children and young people (Children's Commissioner, 2017), and the increased understanding that schools should and can make a difference to the wellbeing of their pupils (DoH & DfE, 2017). Within the review, ASD was defined and the high level of comorbidity between ASD and anxiety was discussed. A definition for mindfulness was also provided before the review explored the current evidence base for the use of mindfulness-based interventions with children and young people, including those diagnosed with ASD.

The current evidence base suggests that mindfulness-based interventions are becoming of increasing interest to professionals as a tool to support wellbeing (Zoogman et al., 2014), however research into the efficacy with children and young people in school settings is in its infancy. Many of the studies utilised outside professionals to deliver the intervention, and less appears to be known about the

possible impact of mindfulness-based interventions delivered by teachers to reduce anxiety. What was also made apparent within this review was the lack of research that has explored the use of mindfulness-based interventions within ASD youth populations, and as such this is an important area for further exploration.

2.8 Current Study

The following section presents the rationale, unique contribution, and the research questions for this study.

2.8.1 Rationale and Unique Contribution

Promoting wellbeing is a current area of priority for both policy makers and educational professionals, and there is an increased emphasis on the role schools can play in promoting positive wellbeing and building resilience against mental health difficulties (DoH & DfE, 2017). Anxiety appears to be increasingly common with younger children (NSPCC, 2017), and children with ASD seem to be particularly vulnerable to experiencing it (van Steensel et al., 2011). As such, it is vital that schools feel confident and skilled to support this population and promote positive mental health.

Research into mindfulness-based interventions is in its infancy, especially within a UK context; however, the information reviewed suggests there is growing evidence that with typically developing children aged between 4 and 11 years old, mindfulness-based interventions, delivered in school settings, can support the reduction of anxiety (Britton et al., 2014; Etherington & Costello, 2018; Napoli et al., 2005). Despite the apparent growing evidence base for the use of mindfulness-based interventions with children and young people, there is a noticeable lack of evidence of the application of mindfulness-based interventions within an ASD population who may be more vulnerable to experiencing anxiety (van Steensel et al., 2011). The minimal research that has been conducted with children and young people diagnosed with ASD indicates possible benefits of mindfulness on social and emotional factors (Ridderinkhof et al., 2018; Semple, 2019; Singh et al., 2011; Singh et al., 2019), including anxiety (Hwang et al., 2015). However, all of the research measuring the impact of mindfulness was not conducted within school settings.

Accordingly, the proposed study aims to make a unique contribution to the literature by exploring whether a mindfulness-based intervention, may be adapted and implemented within a school setting, to reduce anxiety levels of primary school aged children aged with a diagnosis of ASD.

2.8.2 Research Questions and Hypotheses

The primary research question:

1. ***Does the mindfulness-based intervention reduce anxiety of children aged between 4 and 11 years with ASD?***

   Hypothesis: The mindfulness-based intervention reduces anxiety of children aged between 4 and 11 years with ASD.

   Three sub-questions will be explored within this research question:

   1.1 Does the mindfulness-based intervention reduce the participants' anxiety-related behaviour?

   1.2 Does the mindfulness-based intervention reduce school staff reports of participant anxiety? (As measured by the School Anxiety Scale-Teacher Report; Lyneham et al., 2008)

   1.3 Does the mindfulness-based intervention reduce parent reports of participant anxiety? (As measured by the Spence Children's Anxiety Scale; Spence, 1999)

Two further research questions will also be explored:

2. ***What are the children's perceptions of the mindfulness-based intervention?***

3. ***What are the teachers' perceptions of the mindfulness-based intervention?***

3 Methodology

3.1 Introduction to the Methodology

This chapter provides an overview of the methodology of the current study including the rationale for key methodological decisions that were made during the research process.

The chapter begins with an outline of theoretical paradigms that are key within real-world research. The researcher will then describe their rationale for adopting a pragmatic viewpoint within the current research. The research design is then described with an explanation of both the quantitative and qualitative strands of the research. The sampling procedures, participants, intervention and measures used will also be discussed. Methods for data analysis are highlighted. The chapter concludes by exploring relevant ethical considerations, stakeholders and threats to validity and reliability within the current study.

3.2 Theoretical Paradigms

A paradigm refers to 'a way of looking at the world' (p. 55, Mertens, 2015). Different paradigms hold different philosophical assumptions related to the researcher's ontology (the nature of reality) and epistemology (the nature of knowledge) (Guba & Lincoln, 1994). A researcher's ontological and epistemological viewpoint has implications for the research questions they explore and the methods they employ (Mertens, 2015). It is therefore important that a researcher is able to understand and identify the different paradigms and their underlying philosophical assumptions. There are four key research paradigms that appear prevalent within real world research; positivism, post-positivism, constructivism and pragmatism.

3.2.1 Positivism

The positivist paradigm originates from the empiricist philosophy (Mertens, 2015) and assumes that there is a single external reality which can be measured objectively (Robson, 2002). It postulates that we can study our social world in the same way that we study the natural world. Scientific experimentation methods are used to discover laws and causal relationships between variables (Mertens, 2015).

This paradigm has been widely criticised in the field of real-world research for being overly deterministic and reductionist (Lincoln & Guba, 1985). The paradigm fails to accept the possible subjectivity or methodological limitations within research exploring human behaviour.

3.2.2 Post-positivism

As a result of the criticisms of the positivist paradigm, the post-positivist paradigm developed. This paradigm assumes that a single reality exists, although it acknowledges that it can only be known imperfectly because of the researcher's limitations (Robson, 2002). Post-positivism continues to hold the belief that we should utilise scientific experimentation methods to investigate causal relationships; however, it assumes the understanding of these relationships is not certain and can be modified in the light of further investigation (Mertens, 2015). Many opponents of post-positivism reject the belief that a single reality exists and have argued that the paradigm is weak when applied to complex human behaviour (Mertens, 2015).

3.2.3 Constructivism

Constructivism is regarded as the dominant opposing paradigm to positivism. The main assumption of the constructivist paradigm is reality is not an objective truth, rather it is constructed through experience (Mertens, 2015). The paradigm emphasises that a researcher's values will be part of the research process and therefore objective knowledge is not possible. It is assumed that there are multiple realities (Lincoln & Guba, 1985) and therefore, generalisability of research data is not possible. Researchers within this paradigm are concerned with understanding the multiple social constructions of meaning and knowledge through the description of experiences and perspectives (Robson, 2002). Cohen et al. (2018) highlight that researchers aligned with post-positivist and positivist assumptions have criticised constructivism for the abandoning 'scientific' procedures and the lack of generalisability of the information gathered.

3.2.4 Pragmatism

Pragmatism is less concerned with the nature of reality and truth and more interested in 'what works' in relation to the research question and context in which it is being

investigated (Robson, 2002). Teddlie and Tashakkori (2009) emphasise that pragmatism provides an underlying philosophical framework for mixed methods approaches. Pragmatic researchers believe that through triangulation of different types of data, the researcher is able to explore the complexity of different phenomena without the constraints of the other theoretical paradigms (Cohen et al., 2018). Pragmatism assumes that reality will be guided by the researcher's personal value systems and therefore the researcher studies what they deem to be important (Teddlie & Tashakkori, 2009).

Pragmatism has faced criticism from researchers using other paradigms, who argue that it is not possible to 'mix methods' as the underlying philosophical assumptions of different methodological approaches are incompatible (Cohen et al., 2018). Despite this criticism, research has indicated that the work of an EP closely aligns with this paradigm, owing to the emphasis placed on answering specific questions that are of practical and have social relevance (Burnham, 2013).

3.2.5 Epistemology of the Current Study

The aim of the current study was to investigate the impact of a mindfulness-based intervention on the anxiety of children diagnosed with ASD. The researcher proposed predominantly post-positivist research questions to explore this aim. However, as the research took place in a real-world setting and explored complex human behaviour the researcher wanted to triangulate the data gathered by including an aspect of naturalist inquiry (Lincoln & Guba, 1985). The researcher was interested in what works best to answer the research questions within the context that it was being explored. Therefore, a pragmatic paradigm leading to a mixed methods approach was considered the most suited to meet the aims of the study. Further information related to the mixed methods approach of the research will be described in the next section.

3.3 Research Design

3.3.1 Quantitative Research Designs

There are a range of different designs that can be utilised to gather quantitative data. Typically, these designs are fixed and use a deductive approach to test hypotheses based on theory (Robson, 2002). Many allow the researcher to manipulate

independent variables to explore the impact on dependent variables. Emphasis is placed on the generalisability of the findings and therefore these approaches tend to focus on group effects rather than individual changes (Robson, 2002). Some designs that were considered for this study are described below.

3.3.1.1 Group Designs

In many fields of applied research, RCTs are considered the 'gold standard' method to explore the effectiveness of an intervention (Robson, 2002). RCTs require a large sample of participants to be randomly assigned to an intervention and comparison group (Cohen et al., 2018). Key variables are isolated and measured in response to the introduction of the independent variable. However, there is recognition that this design can be challenging to use within educational research (Robson, 2002). Cohen et al. (2018) highlights that ethical concerns can also arise from denying those within the comparison group a potentially helpful intervention.

An alternative group design that is suggested to be more practical within school-based research is a quasi-experimental design (Cohen et al., 2018). Similarly, measures are taken to explore the effect of the independent variable on dependent variable/s. However, this design does not include randomisation to groups or a comparison group (Cohen et al., 2018). Quasi-experimental designs are not without limitations, and compared to RCTs, there is an increased risk to the internal validity of the study due to the possibility of bias and lack of control of extraneous variables (Mertens, 2015).

As this research targeted a low incidence population, it would have proved particularly challenging to recruit enough participants to adopt a group design. Furthermore, a limitation to the use of using any group designs is that they do not take into account any individual differences in response to the independent variable (Cohen et al., 2018). The researcher acknowledges the heterogeneity within the chosen population, and therefore these designs were not felt to be feasible or appropriate. As the researcher adopted a pragmatic standpoint, alternative methods were considered.

3.3.1.2 Single Case Experimental Designs

A design that allows for relationships between independent and dependent variables to be explored with a reduced number of participants is a single case experimental design (SCED) (Horner et al., 2005). The approach can be used to evaluate the effect of an intervention on aspects of an individual's learning or behaviour while increasing the level of experimental control above a traditional case study (Horner et al., 2005). Typically, three to eight participants are recruited, and repeated measures are taken over time, usually before, during and after an intervention (Horner et al., 2005). The dependent variable within a SCED is typically observable behaviour, and as it is measured repeatedly the behaviour must be clearly defined and reliable (Kratochwill et al., 2013).

SCEDs have become increasingly accepted as a method to explore the efficacy of interventions (Kratochwill et al., 2013) and can be particularly useful when working with heterogeneous (Reason & Morfidi, 2001) and low incidence (Ganz & Ayres, 2018) populations. Several participants may be included within a SCED; however, the effect of the intervention is considered for each individual rather than the overall group. As such, there is limited generalisability of the data. Improvements can be made to the external validity of SCEDs by including multiple participants, in multiple settings and measuring multiple behaviours (Horner et al., 2005).

Researchers can utilise various types of SCED, and the main types are presented in Table 3-1.

Table 3-1: A table to describe the types of SCEDs (adapted from Robson, 2002).

SCED Design	***Description***
A-B design	A baseline phase (A) followed by a second phase where the intervention (B) is introduced. Measures are taken throughout each phase, and performance in phase A is compared to performance in phase B.
A-B-A design	As above, with a return to the baseline (A) after the intervention phase.
A-B-A-B design	An additional intervention phase (B) is added to the A-B-A design.
Multiple baseline designs	Multiple baseline designs involve the intervention being applied at different points in time, to different baseline conditions. This could be across settings, across participants or behaviours.

SCEDs should always include at least one baseline phase (A) and intervention phase (B) as a minimum. The researcher is then able to explore whether there is measurable change in the intervention phase to the dependent variable, as compared to the baseline phase. It is therefore important that stability can be observed within the baseline and there are enough data points collected to be able to demonstrate any change. At least three (and ideally five) data points are collected during each phase to increase the validity of the research (Kratochwill et al., 2013; Ganz & Ayres, 2018).

Kratochwill et al. (2013) argue that an ABAB or multiple-baseline designs are the most methodological sound SCED because they increase the control of possible extraneous variables that may impact on any results. The internal validity of the design increases if there is more than one baseline and intervention phase; such as an ABAB design. This allows for the researcher to see whether there is consistent change when the intervention is introduced and then removed. Some of these methodologies can be difficult to implement within educational research as often 'learning' may have taken place within the intervention phase that cannot be unlearnt (Reason & Morfidi, 2001).

The main criticism of SCEDs is the limited generalisability of the results due to the small sample used (Barlow & Hersen, 1984). Additional challenges to the approach include the need for a number of steps to be taken to ensure that risks to the internal validity and reliability of the data are minimised (Kratochwill et al., 2013). These are discussed further in section 3.9.1.

3.3.2 Mixed Methods Designs

Within mixed methods designs, the researcher employs the most appropriate methods of both qualitative and quantitative approaches to investigate a phenomenon (Teddlie & Tashakkori, 2009). Often multiple research questions might be asked, and a mixed method design aims to triangulate information from multiple methods to help answer these. Mixed methods are argued to have particular value when a researcher is exploring an area within in a complex social context (Teddlie & Tashakkori, 2009). Patton (2002) highlights that utilising mixed methods can add depth and provide a more comprehensive understanding than using quantitative methods only.

Mixed methods designs can differ based on the emphasis or timeline of each strand (qualitative or quantitative) (Creswell & Creswell, 2018). A mixed method design where one data set (e.g., qualitative data) is collected to support another data set (e.g., quantitative data) is described as an 'embedded design' (Creswell & Creswell, 2018). The inferences made on the basis of the results from each strand are then drawn together to make overall inferences (Mertens, 2015).

Although mixed method approaches can have value within educational and psychological research (Onwuegbuzie & Leech, 2005), they have been criticised as information can be poorly integrated from the findings (Mertens, 2015). A further challenge can be that they are typically more time consuming and require the researcher to have skills in a range of methodological techniques (McKim, 2017).

3.3.3 Current Research Design and Rationale

Following a pragmatic viewpoint, an embedded mixed methods design was chosen to best answer the research questions (see section 2.8.2).

The main aim of the research was to explore whether the mindfulness-based intervention reduces participant anxiety. Consequently, quantitative methods were deemed imperative to be able to assess whether there has been measurable change in participant anxiety. To provide further understanding of the use of the intervention, the researcher also wanted to explore participant perspectives of the mindfulness-based intervention. It was hoped that through triangulation of different types of data, a greater understanding of the efficacy of utilising a mindfulness-based intervention with children with ASD would be achieved. This was deemed to be particularly important due to there being limited research in this topic area. Therefore, as described by Patton (2002), a mixed methods design should provide an opportunity to develop a more comprehensive understanding of the use of a mindfulness-based intervention with children with ASD than simply using quantitative methods alone.

The quantitative and qualitative aspects of the study will now briefly be outlined. Further information relating to the study's methodology will then follow, including; the participant selection, intervention and measures.

3.3.3.1 Quantitative Aspect

The various types of SCED described in table 3-1 were considered for this study.

An A-B-A or A-B-A-B SCED design was not deemed appropriate, as any learning that took place as a result of the intervention, could not be 'unlearnt', and therefore would confound any results obtained in an additional baseline phase (Reason & Morfidi, 2001). As the intervention was being delivered within a group situation, a multiple baseline design was not possible as the participants started the intervention at the same time point. However, the researcher was able to stagger the baselines slightly by conducting the research in two different settings with two different start times.

Therefore, after consideration, the researcher chose an A-B SCED with multiple participants. Although the lack of generalisability from SCEDs is acknowledged, this design allows the effect of the mindfulness-based intervention on the participants' anxiety to be explored while achieving a level of experimental control.

Key information about the chosen research design and procedure is provided below:

- The baseline phases lasted approximately four weeks and the intervention phases approximately five weeks.
- Repeated measures were collected during both phases (see section 3.6.1.2).
- In order to triangulate the data, measures were collected pre and post intervention (see section 3.6.1.4).
- The independent variable was a mindfulness-based intervention delivered by class teachers over five weeks.
- The dependent variable was anxiety, measured by observations of pre-identified specific anxiety-related behaviours using a structured observation schedule. The target behaviours and frequency and duration of the observations were identified in consultation with the class teachers.
- The repeated measures were triangulated with pre and post measures; the Spence Parent Report Children's Anxiety Scale (Spence; Spence, 1999) and the School Anxiety Scale Teacher Report (SAS-TR; Lyneham et al., 2008). Further information related to measures can be found in section 3.6.1.

3.3.3.2 Qualitative Aspect

The qualitative aspect of the research involved exploration of the perceptions of the participants; both the children who received the intervention and the teachers who delivered the intervention.

A data collection method that is widely used to gather perspectives is interviews (Mertens, 2015). Interviews can vary in their flexibility and tend to be described as either 'structured' (*fixed questions in a pre-set order*), 'semi-structured' *(pre-set questions; however, the order and wording can be altered and additional questions developed as needed*) or 'unstructured' (*informal conversation about a topic of interest*) (Robson, 2002). Interviews can also be conducted with individual participants or with groups.

Interviews are reported to be advantageous because they are flexible and enable further enquiry into interesting participant responses (Robson, 2002). This can lead to rich information about the topic being gathered. As such, interviews are often utilised within mixed methods research to supplement and extend the quantitative information gathered (Mertens, 2015).

The researcher decided that in order to best answer the research questions, individual interviews with the children and teachers would be conducted. Consideration was given to whether group interviews with the children would be appropriate; however, a potential challenge when completing group interviews is the risk of dominance of individual group members (Cohen et al., 2018). As such, the researcher felt that individual interviews would support the children's perspectives to be gathered. Semi-structured interviews were chosen as they offered structure whilst also allowing the questions to be slightly altered depending on the needs of the participant (Robson, 2002). This was deemed particularly important for the children participating who would likely have varying communication needs. Further information relating to the semi-structured interviews can be found in section 3.6.2.

3.4 Participants

3.4.1 Sampling Strategy

Due to the low-incidence nature of the population, the researcher utilised an opportunistic sampling strategy (Robson, 2002).

Settings that educate a high number of pupils with ASD were initially contacted via email (see Appendix 2) to invite their participation. Three schools displayed interest and an initial meeting was held with either the head teacher or the assistant head teacher. Following these meetings, two of the settings identified potential classes within their schools with pupils that may meet the inclusion criteria for the research (see table 3-2 below). Meetings were then arranged with the class teachers to provide an overview of the research and discuss whether they would be interested in participating. It was important that any participating teachers were interested and felt able to deliver the intervention. Discussion took place between teacher and researcher as to whether they felt the intervention was suited to their class. Teachers were then asked to send information about the research and consent forms to parents of children who they identified as meeting the inclusion criteria. Both schools decided to deliver the intervention to their whole class; however, only the children who met inclusion criteria (see table 3-2) and whose parents consented, participated in the research. Parental consent was gained for five pupils across the two settings.

3.4.2 Participant Inclusion Criteria

The participant criteria for inclusion within the research is described in table 3-2.

Table 3-2: A table to describe the participant inclusion criteria.

Inclusion criteria	***Rationale***
Pupils who have a diagnosis of ASD.	The research aimed to explore the impact of a mindfulness-based intervention on children within the ASD population.
Primary school aged (4 to 11 years) pupils, preferably upper Key Stage 2 pupils (Year 5 or 6).	The research aimed to explore the impact of a mindfulness-based intervention on primary school aged children. A number of cognitive, physical, social and emotional changes occur during this developmental period and therefore this stage is felt to be critical for building resilience against mental health difficulties (Schonert-Reichl & Lawlor, 2010). Furthermore, as highlighted within the literature review, less research has investigated the impact of mindfulness-based interventions with primary school aged children.
Pupils who have been at the setting for six months or more.	The researcher acknowledged that if a pupil has recently moved to the setting, they may be experiencing some anxiety as a result that may naturally decrease as they become more familiar with the setting.
Pupils identified by school staff as experiencing heightened anxiety. A dimensional definition of anxiety was described the staff to support the identification of participants; the feeling of fear or worry that (Gaigg et al., 2018), at times, interferes with their functioning in school (Muris, 2014). It was not necessary for pupils to have a formal diagnosis of anxiety.	The research aimed to explore the impact of the intervention on participant anxiety levels.

3.4.3 Description of the Schools

The two schools that participated in the research are state funded 'complex needs' schools. All pupils that attend the setting require an Education, Health and Care Plan (EHCP) and are identified to have a range of complex needs. It is important therefore to highlight that the participants were recognised to have additional cognitive and learning needs. This has implications for the generalisability of the findings to individuals with ASD who are recognised to have average to high intellectual ability. Pupils typically travel to the settings from across locations within the county. Both settings follow the Early Years and National Curriculum 'where possible'. Emphasis is also given to supporting the education of social, emotional, physical and independent skills. The researcher had hoped to identify upper Key Stage 2 classes (Year 5 and Year 6 pupils); however, due to the sampling method the participating classes were more varied in their age ranges. A level of flexibility with the criteria was required to maintain school engagement and support participant recruitment.

- School One

The school educates approximately 110 pupils between the ages of 3 and 19 years. The classes are mixed ages as pupils are grouped with those who have similar needs and approaches to learning. The class that participated in the research consisted of ten pupils who were aged between 5 years 10 months and 9 years 1 month at the start of the research. A teacher and two teaching assistants were in class to support the pupils. The class followed work equivalent to Key Stage 1 curriculum mixed with additional opportunities to engage in play-based learning.

- School Two

This setting educates approximately 150 pupils between the ages of 7 and 16 years. The pupils are kept within their key stage and grouped into classes based on their needs and approaches to learning. The class included in the research consisted of six pupils who were all in Year 5 or 6 (Key Stage 2). The teacher was supported in class by one teaching assistant. The class completed primarily Key Stage 1 equivalent work.

3.4.4 Description of the Participants

Descriptive information about the five children who participated in the research from both schools is provided below. This information was gathered in discussion with the class teacher once parental consent had been received. All participants were male, White British and spoke English as their first language. The names provided are pseudonyms.

- Charlie

Charlie attends school one and at the beginning of the research he was 7 years and 7 months old. Charlie's primary special educational need is described as ASD. His EHCP also highlighted learning and social, emotional and mental health needs and hypermobility in his joints. Charlie was educated in the same class last academic year.

- Ben

Ben attends school one and at the beginning of the research he was 7 years and 3 months old. Ben's primary special educational need is described as ASD. His EHCP also highlighted learning and social, emotional and mental health needs. Ben was educated in the same class last academic year.

- Harry

Harry attends school one and at the beginning of the research he was 5 years and 11 months old. His primary special educational need is described as ASD. Harry is the youngest member of his class and he joined this year.

- Oliver

Oliver attends school two and at the beginning of the research he was 10 years and 4 months old. His primary special educational need is described as ASD. His EHCP also highlighted social, emotional and mental health needs. In the previous academic year, Oliver accessed Lego Therapy sessions in school. Oliver had been in his current class since the start of the academic year.

- Alex

Alex attends school two and at the beginning of the research he was 10 years and 11 months old. His primary special educational need is described as ASD. In the previous

academic year, Alex accessed Lego Therapy sessions in school, and he had recently been referred for support from an Emotional Literacy Support Assistant. At the start of the research he was on the waiting list for this support. Alex had been in his current class since the start of the academic year.

- Teachers

The two teachers that delivered the intervention and participated in the interviews were both White British, female and their first language was English.

3.5 Intervention

3.5.1 Description of the Intervention

The mindfulness-based intervention used within the current study was an adapted version of the 'MindUP curriculum' (The Hawn Foundation, 2011). As described within the literature review, the MindUP curriculum is an American developed evidence-based intervention that teaches children skills to foster their social and emotional awareness and become more mindfully aware (The Hawn Foundation, 2011). Developers of MindUP highlight a range of psychological underpinnings that informed the curriculum, including developmental neuroscience, positive psychology principles, social and emotional learning and mindfulness (The Hawn Foundation, 2011). It can be purchased online for a relatively low fee and research has indicated positive outcomes within typically developing populations (Schonert-Reichl & Lawlor, 2010; Schonert-Reichl et al., 2015). There are three versions of the curriculum that target different age ranges; PreK-2 (approximately 4-7 years), Grades 3-5 (approximately 8-11 years) and Grades 6-8 (approximately 11-14 years).

The MindUP curriculum consists of 15 lessons that can be delivered over a flexible time period. The lessons aim to promote self-regulation (e.g. mindful awareness, mindful smelling, mindful tasting) and social and emotional understanding (e.g. perspective-taking skills and empathy). The curriculum also includes a 'core mindfulness practice' (breathing and attentive listening) which is recommended to be completed three times a day for three minutes.

The lessons are arranged into four units of teaching:

- *Unit 1: Getting Focused (Lessons 1-3)*
  Introduces brain physiology and the concept of mindful attention, establish daily Core Practice.
- *Unit 2: Sharpening your Senses (Lessons 4-9)*
  Experience the relationship between our senses, our moving bodies and the way we think.
- *Unit 3: It's All About Attitude (Lessons 10-12)*
  Understand the role of our mind-set in how we learn and progress.
- *Unit 4: Taking Action Mindfully (Lessons 13-15)*
  Apply mindful behaviours in our interactions with our community and the world.

This curriculum was chosen because it provides step-by-step lesson plans specifically designed for teachers to deliver to their students. It also covers the core aspects of evidence-based mindfulness interventions; techniques that focus attention through breathing, the role of body movements and focusing on thoughts and feelings (Zenner et al., 2014). Alternative mindfulness programmes were explored; however, many of these required lengthy training periods or were not designed to be delivered within a school. The MindUP curriculum was felt to provide a useful starting point and structure for the intervention, which could then be adapted for the participants needs if required. The potential limitations of using an American-based intervention will be fully explored in Chapter 5 (discussion).

Through discussion with the class teachers, the PreK-2 version of the curriculum was chosen which is typically aimed at children aged between 4 and 7 years of age. Due to some of the participant ages and their complex needs, this version was felt to be more appropriate for their developmental level. Both teachers were provided with copies of the curriculum. The researcher met with the teachers individually on three occasions during the implementation of the intervention to look through the curriculum lesson plans and make any necessary adaptations. Both teachers attempted to follow the MindUP curriculum as closely as possible. Any adaptations were made to ensure the intervention was accessible to the participants. Within the MindUP curriculum, 'goals' are identified for each lesson. Despite any adaptations, the goals of the lessons

remained the same. The key adaptations that were made in consultation with the teachers were:

- A reduction in the number of the activities for each lesson. Typically, no more than two activities were delivered within a session.
- The reduction, or removal of writing activities.

An example lesson plan can be found in Appendix 3.

3.5.2 Implementation of the Intervention

The intervention was delivered three times a week (typically Monday, Tuesday and Wednesday) over a period of five weeks, by the class teacher to their whole class. school one delivered the intervention during the Autumn term (29/10/2019-04/12/2019) and school two delivered the intervention during the Spring term (13/01/2020-12/02/2020).

The intervention was conducted in place of the pupils' regular PSHE lessons. Both settings decided to deliver the intervention after lunch and agreed to allow up to 40 minutes for the intervention to take place. The teachers were flexible with the length of the sessions depending on the engagement of the pupils. Both settings revisited their learning at the end of the day by listening to a story which linked to the topic. In line with the suggested delivery of the curriculum (The Hawn Foundation, 2011), the 'core practice' was offered at least three times a day (first thing, after lunch and at the end of the day) during each school day.

3.5.3 Intervention Fidelity

To reduce possible risks to the validity of the research, it is important to consider the fidelity of the intervention. It is recommended that observations are conducted to ensure that the intervention is accurately and consistently implemented (Horner et al., 2005). As adaptations to the MindUP lessons were agreed beforehand, the intervention fidelity was checked against the agreed lesson plan. See Appendix 4 for an example. The researcher observed the delivery of the intervention on one occasion at each setting.

Although adaptations were agreed beforehand, the teachers were informed that it would be acceptable for them to make further adaption to the lesson plans, where they felt it was necessary to engage their class. This was particularly important to follow ethical practice and work in the best interests of the children. The teachers were asked to annotate the lesson plans with any amendments that were made within the lessons to track what had been delivered. However, it is important to highlight that any adaptations will have implications for the replicability of the research and could limit the validity of the findings.

3.6 Measures

3.6.1 Quantitative Measures

3.6.1.1 Repeated Measures

Initially, the researcher proposed that anxiety would be measured using two repeated measures, one of which was a self-report questionnaire. The self-report questionnaire that was planned to be utilised was the Paediatric Index of Emotional Distress (O'Connor et al., 2010). This was chosen because it is a relatively short measure for the participants to complete and could be adapted with visual symbols if required.

Following discussions with the teachers it became apparent that this measure, or an alternative standardised self-report measure, would not be a valid or reliable measure of the participants' anxiety. The teachers reported that the participants did not yet have an awareness of the emotional vocabulary required to complete the self-report measure. Consideration was given as to whether a simple Likert scale could have been designed which captured the emotional vocabulary that the participants were already exposed to in the classroom (e.g. happy, sad or angry). However, following further discussion with the teachers it was felt that the participants may have struggled to recognise the differences between their emotions and share these consistently.

Therefore, the decision was made to measure participant anxiety using one repeated measure; observations of pre-defined specific anxiety-related behaviours using a structured observation schedule and coding system. The validity and possible limitations of this will be discussed in Chapter 5.

3.6.1.2 Behaviour Observation

The dependent variable within a SCED is typically observable behaviour (Horner et al., 2005). In addition, as highlighted within Chapter 1, anxiety in young people with ASD can often be displayed through externalising behaviours (Kerns et al., 2014, Lecavalier et al., 2014; Ozsivadkian et al., 2012; White et al., 2009). To increase the validity and reliability of observational data, the behaviour observed must be; operationally defined, measured repeatedly and assessed for consistency (Horner et al., 2005).

Once parental consent was granted, the researcher met with the class teachers to identify and define the target behaviours to be measured. To support this discussion a template was developed to capture relevant information and support target behaviours to be identified (see Appendix 5). Through this discussion, behaviours that the teachers felt each participant displayed when anxious were identified and described. The aim was to complete an exhaustive list of these behaviours and identify any possible anxiety provoking situations in which they may occur. It is recognised that it was difficult to fully establish whether all of the behaviours described were related to anxiety or whether they could have been reflective of a different emotion. Therefore, this is recognised as a threat to the reliability of the measures. Nonetheless, due to the difficulties with assessing and measuring a construct such as anxiety, using the teachers' knowledge of the participants was deemed the most appropriate way to define the behaviours.

Based on the information gathered, target behaviours (see Table 3-3) and individual observation schedules were developed for each participant. All of the observations used event coding where the observer recorded whenever the target behaviour occurred. The behaviours were individually recorded, even if they occurred within close succession. The end of an 'event' (each behaviour) was marked by a break in the behaviour. Event coding is an approach to behaviour measurement frequently used within SCEDs (Barlow & Hersen, 1984). This method was chosen as the teachers felt this would be an achievable way to repeatedly observe the chosen behaviours. This was possibly due to the small number of children in the classes and the high staffing ratio. Also, the teachers felt that there was not always a consistent pattern for when the participants displayed the behaviours, and therefore event coding

enabled all observations of the behaviours to be captured on the chosen recording days. This would not have been possible with alternative approaches, such as interval sampling. Nevertheless, it is important to note that recording the behaviours throughout a day, increases the risk to the reliability of the data, for example due to observer error. This is discussed in section 3.9.1.1, and the steps taken to increase the reliability of the measures are described in section 3.6.1.3.

The observations were completed primarily by the teachers, with support during break and lunch times from their support staff. The schedules were trialled for a week to ensure that the behaviours were operationally defined and feasible for the school staff to complete. No amendments were made so the data gathered during this pilot week was incorporated into the overall analysis.

Table 3-3: A table to describe the observations for each participant.

Participant	***Operational Definition of Target Behaviours***	***Context of Observation***
Charlie	The number of times Charlie seeks physical contact from an adult (e.g. leaning into them, holding their arm or asking for a safe hug).	Recorded throughout Monday and Wednesday.
Ben	The number of times Ben displays the following behaviours at the end of a chosen activity or at the end of free time. • Hitting • Biting • Running away • Going to a 'safe' area (either the reading corner or the swing) • Screaming	Recorded throughout Monday and Wednesday.
Harry	The number of times Harry displays the following behaviours in response to being asked to engage in an adult-led activity (e.g. work tasks). • Stomping his feet • Saying 'no, no, no' • Hiding behind the adults • Crying	Recorded throughout Monday and Wednesday. Excluding play and lunch times.
Oliver	The number of times Oliver displays the following behaviours. • When asked to engage in a learning task or asked a question related to a learning, Oliver changes the subject to talk about one of his interests. • Oliver paces around the room.	Recorded throughout Monday and Wednesday.
Alex	The number of times Alex displays the following behaviours in response to him getting something wrong, not being able to complete a task or losing a game. • Crying • Talking negatively about school • Being unable to move on to the next activity until the task is completed correctly • Refusal to engage in the activity.	Behaviours recorded throughout the week to give a total frequency of behaviours.

3.6.1.3 Reliability of the Behaviour Observations

Kratochwill et al. (2013) outlined that inter-observer agreement should be documented for at least 20% of data points within each phase (e.g. baseline and intervention). Inter-observer agreement refers to the extent to which two observers agree when they are observing the same behaviours using the same observation schedule. Inter-observer agreement was completed once in each phase for all of the participants by the researcher. The target behaviours for the course of either a morning or afternoon were observed and recorded and then compared to the teacher's observational record. The inter-observer agreement of the observations is reported in the results in Chapter 4.

As the observations were recorded over a period of a day or the course of the week, the researcher was unable to complete integrity checks for at least 20% of the data points. Therefore, this should be considered a risk to the reliability of the data gathered.

3.6.1.4 Pre and Post Measures

Collecting data only at single points pre and post intervention increases threats to the reliability and validity of the data. However, triangulating the information gathered through repeated measures with pre and post data is recommended to improve the reliability and validity of the findings (Robson, 2002). In addition, multiple methods are recommended when assessing anxiety in children and young people with ASD (Moskowitz et al., 2017). The pre and post measures explored the views of other key stakeholders; parents and teachers. They were completed before the baseline phase, and after the intervention had been delivered.

The participants' parents completed the 'Spence Children's Anxiety Scale- Parent Version' (Spence) which is a 39-item questionnaire that measures child anxiety (Spence, 1999). The items describe observable behaviours that children with anxiety might display. This measure was chosen because internal consistency has been found to be 'good to excellent' (α = .88) with an ASD population (Zainal et al., 2014). The questionnaires were sent home with the pupils and returned to school where the researcher collected them by hand.

The teachers completed the 'School Anxiety Scale- Teacher Report' (SAS-TR) which is a 16-item teacher questionnaire to assess child anxiety (Lyneham et al., 2008). Teachers rate items on a 4-point scale. The questionnaire has been found to be positively correlated with parent and participant ratings of anxiety (Lyneham et al., 2008). The questionnaire has also been found to have good reliability when used within an ASD population (α =.70) (Luxford et al., 2017). This questionnaire was completed by the participants' class teachers.

3.6.2 Qualitative Aspect

After the intervention was delivered the researcher completed semi-structured interviews with both the children who participated in the research and the class teachers. All interviews were audio recorded (with prior consent from participants) to support analysis.

3.6.2.1 Interviews with the children

The purpose of the interviews with the children was to gain their perceptions of the intervention and contribute to a more holistic understanding of the intervention's utility.

A semi-structured interview schedule was developed (see Appendix 6). A printed version of the interview questions including widget symbols was displayed during the interview. This was a communication strategy used in both schools. The children were asked if they wanted to have their class teacher join them for the interview. Three of the children chose to have their class teacher join the interviews.

Four of the five children who participated were interviewed. Harry was absent on the day of the interviews. Further information is provided in the Results discussed in Chapter 4.

3.6.2.2 Teacher interviews

The purpose of the teacher interviews was to gather their perceptions about delivering the mindfulness intervention including any potential benefits or barriers they experienced.

The two class teachers were interviewed once the mindfulness-based intervention had been delivered. A semi-structured interview schedule was developed to support the discussion (see Appendix 7).

3.7 Data Analysis

As the research was mixed methods, both quantitative and qualitative data analysis approaches were used. The quantitative methods will first be outlined, with consideration of possible approaches that could have been utilised. The method of data analysis for the qualitative data will then be described.

3.7.1 Quantitative Data Analysis

3.7.1.1 Visual Analysis

The most common method for analysing data gathered from SCEDs is visual analysis (Kratochwill et al., 2013). Visual analysis involves graphically charting a participant's data and then comparing each phase to see if there has been an intervention effect. This comparison typically looks at a range of factors to assess for an effect and these are highlighted in table 3-4 below. To demonstrate an effect of the intervention, Kratochwill et al. (2013) suggests that there should be at least three demonstrations of these criteria.

Table 3-4: A table to describe characteristics of visual analysis (information gathered from Horner et al., 2005 and Kratochwill et al., 2013).

Characteristic	***Description***
Level	The mean score during each phase. A difference between the mean scores in each phase may indicate an effect.
Trend	The slope of the line of best fit within each phase. The slope may be stable, upward or downward. A change in the slope of the trend line may indicate an effect.
Variability	The fluctuation of the data points from the means. Limited variability, particularly within the baseline indicates more reliable data.
Immediacy of Effect	The change in level between the means of the last three baseline data points and the first three intervention data points. A difference indicates how quickly the impact of the intervention was seen.
Overlap	The proportion of data points that overlap in the intervention phase with the baseline phase. A small percentage of overlap may indicate an effect.
Consistency of Patterns Across Phases	The extent to which there is consistency within all phases in a condition (e.g. all A or all B phases). This is not relevant for AB designs.

Visual analysis can be confounded by variable data, particularly if the baseline is not stable before the intervention is introduced (Kratochwill et al., 2013). Instability of the baseline can make the particularly difficult to interpret (Brossart et al., 2006). Visual analysis has been criticised for its increased risk of both type I (*an effect is concluded when one has not occurred*) and type II errors (*there is an effect, but it is missed*) (Brossart et al., 2014). Researchers highlight that visual analysis can also be confounded by similar factors affecting statistical analysis, such as autocorrelation. Autocorrelation refers to the growing independence of data points when collected over time, which has been found to increase the risk of a type I error (Matyas & Greenwood, 1990). Additionally, the method is recognised to have a level of subjectivity and therefore the reliability of the judgements can be questionable (Brossart et al., 2006). To increase the reliability of the judgements, inter-rater agreement of the visual analysis should be sought (Horner et al., 2005).

3.7.1.2 Statistical Analyses

Despite visual analysis being the most commonly used approach to data analysis within SCEDs, statistical analyses can also be used (Kazdin, 1984). Researchers have advocated the use of both visual and statistical analysis when analysing SCED data (Brossart et al., 2006; Kazdin, 1984). However, many statistical methods require particular assumptions to be met. For example, time series analysis requires more than 50 data points and no missing data, whereas t-tests require the data to be normally distributed (Kazdin, 1984). These assumptions can be more challenging to meet within school-based research. In addition, Brossart et al. (2014) acknowledges that statistical calculations are subject to many of the same risks as visual analysis (e.g. variability in the data).

A statistical analysis that has been more recently discussed in relation to SCEDs is effect size. Effect size refers to the strength of the association between the outcome and the intervention (Brossart et al., 2006). Within the literature there appears to be a range of methods to calculate effect size (such as Tau-U) (Brossart et al., 2014). However, research suggests that the results of these calculations can vary considerably depending on what method is used (Brossart et al., 2006). As such, there is currently no consensus on which effect size calculation should be used when analysing SCED data in (Kratochwill et al., 2013).

3.7.1.3 Pre and Post Measures Analysis

There are a range of statistical analyses that can be used within group design studies to investigate whether any change with the dependent variable has been significant (Mertens, 2015). However, due to single case design and small sample used within this study many of these analyses were not appropriate to analyse the pre and post measures.

One method that can be used to analyse change with pre and post measures is the Reliable Change Index (RCI) (Jacobson & Truax, 1991). The RCI can be used to explore whether any change between two data points is clinically significant and whether it cannot be accounted for by measurement variability (Jacobson & Truax,

1991). It is useful for ideographic research, where groups are not being examined as it can compare change at the individual level (Zahra & Hedge, 2010). A score of 1.96 or above is described as reliable change that could not have occurred by chance (Jacobson & Truax, 1991). However, this analysis approach has been criticised for possible measurement errors, such as regression to the mean (if a pre score is extreme, the post score is statistically more likely to be closer to the mean) (Speer, 1992). Alternative methods have been proposed in an attempt to address this criticism; however, many are reported to have their own limitations (Maassen, 2001). Within the literature, the RCI method suggested by Jacobson and Truax (1991) appears to be the favoured approach to calculate change (e.g. Brooks et al., 2017; Maskey et al., 2014).

3.7.1.4 Analysis in the Current Study

In this study, the repeated measures data was analysed visually, as this continues to be the most common form of analysis when conducting SCEDs (Kratochwill et al., 2013). The criteria described in table 3.5 was used to support the visual analysis, and this was informed by Horner et al. (2005) and Kratochwill et al. (2013).

Table 3-5: A table to describe the characteristics used to visually analyse the SCED data within this study.

Characteristic	***Indicator of an effect in this study***
Level	The mean score is lower in the intervention phase demonstrating a reduction in the frequency of anxiety-related target behaviours.
Trend	A change in the slope of the trend, ideally from a stable trend to a downward trend. This was calculated via Excel.
Variability	Limited variability (small range and standard deviation) of the data would be indicative of more reliable data.
Overlap	A small percentage of overlap is observed between the baseline and intervention phase.

Immediacy of the effect was not considered within the analysis as it was assumed that due to the nature of the intervention any effect would happen over time, as more skills were taught. As the design was an AB, consistency of patterns across the phases was not relevant.

To increase the reliability of the analysis, a TEP familiar with SCEDs visually analysed the data and overall inter-rater agreement of the judgements was calculated. Agreement was calculated using Cohen's Kappa (Cohen, 1960). This is described in the results chapter in section 4.2.6.1

The data did not meet the criteria to support the use of most of the statistical analyses available. Effect sizes could have been calculated; however, as there is a lack of agreement related to the best method to calculate effect sizes (Kratochwill et al., 2013), the decision was made to not calculate these within this study.

The pre and post measures were analysed using the RCI. This was calculated in Microsoft Excel using the following formula (Figure 3-1).

Figure 3-1: The RCI formula (Jacobson & Truax, 1991) used to analyse the pre and post measures

$$RCI = \frac{x_2 - x_1}{\sqrt{2\left(s_1\sqrt{1 - r_{xx}}\right)^2}}$$

x_1 = participant's pre score

x_2 = participant's post score

S_1 = standard deviation of the control group

r_{xx}= test-retest reliability

In order to calculate the standard error of difference, psychometric data was required from the pre and post measures that were used (Spence and SAS-TR). The psychometric properties that were used are described in table 3-6 with details of where they were obtained from.

Table 3-6: A table to display the reliability and standard deviations used to calculate the RCI for pre and post measures.

	Parent (Spence) (Nauta et al., 2004)	***Teacher (SAS-TR)*** *(*Lyneham et al., 2008)
Reliability (Cronbach's alpha)	0.89	0.93
Standard Deviation	9.7	8.43

3.7.2 Qualitative Analysis

The information gathered from the semi-structured interviews was analysed using thematic analysis. As the teachers and children's involvement with the intervention differed, their data was analysed separately.

Thematic analysis involves identifying, analysing and reporting patterns within the data, described as 'themes' (Braun & Clarke, 2006). This method was chosen as it is a flexible approach which would answer the qualitative research questions (see section 2.8.2) by enabling patterns to be identified within the participants' perspectives. In addition, unlike some other qualitative analysis methods, it can be used with any underpinning ontological and epistemological stance (Braun & Clarke, 2013).

Braun and Clarke's (2006) six stage guide to thematic analysis was used as it enabled a clear audit trail for how the themes within the data were identified. The stages are described below with reference to the specific methods used within this study.

- *Step 1: Familiarising yourself with the data*
  The researcher transcribed the data which supported their familiarisation. Once the data was transcribed and checked for accuracy, the researcher re-read the data twice.
- *Step 2: Generating initial codes*
  The researcher went through the interviews developing initial codes for all extracts of the data. This process was then repeated to ensure that no content had be lost and attention had been given to all aspects of the data.
- *Step 3: Searching for themes*
  Once all the data had been coded, the researcher began to look at how the codes fit together to form overarching themes and sub-themes.
- *Step 4: Reviewing themes*
  This stage involved refinement of the candidate themes by reviewing the evidence supporting them. This was done by returning to the original data extracts to consider whether they apply to the theme. The researcher then considered if the

candidate themes accurately reflected the data set as a whole. A thematic map was created.

- *Step 5: Defining and naming the themes*

  After a thematic map was created, the themes were defined and refined further. Braun and Clarke (p.92, 2006) highlight that the 'essence' of what the theme is about should be captured when naming themes.

- *Step 6: Producing the report*

  The analysis is reported in Chapter 4. This includes the presentation of a thematic map and data extracts to demonstrate the themes identified.

An important distinction that should be made is whether an inductive or deductive approach to data analysis has been used (Patton, 2002). Within this analysis, an inductive approach was used, whereby the researcher was interested in what emerged from the data rather than imposing a theoretical framework on the data. This was particularly important as there was limited previous research in this area. However, it is important to note that the process can never be fully inductive as the researcher plays an active role in the analysis. Therefore, the researcher's assumptions and experiences will shape the analysis (Braun & Clarke, 2006). This is discussed further in Chapter 5.

Another important distinction should be made between whether the themes are being explored at the 'semantic' (*explicit or surface meanings of the data*) or 'latent' (*underlying ideas and assumptions that are informing what is being said*) level (Braun & Clarke, 2006). The semantic level was used as the researcher was concerned with what the participants explicitly said.

To support the reliability of themes identified, agreement was sought from two TEPs familiar with thematic analysis. Ten data extracts and the themes and subthemes were shared with the TEPs and they were asked to match the data to the themes provided. The percentage of agreement and disagreement was calculated and is reported within section 4.3.2.7 in the results chapter. The researcher had hoped to share the thematic maps with the participants to establish whether the themes captured their

perspectives. This is a more robust approach to assess the reliability of the analysis. However, owing to current work practices in spring 2020 this was not possible.

3.8 Ethical Considerations

Professional and ethical standards for EPs and researchers were consulted throughout the current study. These included the *British Psychological Society (BPS)'s Code of Human Research Ethics (2014) and Code of Ethics and Conduct (2018)*, and *The Health and Care Professions Council Standards of Conduct, Performance and Ethics (2012*).

Approval from the University of Nottingham Ethics Committee was obtained in May 2019. Following minor changes to the design (removal of the self-report measure and inclusion of key stage 1 aged pupils), an application for chair approval of minor amendments was made and granted in November 2019.

3.8.1 Informed Consent

Consent was obtained from the teachers following initial discussions about the research. They were fully informed of the aims and process of the research and their right to withdraw at any point (see Appendix 8).

As the children participating were under 16, written parental consent was obtained for them to take part in the research project (see Appendix 9). Parents were informed of the aims of the research and their right to withdraw their child at any point. The consent form explained that their child's class teacher would deliver the intervention and measurements would be taken before, during and after the intervention. Consent was voluntary and the participants' parents were required to opt in. As the school determined that the intervention was an appropriate part of their usual PSHE curriculum, formal consent was not obtained from the parents of children who were in the class where data was not collected. Formal consent was also not obtained from the children who took part in the intervention as it was deemed part of their planned curriculum to be delivered by their teacher. However, within the intervention the children had the right at all times to 'pass' or not participate in any activity.

Parental consent was also sought for the participants to be interviewed by the researcher at the end of the intervention. Pupil assent was obtained from the children when conducting the interviews and they were reminded that they do not need to take part and that they could withdraw at any point.

3.8.2 Confidentiality

The consent forms explained that all data collected would be anonymised and kept secure. A GDPR privacy notice was also sent home with the parental consent forms detailing what information would be gathered and that it would remain confidential (see Appendix 10).

Within small scale research such as this, extra care must be taken to ensure that the participants anonymity is ensured (Robson, 2002). Minimal background information about the children and schools has therefore been reported to reduce the chance of the participants being identified.

3.8.3 Debriefing

Both the teachers (see Appendix 11) and children that participated were provided with a verbal debrief after the interviews were completed. A written version of the debrief was provided, and the children's included 'widgit symbols' (images that support text) to aid their understanding (see Appendix 12). The debriefs included thanking the teachers, parents and children for their participation, providing an opportunity to ask questions, reminding them of their right to withdraw and highlighting sources of support. A debrief letter was also sent home to parents (See Appendix 13).

3.8.4 Participant Protection

When undertaking research, it is imperative that any potential risks to physical or psychological harm, discomfort or stress are identified to protect the participants (BPS, 2014). During the study, the researcher liaised regularly with the class teachers to ensure that no additional concerns or risks had occurred with the children during the intervention. Parents were informed that if school raised any concerns about their child's wellbeing they would be immediately withdrawn from the study.

The researcher recognised that speaking to a relatively unfamiliar adult could have been anxiety provoking for some of the children, so they were asked if they would like their teacher to join for the interview process.

When debriefed, possible sources of support were provided to parents and teachers. The children were reminded that they could talk to their teacher should they have any questions.

3.9 Evaluating the Quality of Research

3.9.1 Evaluating Quantitative Designs

3.9.1.1 Reliability

Reliability refers to the 'stability or consistency with which we measure something' (p.101, Robson, 2002). Possible risks to the reliability of the measures included; participant error, participant bias, observer error and observer bias.

Participant error refers to the possibility that the participants' performance may fluctuate widely. This was a significant risk within this research as it is likely that at times extraneous factors affected the participants' level of anxiety (e.g. something happened at the weekend or a change with routine). In an attempt to reduce this, the behavioural observations were conducted on the same day each week. The teachers also communicated any significant changes that there were aware of which may have contributed to any fluctuation.

There is a possible risk of participant bias from the teachers completing the pre and post measures. Triangulation of data was used to address and increase the reliability.

Observer error and observer bias were also potential risks to the reliability of this research. The teachers completing the behavioural observations may have inadvertently made errors or been bias within their recording of the data. Steps that were taken in an attempt to reduce these risks were discussed in section 3.6.1.3.

3.9.1.2 Internal Validity

Internal validity refers to whether any changes observed on the dependent variable (anxiety) are due to the independent variable (mindfulness-based intervention), rather than any extraneous variable (Mertens, 2015). The threats to reliability described in the previous section, for example participant error and observer bias, will impact on the internal validity of the study.

A SCED allows for more experimental control than a case study approach (Kratochwill et al., 2013). However, the use of an A-B SCED reduces the internal validity (Horner et al., 2005), as the researcher was not be able to control any external variables that may have resulted in any change between the baseline and intervention phase. As highlighted previously, alternative methods were considered to improve the internal validity; however, they were ruled out for various reasons.

Cook and Campbell (1979) discussed a number of threats to the internal validity of research. Table 3-7 highlights some possible threats to the internal validity within this research, alongside any steps taken by the researcher to attempt to reduce them.

Table 3-7: A table outlining threats to internal validity and attempts to control for these within the current study.

Threat	***Attempts to control for these threats***
History: Things that have changed in the participants' environment that may influence the results.	Due to the research being conducted within a real-world setting, it was not possible to completely control for this threat. The researcher requested that the participants should not begin any new interventions during the research in an attempt to reduce this risk.
Maturation: Change, growth or development of the participants not related to the intervention.	This was a high risk within this research. The children will have matured over the course of data collection which may create natural change. Achieving stability within the baseline would reduce this threat. The researcher followed guidance and collected at least three data points in the baseline (ideally more than five) (Kratochwill et al., 2013).
Testing: Changes occurring as a result of practice or experience of the tests.	As no self-report measure was completed, the participants should not experience practice effects.
Instrumentation: Changes to the way the participants are measure during the study period.	The measures were taken on the same day each week which should reduce this threat. Although limited, the inter-rater agreement checks should also reduce this threat further.
Experimental Mortality: Participant drop-out during the research.	The mortality risk was assumed to be relatively low in the study as the data collection period was relatively short. To reduce potential drop out, the researcher was regularly in contact with the teachers.

3.9.1.3 External validity

External validity refers to whether the findings of the research can be generalised to the wider population (Mertens, 2015). There is limited external validity with this research as it was conducted in two similar settings, with a small number of pupils. Therefore, making generalisability to the wider ASD population difficult. Furthermore, the participants attended specialist settings and were recognised to have additional learning needs. Therefore, generalisability to children with ASD who are have average to high intellectual ability is limited. The research aimed to add to an area of relatively

new evidence base by exploring the effectiveness of the mindfulness-based intervention specifically for the children that participated therefore generalisability was not the main aim of the research. In an attempt to improve the external validity, where possible, recommendations by Horner et al. (2005) were followed; such as collecting data from different participants with different measures of the dependent variable.

3.9.1.4 Social validity

Social validity refers to whether the research is of social importance (Mertens, 2015). The social validity was enhanced in this research because the dependent variable (anxiety) has high social importance and the independent variable (the intervention) was delivered by teachers in their usual school context (Horner et al., 2005). The target behaviours and observation schedules were developed in collaboration with teachers to ensure their relevance and their feasibility to complete.

3.9.2 Evaluating Qualitative Designs

Within qualitative research, different criteria are used to evaluate the quality of the research (Lincoln & Guba, 1985; Mertens, 2015). These are outlined in table 3-8, alongside the strategies used within this study in an attempt to meet the criteria. The information discussed is adapted from Lincoln and Guba (1985) and Mertens (2015).

Table 3-8: A table to describe the criteria for evaluating qualitative research alongside the strategies used in this study.

Criteria	***Strategies used to meet the criteria***
Credibility Ensuring that the researcher has captured the lived experiences and interpretations of the participants.	The researcher transcribed the interviews verbatim and followed a structured approach to analysis (Braun & Clarke, 2006). Where needed, the researcher attempted to ask clarifying questions and summarise and reflect back their understanding of participant responses to check their understanding of what was being said. Peer support via research supervision to allow for challenge and reflection about interpretations.
Transferability The ability for researchers to make judgements about similarities and differences in the research situation to their own.	Relevant description of the participants has been provided. Additional description, specifically related to the participating teachers may have been useful, and therefore could be considered a limitation when evaluating the research.
Dependability Ensuring the quality and appropriateness of the methods used in the research process.	Providing a clear description of the research process including how the information was gathered and analysed.
Confirmability Ensuring that the findings are not solely a result of the researcher's own interests, perspectives, motives and biases.	A clear audit trail of the analysis is provided, from the raw data to generation of themes. Inter-rater agreement of the themes was sought from another TEP (see section 4.3.2.7).

3.9.3 Evaluating Mixed Methods Designs

Within mixed methods research, the factors previously described to evaluate the quantitative and qualitative aspects are both relevant. The quality of the quantitative aspect is judged in relation to the reliability and validity of the data, whilst the qualitative

aspect is evaluated based on the credibility, transferability, dependability and confirmability.

In addition to this, key authors within the field of mixed methods approaches, Teddlie and Tashakkori (2009) have proposed a model for evaluating the quality of the mixed methods designs. The authors argue that the reason for choosing to implement a mixed methods design is to provide a better understanding of the phenomenon being investigated. Therefore, for them, the quality and transferability of any inferences that are made are of key importance (Teddlie & Tashakkori, 2009). Their framework aims to explore the overall 'design quality' (*the degree to which the researcher has selected and implemented the most appropriate procedures for answering the research questions*) and 'interpretive rigour' (*the degree to which credible interpretations have been made on the basis of the obtained results*) (Teddlie & Tashakkori, 2009). These factors will be considered when evaluating the overall research design within Chapter 5 (discussion).

3.10 Stakeholders

A number of stakeholders were identified and considered throughout the research:

- Participating pupils and their parents: The parents agreed for their children to take part in the study. The researcher visited the schools on a number of occasions, allowing the pupils to become familiar with them. Following the delivery of the intervention, the pupils were asked whether they would like to share their views with the researcher. The pupils and their parents were given opportunities to ask the researcher questions or ask familiar members of staff.
- Participating teachers and schools: The recruited schools agreed to take part in the research and supported the identification of pupils that met the criteria. The teachers also agreed to take part, delivered the intervention and were crucial for data collection. There was regular contact and liaison between the teachers and the researcher.
- University of Nottingham: The research was conducted as part of the training Doctorate in Applied Educational Psychology. The researcher was supervised by a University tutor throughout the project.

- Local Authority and Educational Psychology Service (EPS): The researcher is on placement within a Local Authority based in the East of England. The EPS provided authorisation for the research through their Research Governance procedures.

The research findings are due to be presented and disseminated to the EPS Service in September 2020. Schools and parents will also receive a brief written summary of the main findings.

3.11 Summary of Methodology

This chapter presented a rationale for the methods used within this study. A pragmatic mixed method design was utilised, gathering both quantitative and qualitative data, to investigate the use of a teacher delivered mindfulness-based intervention with children diagnosed with ASD. The main focus of the research was the quantitative aspect which involved using a SCED involving repeated measures and pre and post measures related to participant anxiety. The qualitative aspect involved semi-structured interviews with the children and teachers to explore their perceptions of the mindfulness-based intervention. Data analysis involved visual analysis, pre and post comparisons and thematic analysis. Threats to the reliability and validity have been described, alongside ethical considerations. The results of the study will now be presented.

4 Results

4.1 Introduction

The results from the quantitative aspect of the study will first be presented exploring the primary research question:

- *Did the mindfulness-based intervention reduce participant anxiety?*

Each case will be presented separately with data gathered from both the SCED and pre and post measures.

Following this the qualitative results will be presented which explored the following research questions:

- *What are the children's perceptions of the mindfulness-based intervention?*
- *What are the teachers' perceptions of the mindfulness-based intervention?*

4.2 Quantitative Aspect

4.2.1 Charlie

Charlie was 7 years and 7 months at the start of the data collection, and he attends school one. Charlie's target behaviours were; the number of times he sought physical contact from an adult (e.g. leaning into them, holding their arm or asking for a safe hug). These were recorded twice weekly, throughout Mondays and Wednesdays.

Seven data points were collected during the baseline phase and ten during the intervention phase. Data was not collected during the week of half-term, and on one occasion during the intervention phase when Charlie was absent from school (25/11/2019).

Charlie's parental post-measure was not returned so the parental pre-measure has not been reported.

4.2.1.1 *Visual Analysis for Charlie*

Figure 4-1: A graph to show the frequency of Charlie displaying anxiety-related target behaviours during the baseline and intervention phase with mean lines.

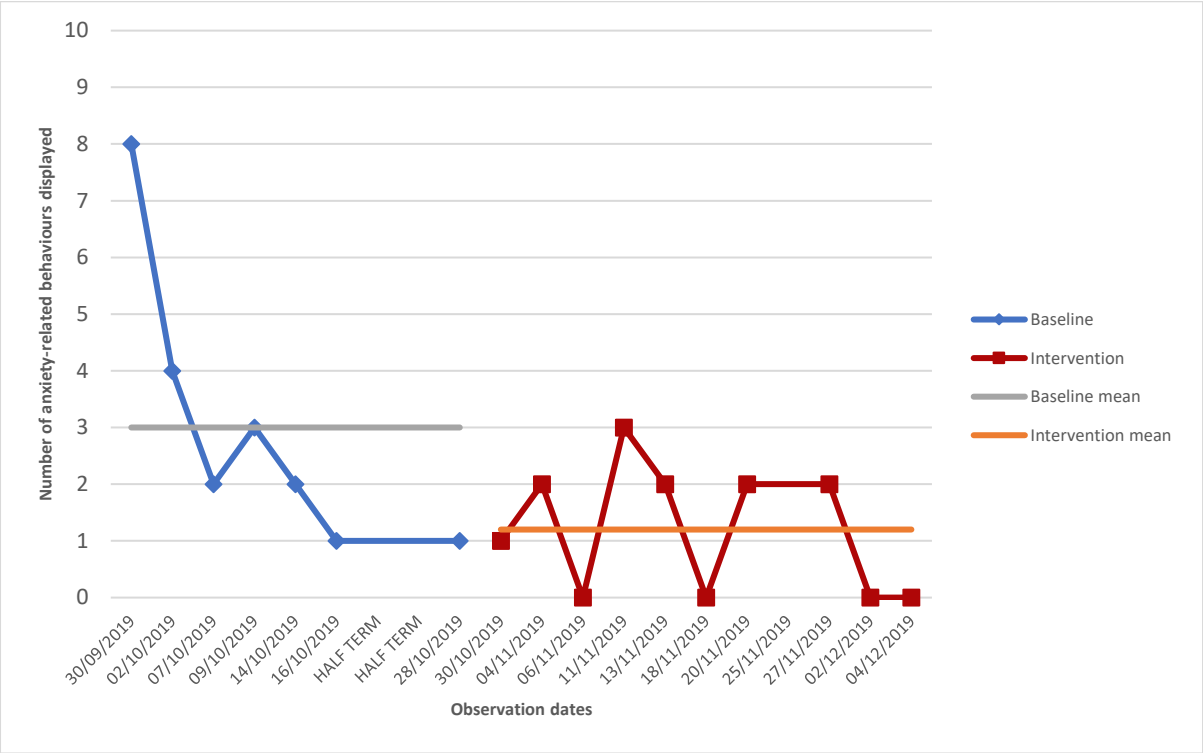


Figure 4-2: A graph to show the frequency of Charlie displaying anxiety-related target behaviours during the baseline and intervention phase with trend lines.

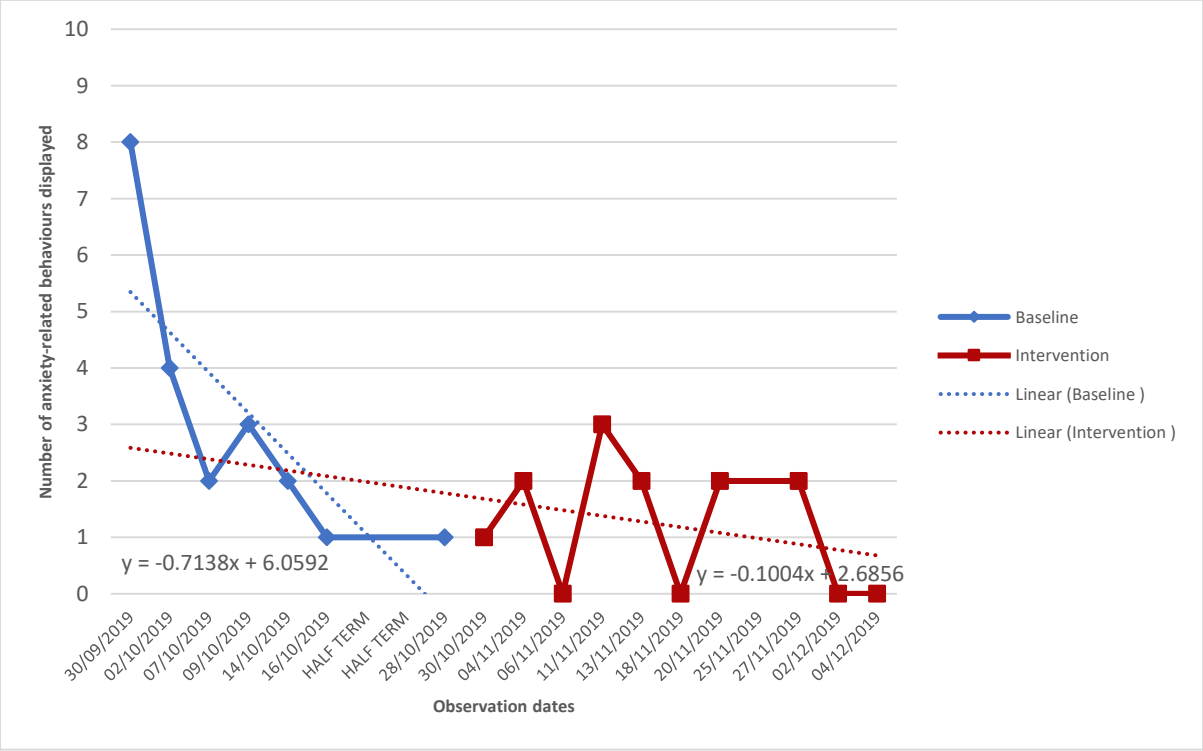


Table 4-1: A table to describe the visual analysis for Charlie's behavioural observation data.

Characteristic	***Descriptive results***	***Statistic results***	
Level	There was a decrease in the mean level between the two phases.	Baseline Mean: Intervention Mean: Mean level change:	3.00 1.20 -1.80
Trend	There was a steep downward trend during the baseline phase and a slight downward trend in the intervention phase.	Magnitude of slope change	0.61
Variability	The variability of data was larger in the baseline than in the intervention phase. There appears to be more stability within the intervention phase.	Range of data (and standard deviation) In baseline phase: In intervention phase:	 7 (2.45) 3 (1.14)
Overlap of data	More than half of the data points in the intervention phase overlapped with the data points in the baseline.	Percentage of data points overlapping	60%

The visual analysis suggested that there was a minimal intervention effect. The reduction in the mean and a downward trend within the intervention phase suggested a possible change in anxiety-related behaviours. However, there was also a downward trend within the baseline, prior to the intervention being introduced. The first data point within the baseline appears to be an outlier and likely influenced the trend and overall mean score. Over half of the intervention data points overlapped with data points within the baseline phase. Therefore, it is difficult to draw firm conclusions that there was a clear reduction in anxiety-related behaviours between the phases.

4.2.1.2 Pre and Post Measures

The table below outlines Charlie's pre and post intervention scores, as reported by his teacher. There was no significant change suggesting that the mindfulness-based intervention did not significantly reduce Charlie's anxiety levels.

Table 4-2: A table to display Charlie's levels of anxiety as reported by teacher pre and post intervention.

	Teacher report (SAS-TR)
Pre	25
Post	24
Difference	-1
Reliable Change Index	0.32
Significance	N

4.2.1.3 Summary

To summarise, the repeated measures did not convincingly indicate that there had been a reduction Charlie's anxiety as a result of the intervention. A significant change was not found when comparing the teacher pre and post measure.

4.2.2 Ben

Ben was 7 years and 3 months at the start of the data collection, and he attends school one. Ben's target behaviours were; the number of times he displayed the following behaviours at the end of a chosen activity or at the end of free time.

- Hitting
- Biting
- Running away
- Going to a 'safe' area (either the reading corner or the swing)
- Screaming

These were recorded twice weekly, throughout Monday and Wednesday (excluding play and lunch times).

Seven data points were collected during the baseline phase and ten during the intervention phase. Data was not collected during the week of half term, and on one occasion during the intervention phase when Ben was absent from school (06/11/2019).

4.2.2.1 Visual Analysis for Ben

Figure 4-3: A graph to show the frequency of Ben displaying anxiety-related target behaviours during the baseline and intervention phase with mean lines.

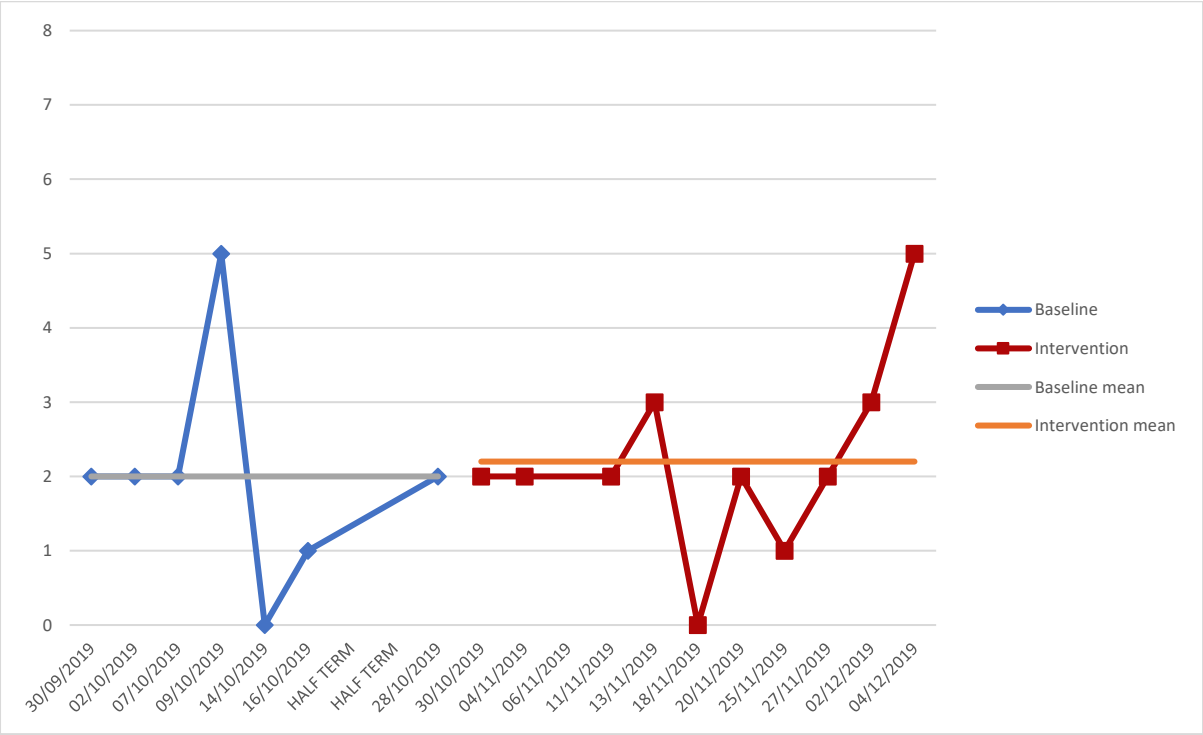


Figure 4-4: A graph to show the frequency of Ben displaying anxiety-related target behaviours during the baseline and intervention phase with trend lines.

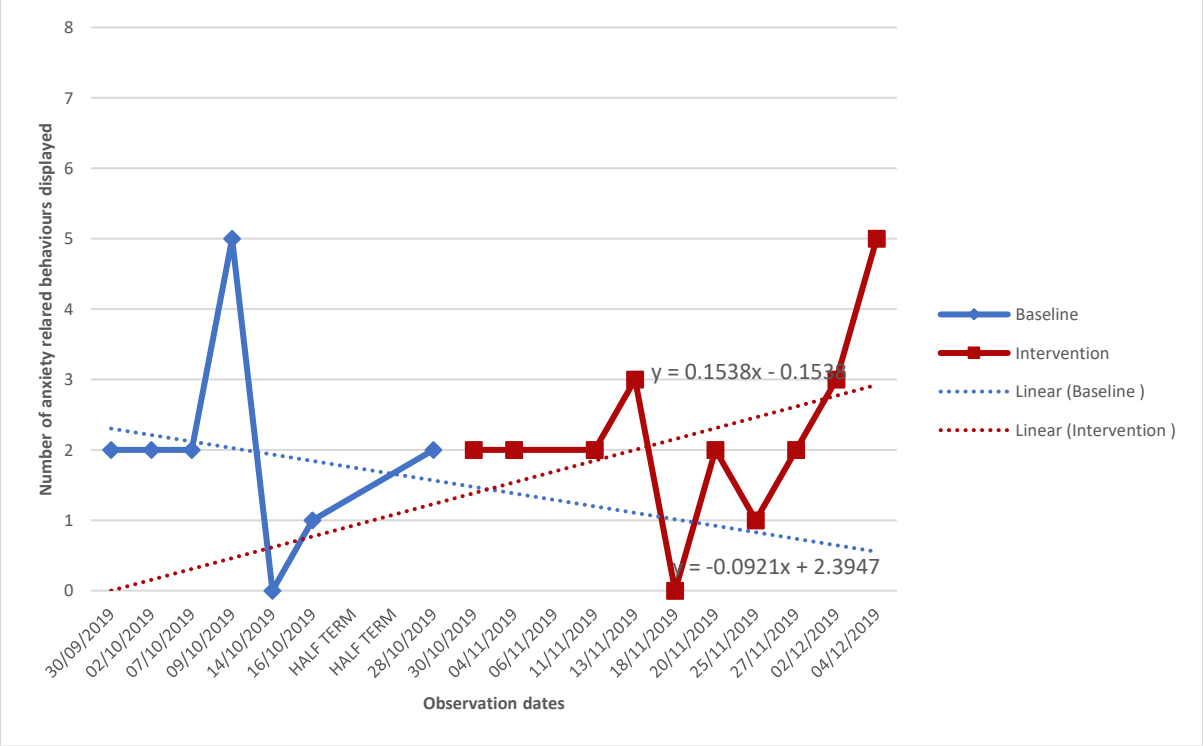


Table 4-3: A table to describe the visual analysis for Ben's behavioural observation data.

Characteristic	***Descriptive results***	***Statistic results***	
Level	There was a small increase between the mean level in the baseline and intervention phase.	Baseline Mean: Intervention Mean: Mean level change:	2.00 2.20 + 0.20
Trend	There was a slight downward trend in the baseline phase and a slight upward trend in the intervention phase.	Magnitude of slope change	0.24
Variability	The variability of the data was the same within both phases.	Range of data (and standard deviation) In baseline phase: In intervention phase:	 5 (1.53) 5 (1.32)
Overlap of data	All of the data points in the intervention phase overlapped with the data points in the baseline.	Percentage of data points overlapping	100%

The visual analysis suggested that there was no observable change in Ben's anxiety-related behaviour between the phases. There was a small mean increase in the intervention phase and all of the intervention data points overlapped with the baseline phases. Also, there was a slight downward trend in the baseline phase, and a slight upward trend in the intervention phase.

4.2.2.2 Pre and Post Measures

The table below outlines Ben's pre and post intervention scores, as reported by parent and teacher. For both measures, Ben's anxiety was reported to slightly increase, although this increase was not found to be significant. The scores suggest that the mindfulness-based intervention did not significantly reduce Ben's anxiety levels.

Table 4-4: A table to display Ben's levels of anxiety as reported by parent and teacher pre and post intervention.

	Parent report (Spence)	***Teacher report (SAS-TR)***
Pre	24	3
Post	27	6
Difference	+3	+3
Reliable Change Index	0.66	0.95
Significance	N	N

4.2.2.3 Summary

In summary, the repeated measures did not at all indicate that there had been a reduction Ben's anxiety as a result of the intervention. A significant change was not found when comparing the pre and post measures.

4.2.3 Harry

Harry was 5 years and 11 months at the start of the data collection, and he attends school one. Harry's target behaviours were; the number of times he displayed the following behaviours in response to being asked to engage in an adult-led activity (e.g. work tasks).

- Stomping his feet
- Saying 'no, no, no'
- Hiding behind the adults
- Crying

These were recorded twice weekly, throughout Monday and Wednesday (excluding play and lunch times).

Seven data points were collected during the baseline phase and ten during the intervention phase. Data was not collected during the week of half term, and on one occasion during the intervention phase when Harry was absent from school (06/11/2019).

4.2.3.1 *Visual Analysis for Harry*

Figure 4-5: A graph to show the frequency of Harry displaying anxiety-related target behaviours during the baseline and intervention phase with mean lines.

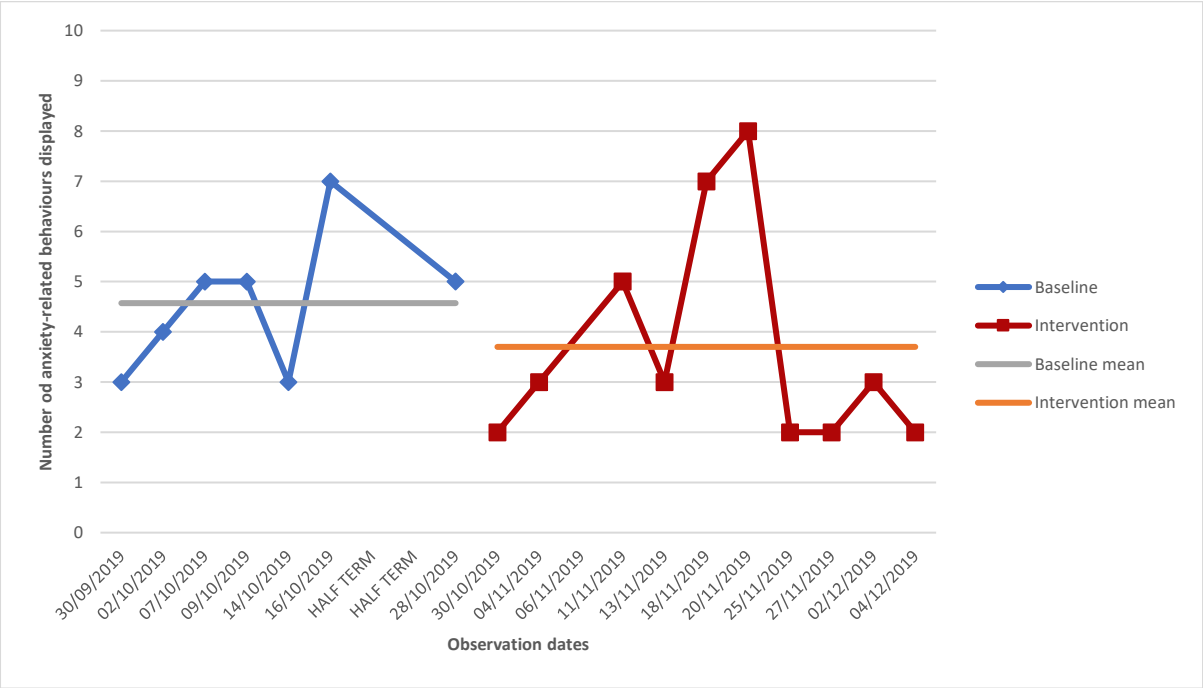


Figure 4-6: A graph to show the frequency of Harry displaying anxiety-related target behaviours during the baseline and intervention phase with trend lines.

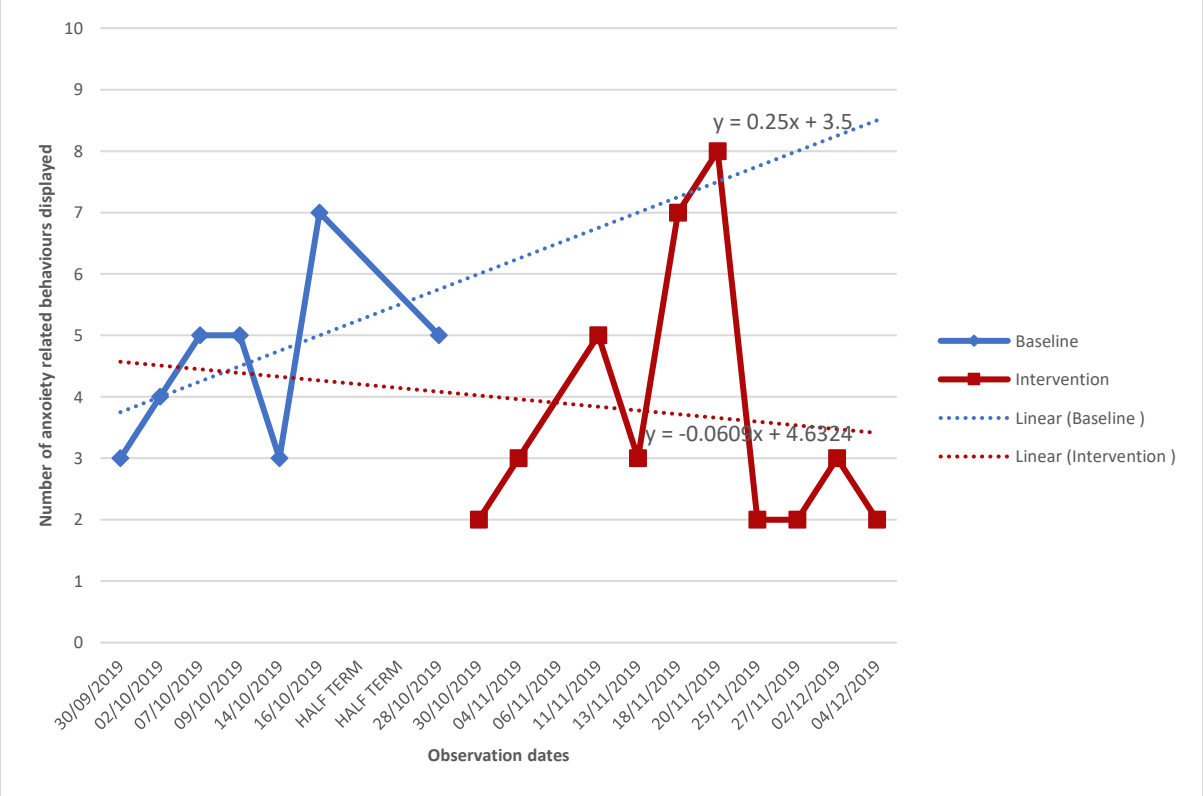


Table 4-5: A table to describe the visual analysis for Harry's behavioural observation data.

Characteristic	***Descriptive results***	***Statistic results***	
Level	There was a decrease in the mean level between the two phases.	Baseline Mean: Intervention Mean: Mean level change:	4.57 3.70 - 0.87
Trend	There was upward trend during the baseline phase and slight downward trend in the intervention phase.	Magnitude of slope change	0.31
Variability	The variability was higher in the intervention phase.	Range of data (and standard deviation) In baseline phase: In intervention phase:	 4 (1.40) 6 (2.21)
Overlap of data	More than half of the data points in the intervention phase overlapped with the data points in the baseline.	Percentage of data points overlapping	60%

Harry's mean scores reduced slightly between the phases. The trend line during the baseline was upward, indicating that without the intervention his anxiety-related behaviours may have increased. This then changed to a downward trend in the intervention. There was a high level of variability during both phases, and more than half of the data points in the intervention phased overlapped with the baseline. Therefore, there was insufficient evidence of a reduction in anxiety-related behaviours between the phases.

4.2.3.2 Pre and Post Measures

The table below outlines Harry's pre and post intervention scores, as reported by parent and teacher. Using the RCI, there was no significant change with either measure, suggesting that the mindfulness-based intervention did not significantly reduce Harry's anxiety levels.

Table 4-6: A table to display Harry's levels of anxiety as reported by parent and teacher pre and post intervention.

	Parent report (Spence)	***Teacher report (SAS-TR)***
Pre	53	14
Post	55	12
Difference	+2	-2
Reliable Change Index	0.44	0.63
Significance	N	N

4.2.3.3 Summary

To summarise, the repeated measures did not convincingly indicate that there had been a reduction Harry's anxiety as a result of the intervention. A significant change was not found when comparing either of the pre and post measures.

4.2.4 Oliver

Oliver was 10 years and 4 months old at the start of the data collection, and he attends school two. Oliver's target behaviours were; the number of times Oliver displayed the following behaviours.

- When asked to engage in a learning task or asked a question related to a learning, Oliver changes the subject to talk about one of his interests.
- Oliver paces around the room.

These were recorded twice weekly, throughout Mondays and Wednesdays.

Eight data points were collected during the baseline phase and ten during the intervention phase. Data was not collected during the two weeks of the school holidays.

Oliver moved to a new house during the intervention phase (17/01/2020) and his teacher reported that Oliver seemed particularly unsettled in school following this.

4.2.4.1 *Visual Analysis for Oliver*

Figure 4-7: A graph to show the frequency of Oliver displaying anxiety-related target behaviours during the baseline and intervention phase with mean lines.

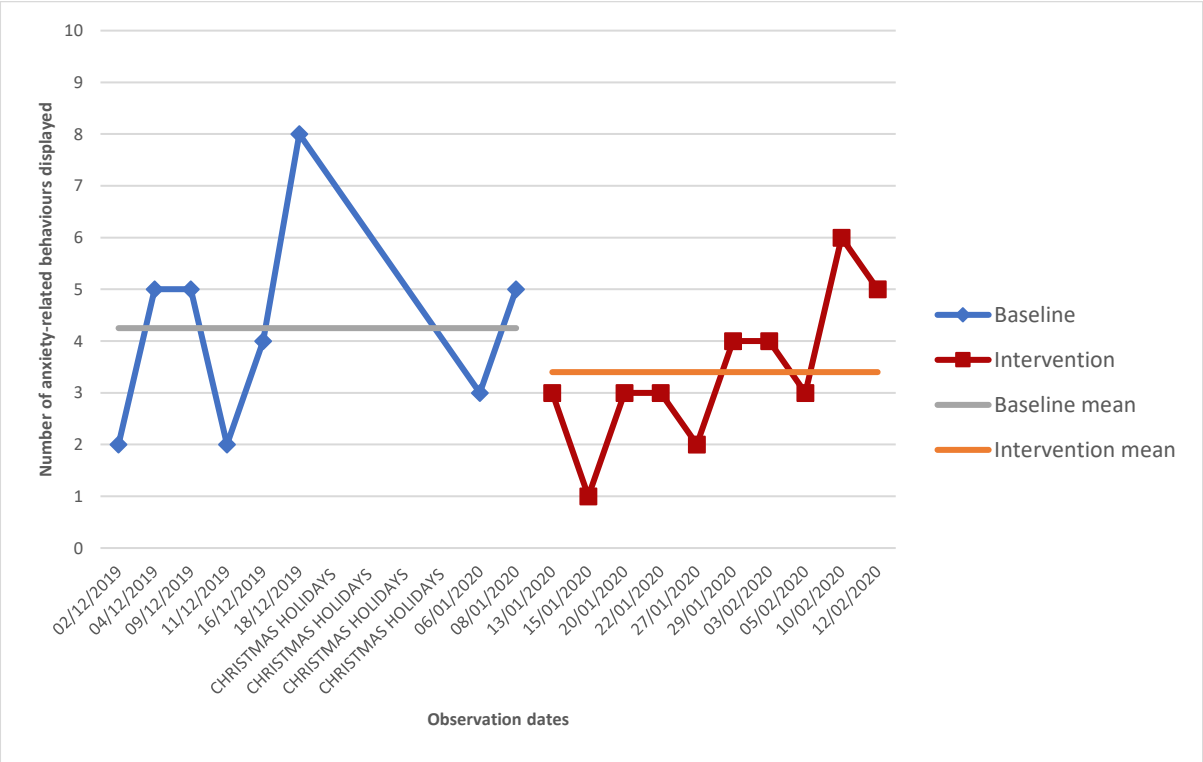


Figure 4-8: A graph to show the frequency of Oliver displaying anxiety-related target behaviours during the baseline and intervention phase with trend lines.

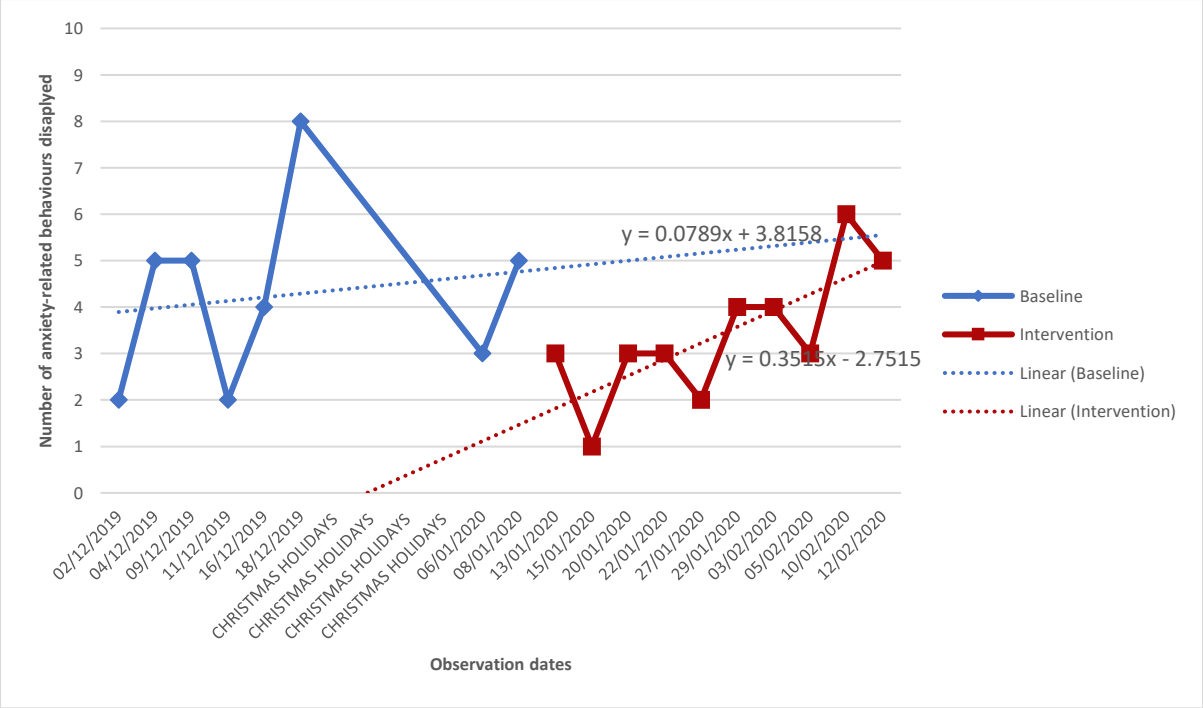


Table 4-7: A table to describe the visual analysis for Oliver's behavioural observation data.

Characteristic	***Descriptive results***	***Statistic results***	
Level	There was a small decrease in the mean level between the baseline and intervention phase.	Baseline Mean: Intervention Mean: Mean level change:	4.25 3.40 - 0.85
Trend	There was an upward trend in both the baseline and intervention phases. The trend in the intervention phase was slightly steeper.	Magnitude of slope change	0.27
Variability	There was slightly more variability in the baseline phase.	Range of data (and standard deviation) In baseline phase: In intervention phase:	 6 (1.98) 5 (1.43)
Overlap of data	There was a very high level of overlap of data in the intervention and baseline phases.	Percentage of data points overlapping	90%

The visual analysis indicated that there was little evidence of a reduction in Oliver's anxiety-related behaviours. There was a small mean change between the intervention and baseline phase, and the variability was similar in both phases. However, there was an upward trend in both phases and a high level of overlap of the data.

4.2.4.2 Pre and Post Measures

The table below outlines Oliver's pre and post intervention scores, as reported by parent and teacher. A significant change was found for the parent report post intervention, suggesting a possible reduction in Oliver's anxiety as a result of the mindfulness-based intervention. However, there was no significant change found with the teacher report.

Table 4-8: A table to display Oliver's levels of anxiety as reported by parent and teacher pre and post intervention.

	Parent report (Spence)	***Teacher report (SAS-TR)***
Pre	39	12
Post	17	11
Difference	-22	-1
Reliable Change Index	4.84	0.32
Significance	Y	N

4.2.4.3 Summary

In summary, the repeated measures did indicate that there had been a reduction Oliver's anxiety as a result of the intervention. Oliver's house move during the intervention phase may have influenced his anxiety levels and his engagement with the mindfulness-based intervention. Although a significant change was found when comparing the parent pre and post measure, this was not observed with the teacher report.

4.2.5 Alex

Alex was 10 years and 11 months at the start of the data collection, and he attends school two. Alex's target behaviours were; the number of times Alex displayed the following behaviours in response to him getting something wrong, not being able to complete a task or losing a game.

- Crying
- Talking negatively about school
- Being unable to move on to the next activity until the task is completed correctly
- Refusal to engage in the activity.

The behaviours were recorded throughout the week to give a total frequency of behaviours.

Four data points were collected during the baseline phase and five during the intervention phase. Data was not collected during the two weeks of the school holidays.

Alex's parental post-measure was not returned so the parental pre-measure has not been reported.

Despite requesting that the participants not engage in any new interventions during the research, the researcher was informed that from the week commencing 07/01/2020, Alex began attending weekly Emotional Literacy Support Assistant sessions.

4.2.5.1 Visual Analysis for Alex

Figure 4-9: A graph to show the frequency of Alex displaying anxiety-related target behaviours during the baseline and intervention phase with mean lines.

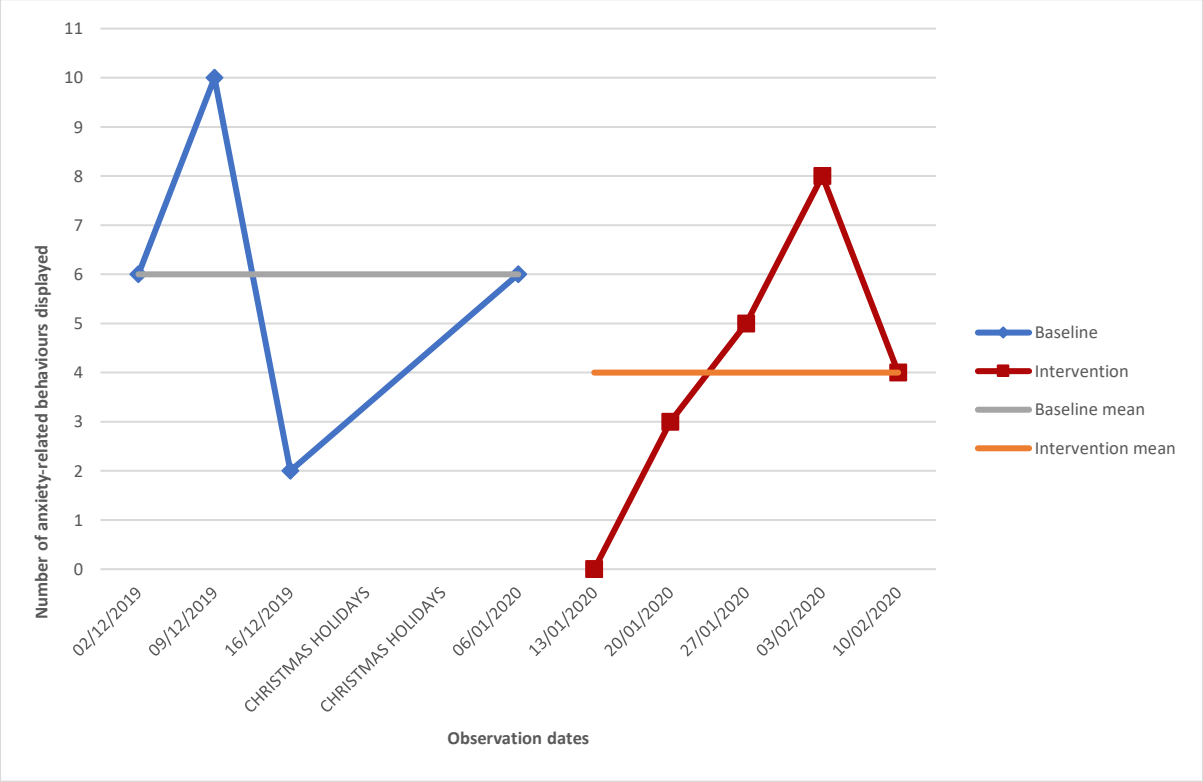


Figure 4-10: A graph to show the frequency of Alex displaying anxiety-related target behaviours during the baseline and intervention phase with trend lines.

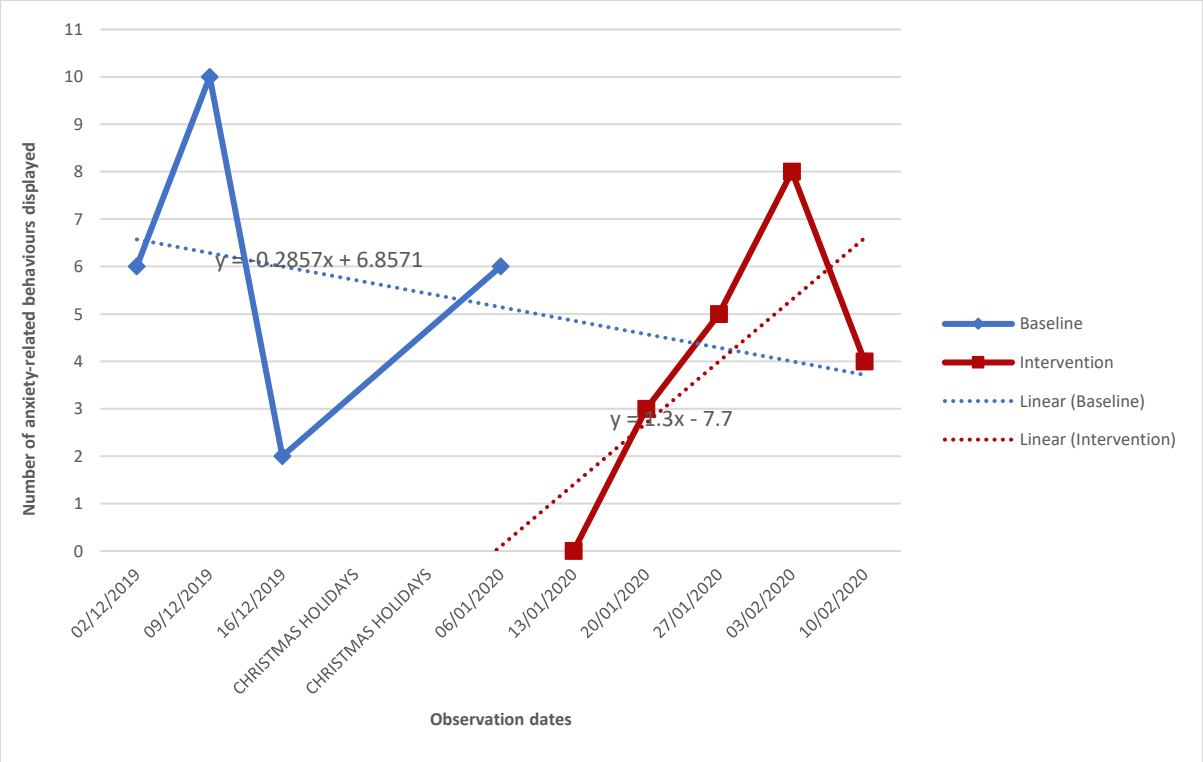


Table 4-9: A table to describe the visual analysis for Alex's behavioural observation data.

Characteristic	***Descriptive results***	***Statistic results***	
Level	There was a decrease in the mean level between the baseline and intervention phase.	Baseline Mean: Intervention Mean: Mean level change:	6.00 4.00 - 2.00
Trend	There was a downward trend in the baseline phase and a steep upward trend (undesired) in the intervention phase.	Magnitude of slope change	1.59
Variability	The variability of the data was high in both phases.	Range of data (and standard deviation) In baseline phase: In intervention phase:	 8 (3.27) 8 (2.92)
Overlap of data	There was a large degree of overlap between the data points in the baseline and intervention phase.	Percentage of data points overlapping	80%

There was a decrease in Alex's mean scores between the phases. However, there was a high level of variability in both phases, and there was a large degree of overlap of the data. These findings, alongside the steep upward trend in the intervention phase suggest that there was insufficient evidence of any reduction in anxiety-related behaviours between the phases.

4.2.5.2 Pre and Post Measures

The table below outlines Alex's pre and post intervention scores, as reported by his teacher. Although a slight reduction was reported, this was not significant.

Table 4-10: A table to display Alex's levels of anxiety as reported by teacher pre and post intervention.

	Teacher report (SAS-TR)
Pre	16
Post	14
Difference	-2
Reliable Change Index	0.63
Significance	N

4.2.5.3 Summary

To summarise, the repeated measures did not convincingly indicate that there had been a reduction Alex's anxiety as a result of the intervention. A significant change was not found when comparing the pre and post measure.

4.2.6 Reliability

4.2.6.1 Inter-rater Agreement for Visual Analysis

The inter-rater reliability was calculated using Cohen's Kappa (Cohen, 1960) and the rating scores can be found in Appendix 14.

The inter-rater reliability for the two evaluators was 0.75. According to Landis and Koch's (1977), this indicates 'substantial agreement'. This agreement increases the reliability of the visual analysis judgments made by the researcher.

4.2.6.2 Integrity of the Behavioural Observations

The researcher conducted integrity checks of the completion of the observation measures on two occasions for all of the participants (one in each phase). The target behaviours for the course of either a morning or afternoon were observed and recorded which were then compared with the teacher's observational record. The overall percentage of agreement was calculated and presented below:

- Charlie: 90%
- Ben: 83%
- Harry: 87.5%
- Oliver: 100%
- Alex: 100%

4.2.7 Summary of Quantitative Analyses

For all participants, the quantitative data (gathered through repeated measures and pre and post measures) did not indicate that a convincing change had been observed on participant anxiety as a result of the intervention. Therefore, the null hypothesis cannot be rejected. These findings will be interpreted within the next chapter with reference to the existing literature base. Methodological limitations, including threats to validity and reliability will also be discussed in light of the findings.

4.3 Qualitative Aspect

This section will describe the findings from the qualitative data gathered to explore the following research questions;

- *What are the children's perceptions of the mindfulness-based intervention?*
- *What are the teachers' perceptions of the mindfulness-based intervention?*

4.3.1 Children's Perceptions

4.3.1.1 Introduction

As previously described, semi-structured interviews were conducted with four of the five participants. Three of the four children chose to have their teacher present during the interview. The participating children's communication and language skills affected their understanding and engagement during the interviews and a number of adaptations to the questions were made during the process, with support from the

teacher. This was particularly apparent with the children from school one; Charlie and Ben. As a result, there was considerable variation in the interview process.

The data gathered from these interviews proved limited and therefore was not considered sufficiently rich enough to enable thematic analysis. An excerpt from each child's transcript is provided in Appendix 15. Therefore, a summary of the views gathered from each of the children is presented followed by an overview of any similarities and differences in their perceptions. Considerable caution must be taken when interpreting any of these views due to the methodological weaknesses. The limitations of the data gathering process and analysis will be discussed in the next chapter, alongside considerations for the challenges of eliciting the views of children and young people with communication and language needs.

4.3.1.2 Charlie

When asked whether the mindfulness lessons were good or bad, Charlie responded 'good'. He did not state what he liked about the lessons; however, when asked explicitly if a lesson was good, Charlie responded 'yeah' to the following lessons; listening, tasting, smelling, moving. When asked if there was any lesson that was bad, Charlie responded 'no'. Charlie did not respond when asked how the lessons made him feel. However, the teacher asked if mindfulness made him feel happy, sad or cross. Charlie said 'happy'.

4.3.1.3 Ben

Ben's communication was particularly limited and he tended to repeat words that had been said. His teacher asked him whether particular lessons were good or bad and Ben replied 'good' to the following lessons; tasting, smelling, looking. Ben replied 'bad' to the following lessons; breathing and listening. When asked 'do you want more mindfulness or no more mindfulness', Ben responded 'no more mindfulness'.

4.3.1.4 Oliver

Oliver reported that the mindfulness lessons were good and when asked what he liked about them he responded, 'my mind'. Oliver reported foods he liked during the tasting lesson 'crackers and orange' and some that he did not like 'chocolate buttons and

marshmallows'. When asked if he liked the breathing, Oliver demonstrated the breathing and then smiled. When asked if the breathing made him feel 'good or not good', Oliver responded 'good'. Oliver replied that he does not know what he would change about his lessons. Oliver's teacher asked him if he will continue doing his breathing and he replied 'yeah'.

4.3.1.5 Alex

Alex chose to have his interview independently without his teacher. When asked what he thought of his mindfulness lessons, Alex responded that 'you do something nice … like be kind'. Alex replied 'I liked everything maybe' when asked if there were any lessons he liked or did not like. When asked how the lessons made him feel, Alex responded 'happy'. Alex also reported that he did not know what he would change. When asked if he thought any of the lessons helped him, Alex replied 'yeah' and commented that 'like breathing maybe … calm down'. Alex was not sure if he would choose to do any of the activities again.

4.3.1.6 Summary of Children's Perceptions

As described, the data gathered from the children's interviews was limited, restricting the inferences that can be drawn.

With great caution, the views shared by the children appeared to be generally positive. The children reported aspects that they liked or that the lessons were 'good'. Only one participant (Ben) reported that some of the lessons that were 'bad' (breathing and listening). Most of the children did not indicate that they would like to continue learning the skills; only Oliver when directly asked by his teacher whether he would continue the 'breathing'. However, most of the children reported that the mindfulness-based intervention made them feel 'happy' (Charlie and Alex) or 'good' (Oliver). Only one participant responded when asked if the lessons helped (Alex) and he reported that he felt that the breathing had helped him calm down.

4.3.2 Teachers' Perceptions

4.3.2.1 Introduction

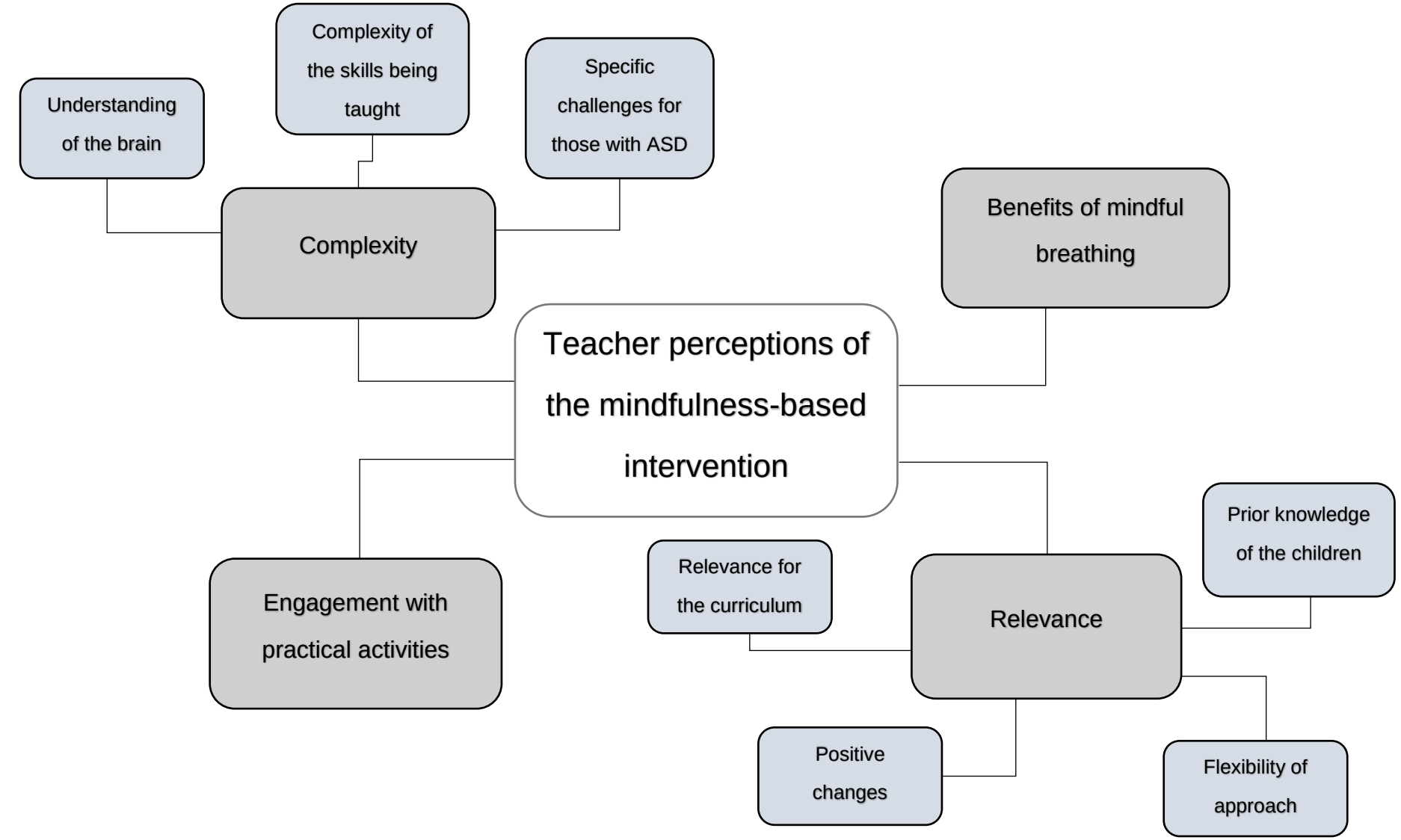
The themes and subthemes that were identified from the thematic analysis of the teachers' interviews are now described. As outlined in section 3.7.2, Braun and Clarke's (2006) six phase model was used to support the analysis process.

- *Step 1: Familiarising yourself with the data*
- *Step 2: Generating initial codes.*
  See Appendix 16 for an example of the coded data.
- *Step 3: Searching for themes.*
  See Appendix 17 for a list of the initial codes that were generated, alongside the developing themes.
- *Step 4: Reviewing themes.*
  See Appendix 18 for tabulation of themes, subthemes, initial codes and data extracts.
- *Step 5: Defining and naming the themes.*
  A thematic map is presented below.
- *Step 6: Producing the report*

4.3.2.2 Thematic Map

A thematic map is presented first (figure 4-11), followed by further description of the themes and subthemes, including illustrative examples from the data.

Figure 4-11: A thematic map of teacher perceptions of the mindfulness-based intervention.



4.3.2.3 Theme 1: Complexity

Across both interviews there was a recognition of the complexity of the intervention and the potential impact this had on the children's understanding of what was being taught. Specific challenges were highlighted in relation to the complexity of the skills being taught for children with ASD. This appeared to be a key theme within the data as both interviewees expressed this on a number of occasions.

This theme was illustrated particularly by this comment:
"but the actual lessons need, need that time but also need that recognition that it's quite an intense thing that we are trying to get children who don't necessarily understand their emotions to be trying to do" (Interviewee 1).

Within this theme, three subthemes were evident, related to the complexity.

i) <u>Understanding of the brain.</u>

Throughout the data the interviewees mentioned that the children found it difficult to understand the lessons that were related to understanding the brain. This is illustrated by the following comments:

- *"it didn't fit the children that I've got in terms of they really didn't understand about the different parts of the brain …the idea that we've got a brain is just was quite a foreign concept"* (Interviewee 1).
- *"I think like there was some stuff with the brain it was quite complicated for them to kind of understand'* (Interviewee 2).

ii) <u>Complexity of the skills being taught</u>

There was also recognition that the skills being taught were complex and possibly too advanced for the children at their current stage of learning and development. It was acknowledged that further teaching and learning would need to take place. This sub-theme is illustrated by the comment shared for the overall theme and also the following excerpts:

- *"the recent activities that we have been doing have been quite (.) I want to say heavy but it's kind of like reverse advent calendars what we can be doing in our local community and because it's not involving*

us it's really, really difficult for the children to understand because they just don't have that outward thinking" (Interviewee 1).

- *"I think we missed some bits out didn't we because they were just too complex, they just wouldn't understand"* (Interviewee 2).

iii) Specific challenges for those with ASD

Both interviewees highlighted perceived challenges that they felt were specific for the children diagnosed with ASD. This is illustrated by the following comments:

- *"I think it's quite difficult when they're autistic for them to like transfer it as well, so they could do it kind of in the lesson but yeah so it's quite difficult for them to kind of transfer the skills to other areas"* (Interviewee 2).
- *"I think some of it is, is that difficult concept of understanding what their bodies do and what their bodies feel like. I think it's quite in a lot of children with autism they are not able to, to possibly pin point pain where it is they know that they are not feeling well but they can't necessarily pin point where abouts in their bodies feel so it's quite a tricky thing to suddenly be saying right I want you to be telling me about how you are feeling about something it is quite an abstract"* (Interviewee 1).

4.3.2.4 Theme 2: Benefits of Mindful Breathing

Another theme that was identified was related to the perceived benefits of mindful breathing. Both interviewees commented about how they felt it had been a useful strategy for particular children, and they also highlighted the ease of incorporating it into the school day.

This theme is illustrated particularly by the following comments:

- *"Yeah I think we'll continue especially the breathing … just because it is so easy to do"* (Interviewee 1).
- *"this morning he struggled with something and was we sort of told him to breathe and that really helped him, so I think yeah the breathing's definitely something that some of them have picked up and used"* (Interviewee 2).

- *"[NAME] really likes the breathing and when I say to him why do you like breathing how does it make you feel and says it makes me feel tired and I said it isn't really making you feel tired it's making you feel relaxed and because you are feeling relaxed you are feeling calmer"* (Interviewee 1).

4.3.2.5 Theme 3: Engagement with Practical Activities

The children's engagement with practical activities was also identified as a theme within the teachers' interviews. Both teachers commented that the children seemed to engage best with the lessons or activities that were practical. Furthermore, there was recognition that this was a helpful way for the children to learn.

This is illustrated particularly by the following comments:

- *"I think they like the kind of more practical things, so they liked the making the bottles"* (Interviewee 2).
- *"yeah having something that we had physically done ourselves made it easier for the children to relate to rather than it being quite abstract in a story books"* (Interviewee 1).

4.3.2.6 Theme 4: Relevance

Across the data there was discussion about the relevance of the intervention for teachers and children. This theme captures a number of comments about the relevance of the skills the intervention aimed to teach, the link to other aspects of the curriculum, how easy and useful it was for the teachers to deliver and the perceived positive changes as a result. Overall, the interview data indicated that mindfulness is perceived to be relevant for the children to learn and the teachers to deliver. This theme will be discussed in further detail under the relevant subthemes below.

The theme is illustrated particularly by this comment:

"we need to be equipping them, equip the children and educating them to help them communicate, so starting right at the beginning in terms of mindfulness and being aware of how we are feeling why we are feeling it and what we can do to make ourselves feel better is incredibly important and I think as a school they really value that because PSHE is one of our top targets" (Interviewee 1).

Four subthemes were evident within this higher order theme:

i) Relevance for the curriculum

The interviewees made a number of comments referencing how the intervention links with, and is relevant to, other areas of the curriculum; including PSHE and healthy eating. There was recognition that the intervention expanded on skills that were already being taught. This subtheme is illustrated by the comments below:

- *"I think it was good because it was kind of something different to what they'd have anyway so we do kind of PSHE and stuff but then that was kind of a different side of it that we don't really look at"* (Interviewee 2).
- *"the mindful tasting will come in really handy when we focus on our healthy eating because we had a couple of really quite picky eaters but were quite happy to try something that was a bit different when we were doing the mindful tasting so I think we'll use that a couple of times"* (Interviewee 1).

ii) Positive changes

As a result of engagement in the intervention, the teachers' perceived that there had been positive changes for specific children. One interviewee also commented on the wider staff changes as a result. This sub-theme was felt to be an indicator of the relevance of the intervention for teachers and children and was illustrated by the following comments:

- *"but definitely [Harry] has been more settled and he's able to verbalise how he is feeling a bit more so he will still show that initial first behaviour, but we are not having the extreme behaviours that we were"* (Interviewee 1).
- *"yes I think the breathing's helped sort of [Alex] erm to stop him really I think and another pupil [NAME] in the class as well"* (Interviewee 2).
- *"Yeah I think um in terms of the I think as practitioners we've become a lot more aware of actually the children's awareness of their own emotions in terms of them being mindful and trying to get them to reflect on it"* (Interviewee 1).

iii) Prior knowledge of the children

The teachers also made comments about the benefits of the them knowing the children and how this supported them to be able to adapt and deliver the intervention.

This is illustrated by the following comments:

"I found it easy enough to do knowing the children that I have got and knowing what I needed" (Interviewee 1).

"because you sort of know what they are going to react badly to and then obviously that could set them off wrongly for the whole afternoon" (Interviewee 2).

iv) Flexibility of the approach

The last subtheme identified was related to the perceived flexibility of the intervention. The teachers highlighted the benefits of the pre-planned lessons and that they felt they could make the necessary adaptations. There was also comments related to how the some of the activities fitted into the school day and could easily be continued.

The following comments illustrate this subtheme:

- *"I think in terms of the lessons being pre planned and having the link with the story books actually it works quite well"* (Interviewee 1).
- *"yeah we could make the changes as we went along"* (Interviewee 2).
- *''easily we could continue with some of the mindful activities and be able to do that throughout the week''* (Interviewee 1).
- *"they've been trying to put more into the timeslots and we have to say what we are doing at what time so it's quite good that we found something that we can do in that and it linked quite nicely on as we normally, normally do circle time activities anyway do"* (Interviewee 2).

4.3.2.7 Inter-rater Agreement of Themes

As described in section 3.7.2, the percentage of agreement for the themes was sought from two TEPs who were familiar with thematic analysis. Ten data extracts were randomly chosen and each TEP was asked to match these to the themes and

subthemes that the researcher had identified (see Appendix 19). The percentage of agreement is displayed in table 4-11. Following this, a slight amendment was made to the name of one of the sub-themes.

Table 4-11: A table to display the percentage of inter-rater agreement of themes.

	Themes	***Subthemes***
Percentage of agreement with TEP 1	100%	87.5%
Percentage of agreement with TEP 2	100%	100%
Overall percentage of agreement	100%	93.75%

4.3.3 Summary of Qualitative Analyses

The thematic analysis highlighted four themes within the teachers' data; complexity, benefits of mindful breathing, engagement with practical activities and relevance. Subthemes were identified within two of the higher order themes; complexity and relevance.

Overall, the teachers' perceptions suggested that there were challenges of the intervention due to its complexity for the children participating. The teachers perceived learning about the brain as a specific area that the children found difficult to grasp. The analysis also indicated that the teachers' perceived aspects of the intervention as too advanced for the children's current level of development. Specific challenges were also highlighted for the children with ASD, such as difficulties generalising the skills from the lessons to use in times of upset.

Despite these challenges, the perceived benefits of mindful breathing were discussed; both in relation to benefits for specific children but also the ease of using the technique within the school day. The teachers' perceived the children as most engaged with the practical activities from the intervention, and the benefit of learning these skills through doing was highlighted.

The last theme within the data captured the teachers' perceptions about the relevance of the intervention. Overall, the data suggested that the teachers' perceived the intervention to teach relevant skills to the children and that teachers are in an appropriate position to be the ones delivering it. This was highlighted through the

teachers' views that the intervention fits within, and links to, other areas of the curriculum. The teachers also highlighted the flexibility of the intervention and how their prior knowledge of the children supported them to adapt and deliver the intervention. Perceived benefits from engagement in the intervention were described, which was also felt to be an indicator of the relevance and suitability of the intervention.

These findings will be discussed further in the next chapter, in relation to previous literature, the methodological strengths and limitations and the implications for future practice and research.

5 Discussion

5.1 Introduction

This chapter will discuss the research findings outlined in Chapter 4. The research aims are reiterated and then the findings related to each of the research questions are presented. Following this, the findings of the study are discussed in relation to previous literature.

The chapter then moves on to evaluate the methodology of the current research, with reference to possible limitations that might affect the interpretation to the findings. This includes a review of the reliability and validity of the study. Lastly, the implications of the findings for practice and future research will be discussed.

5.2 Summary of Aims

The primary aim of the research was to investigate the impact of a teacher delivered mindfulness-based intervention on the anxiety levels of pupils with a diagnosis of ASD. There appears to be growing evidence of the potential benefits of utilising mindfulness-based interventions to reduce anxiety with children and young people (e.g. Britton et al., 2014; Etherington & Costello, 2018; Napoli et al., 2005; Zoogman et al., 2014). Furthermore, there is increased recognition of the role schools can have in promoting positive mental health (DoH & DfE, 2017), and mindfulness-based curriculums have been specifically developed for teachers to deliver to their students (MiSP, 2020; The Hawn Foundation, 2011). Nevertheless, previous research that has explored the use of mindfulness-based interventions specifically with children and young people with ASD appears particularly limited. Therefore, this research aimed to add to the evidence base in this area, specifically about whether a mindfulness-based intervention is an effective way to reduce anxiety in children with ASD.

The research also aimed to explore children's and teachers' perceptions of the intervention. It was hoped that gathering perceptions would provide further insight about the efficacy of teachers delivering mindfulness-based interventions to students diagnosed with ASD.

5.3 Discussion of Findings

5.3.1 Research Question 1

The primary research question for this study was: ***Does the mindfulness-based intervention reduce anxiety of children aged between 4 and 11 years with ASD?***

Hypothesis: The mindfulness-based intervention reduces anxiety of children aged between 4 and 11 years with ASD.

The findings for this research question will be discussed in relation to the three sub-questions.

5.3.1.1 Does the mindfulness-based intervention reduce the participants' anxiety-related behaviour?

Repeated measures were taken of target anxiety-related behaviours for all five participants during both the baseline and intervention phase. The visual analysis did not suggest that there had been an observable reduction in anxiety-related behaviours as a result of the intervention. These findings should be considered in light of the methodological limitations of the study which are discussed further in section 5.5.

5.3.1.2 Does the mindfulness-based intervention reduce school staff reports of participant anxiety? (As measured by the SAS-TR; Lyneham et al., 2008)

For all participants the repeated measures were triangulated with pre and post teacher report measures. Before and after the intervention, the teachers completed the SAS-TR, and the difference in scores were analysed using the RCI (Jacobson & Truax, 1991). Although for four of the participants there was a slight reduction in anxiety as reported by the teachers (Charlie, Harry, Oliver and Alex), the reduction was not found to be significant for any of the participants. Therefore, indicating that there had been no significant change in teacher reports of participant anxiety as a result of the intervention.

5.3.1.3 Does the mindfulness-based intervention reduce parent reports of participant anxiety? (As measured by the Spence; Spence, 1999)

Pre and post measures were also obtained from three of the participants' parents using the Spence. The difference in the pre and post scores were analysed using the

RCI (Jacobson & Truax, 1991). For Oliver's parental pre and post report measures, a significant reduction in anxiety was found after the intervention. However, for both Ben and Harry a slight increase in anxiety was reported by parents, although this change was not found to be significant for either participant. The overall findings indicate that there was limited evidence of significant change for parent reports of participant anxiety as a result of the intervention.

5.3.1.4 Conclusion

In summary, when reviewing the data gathered via the repeated and pre and post measures, no convincing evidence was found that the mindfulness-based intervention reduced the children's anxiety. Therefore, the null hypothesis cannot be rejected. These findings should be considered in light of the current study's methodological limitations which are discussed in section 5.5.

5.3.2 Research Question 2

The following research question was also explored within the current study:

What are the children's perceptions of the mindfulness-based intervention?

This research question was explored through semi-structured interviews with four of the five children who had participated in the intervention. The data gathered from these interviews limited the analysis options and therefore it has been challenging to make overall inferences about the children's perceptions from the data. The limitations of this will be discussed in section 5.5.6.

Nevertheless, cautious interpretation of the children's perceptions indicated that their views were generally positive. The children reported aspects of the curriculum they liked or that the lessons were 'good'. Only one participant (Ben) reported that some of the lessons were 'bad' (breathing and listening), with the other three participants indicating that they liked all of the lessons. Three of the four children also reported that the intervention made them feel 'happy' or 'good'. These findings suggest that the mindfulness-based intervention was generally enjoyed by the children. However, only one participant (Oliver) indicated that he would continue with aspects of the mindfulness (breathing) when directly asked by the teacher. Therefore, this suggests

that the children may not perceive the intervention as something they see themselves as continuing, either via their school curriculum or independently. Although, as previously described, considerable caution is needed when interpreting these findings due to the restrictions with the data and analysis process.

5.3.3 Research Question 3

The following research question was also explored within the current study:

What are the teachers' perceptions of the mindfulness-based intervention?

This research question was explored through the use of semi-structured interviews with the two teachers that delivered the mindfulness-based intervention to their class. The data was analysed using thematic analysis.

The findings suggested four overall themes related to the teachers' perceptions of the mindfulness-based intervention. Subthemes were identified within two of the higher order themes; complexity and relevance. The four themes are summarised below:

- *Complexity*

  The teachers' perceptions indicated that there were challenges in implementation due to the complexity of the mindfulness-based intervention for the children participating. Within this theme there was recognition by the teachers that there were specific challenges related to the intervention for the children with ASD; such as being able to generalise the skills.

- *Benefits of mindful breathing*

  The teachers' perceived mindful breathing as beneficial and easy to use as a strategy within schools.

- *Engagement with practical activities*

  The practical activities within the mindfulness-based intervention were viewed as the most engaging and helpful way for mindfulness skills to be learnt.

- *Relevance*

  The skills being taught during the intervention were perceived to be of relevance for the children and positive outcomes for individual children were identified, related to emotional wellbeing, as a result. The teachers also viewed that the

intervention could fit into the school day and that their prior knowledge of the children supported them to adapt and deliver the intervention.

The teachers' perceptions generally indicated that there were challenges to implementing the intervention with children with ASD, particularly due to the complexity of the skills being taught. However, the intervention was also perceived to be relevant and have potential benefits for some of the children. Mindful breathing was viewed by the teachers as particularly useful, with both teachers reporting that they planned to continue using this within their curriculum. The teachers also viewed that, due to the complexity of the skills being taught, further teaching and learning related to these skills would be helpful.

5.4 Interpretation of the Findings in Relation to the Previous Literature

5.4.1 Introduction

This section will discuss the findings in relation to the literature reviewed in Chapter 2.

5.4.2 Impact on Anxiety

Contrary to previous research conducted with children and young people diagnosed with ASD (Hwang et al., 2015), this research did not find that the mindfulness-based intervention significantly reduced participant anxiety. There are several differences with the implementation of the interventions when comparing the current study and the previous research conducted by Hwang et al. (2015), that may have contributed to the differences observed in the findings. Hwang et al. (2015) research involved the participants engaging in mindfulness practice over a period of 12 months. Therefore, one possible explanation is that in Hwang et al. (2015) study mindfulness skills were taught over a much longer period. This suggests it is possible that learning and practice of mindfulness over an extended period of time may be a beneficial way to reduce anxiety. Similarly, the research conducted by Singh et al. (2011) involved mindfulness skills being taught to adolescents until they did not display aggressive behaviour for four weeks. The intervention length varied from 17 to 24 weeks. Although this research explored the impact on aggressive behaviour rather than anxiety, it indicates that it may take longer than five weeks mindfulness teaching to change behaviour. It is important to note that the teachers within the current study also

reported that further teaching and learning of the skills would be helpful for those participating in the intervention. As such, the children in the current study may not have fully mastered mindfulness skills which could have affected the possible benefits on their anxiety levels.

Hwang et al. (2015) research also involved the mindfulness skills being taught by the participants' mothers. The difference in findings could also therefore be related to who delivered the intervention. None of the wider literature investigating the use of mindfulness-based interventions with children diagnosed with ASD has used teachers to deliver the intervention. Therefore, less seems to be known about the utility of teacher delivered mindfulness-based interventions with young people diagnosed with ASD. Nevertheless, the systematic review presented in chapter 2 indicated that there were no observed differences in the effectiveness of the mindfulness-based interventions delivered by teachers compared to outside professionals. Although this was in relation to pupils attending a mainstream primary school, it might be assumed that teachers in specialist settings should be as effective at delivering mindfulness-based interventions to their pupils with ASD.

Another factor that may have influenced the differences observed is that the participants in the current study were recognised to have additional learning needs which may have contributed to the effectiveness of the intervention. The children who participated were likely to be at an earlier developmental stage than the participants in Hwang et al. (2015) research. Hwang et al. (2015) reported that the participants were aged between 8 and 15 years old, whereas the participants in the current study were aged between 5 years 11 months and 10 years 11 months. Previous researchers have indicated that during the latter years of primary school (approximately 9-12 years of age) a number of developmental changes, such as neural and mental organisation, take place that support an individual's self-reflective capacity (Zelazo & Carlson, 2012) and it is a critical stage for building resilience against mental health difficulties (Schonert-Reichl & Lawlor, 2010). This understanding contributed to the researcher's decision to target children attending primary schools within this research. However, the participants in the current study were recognised to have a range of additional learning needs and therefore, there may be differences in their brain development (Graham, 2017). Consequently, the developmental changes required to support self-

reflection may not yet have occurred. As such, learning mindfulness may have been more challenging for the children participating in this study. This has implications for educational professionals when considering the appropriateness of using mindfulness-based interventions with children and young people. Moreover, when considering their use within ASD populations, factors such as whether the children and young people have additional learning or communication needs and their developmental age appear important.

Although within this study the quantitative analysis did not show any significant change in participant anxiety, the teachers reported that they felt the intervention had reduced the anxiety of specific participants. Hwang et al. (2015) research reported that, although at a group level a significant reduction in anxiety was found, there was differences in the results for individual participants. As such, Hwang et al. (2015) findings, alongside the teachers' reports in this study, suggest possible individual differences in response to the intervention. Isolating the different factors that may help or hinder positive engagement and response to mindfulness-based interventions within the ASD population seem an important area for further exploration.

The research reviewed in chapter 2 that explored the impact of mindfulness-based interventions on children and young people's anxiety, all used either self-report, parent or teacher reports of anxiety. Although this study utilised parent and teacher report measures, self-report measures were not utilised due to the children's perceived level of emotional literacy skills. Furthermore, the repeated measures that formed the SCED involved pre-defined target behaviours described by the participants' teachers. The chosen measures, therefore, could have contributed to the different findings observed within the current study. The potential methodological limitations of the measures used in this study will be explored within section 5.5.

5.4.3 Children's Perceptions of the Intervention

Despite methodological limitations, the findings from this research indicated that most of the children liked aspects of the mindfulness-based intervention. These could be considered similar to the findings of previous research (Thomas & Atkinson, 2017; Vickery & Dorjee, 2016) where the majority of children and young people who

participated reported that they enjoyed practicing mindfulness. While these studies were also conducted in UK settings, they were undertaken in primary schools, whereas the present research was conducted in complex needs settings. The previous studies also differed by exploring the views of 'typically developing' pupils, rather than those specifically diagnosed with ASD. Although caution must be taken when making any inferences about the children's perceptions, the comparative findings tentatively suggest that children diagnosed with ASD may enjoy engaging in mindfulness as much as their 'typically developing' peers.

Thomas and Atkinson (2017) indicated that their participants reported being better able to self-regulate and were more relaxed in school as a result of the mindfulness-based intervention. Within this study, only one participant communicated that he felt the intervention had helped him to 'calm down'. However, as previously mentioned Thomas and Atkinson's (2017) research was not specifically with children diagnosed with ASD. Therefore, the differences observed are possibly related to the communication needs of the children who participated in the current study.

Previously conducted doctoral research has gathered the views of children and young people diagnosed with ASD following involvement with a teacher-delivered mindfulness-based intervention (Lambert, 2015). The research explored the experiences of four children aged between 10 and 13 years old who attended a mainstream setting. After the intervention, the participants reported feelings of empowerment and resiliency, and positive changes to their experiences of having worries (Lambert, 2015). Prior to inclusion in the interviews, assessments were undertaken to ensure that the children had the pre-requisite communication skills to participate. It is therefore likely that the children's communication skills were more advanced than those that participating in the current study which would account for the differences in the breadth and depth of the views obtained. This highlights the considerations needed when designing research that aims to gather the views of children and young people with communication needs. This will be explored further in section 5.5.6.

5.4.4 Teachers' Perceptions of the Intervention

Similar to findings in previous research (Thomas & Atkinson, 2017), the teachers within this study provided examples of how they perceived the mindfulness-based intervention had reduced the anxiety of specific children.

Within this current research, a key theme from the teachers' perceptions appeared to be related to the *complexity* of the intervention. When looking at previous research that has explored teachers' views of delivering mindfulness-based interventions, 'complexity' did not appear to be explicitly raised (Thomas & Atkinson, 2017; Kuyken et al., 2013). Therefore, this appears to be a novel finding within this research. The prior research was conducted within mainstream settings; therefore, this suggests the concerns about complexity identified within the present research may be a result of the needs of the children who participated in the study. As previously described, the participants in the current study were attending a complex needs setting and therefore identified as having additional learning and communication needs. Despite the youngest version of MindUP (aimed at children approximately 4-7 years) being chosen in this study and adaptations being agreed, aspects were still felt to be too complex for the participants. As such, there are implications for teachers when considering what mindfulness-based interventions may be suitable and accessible for their pupils, especially for those pupils with ASD and additional needs.

Although complexity was not explicitly raised as a perceived challenge within prior research, when examining the information shared within Kuyken et al. (2013) research, teachers reported an average of 6.8 (on a 10-point Likert scale) for the children's 'understanding of mindfulness'. This figure suggests that the teachers were not confident that all of the children understood mindfulness. It therefore seems important that the complexity of the skills being taught within mindfulness-based interventions is acknowledged and the potential challenges created when teaching children and young people particularly those with additional needs.

A sub-theme identified in this research was that the teachers' perceived particular challenges related to the participants learning mindfulness due to their diagnosis of ASD. One of the teachers reported that they felt that it was difficult for the children with ASD to 'pinpoint' feelings in their body. These difficulties could be reflective of wider

sensory processing difficulties that are frequently identified within individuals with ASD, as discussed in chapter 2. Mindfulness is understood to include directing and focusing attention bodily sensations (Tang et al., 2007). Therefore, if an individual has difficulties with sensory processing, it could be arguably more difficult for them to do this. However, it could be hypothesised how the practise of focusing attention on bodily sensations could be beneficial for those with sensory processing difficulties. This seems like a valuable area for future research that is evaluating the impact of mindfulness-based interventions with those diagnosed with ASD, due to the recognised high incidence of sensory processing difficulties within the population (Tomchek & Dunn, 2007; Baker et al., 2008).

Previous research conducted by Thomas and Atkinson (2017) reported that teachers felt the mindfulness curriculum they delivered was feasible in the context of a mainstream primary school setting. Similarly, the teachers in this study appeared to perceive the mindfulness-based intervention as feasible within complex needs settings, highlighting the possibility that the intervention could be continued and fitted into the school curriculum and day. The teachers within the present study also highlighted adaptations were needed and that they could make these as they went along. Within Thomas and Atkinson's (2017) research, the teachers identified some potential adaptations that they would make, such as shortening the lessons and differentiation for pupils. The comparative nature of these findings suggests that the need for adaptation is not necessarily isolated to children and young people diagnosed with ASD. It seems that teachers may need to be able to adapt any mindfulness-based intervention to suit the needs and teaching style of their individual pupils and class.

5.5 Methodological Evaluation

5.5.1 Introduction

This section will explore specific methodological strengths and weaknesses that should be taken into account when considering the implications of the findings.

5.5.2 Sampling

Within the study there was no participant attrition and the sample size fell within the typical range for SCEDs (Horner et al., 2005). The recruitment of the participants was

more of a challenge than the researcher anticipated. This is possibly due to accessibility issues and the need for reliance on a number of gatekeepers (e.g. head teacher, teachers and parents). The researcher initially aimed to target children diagnosed with ASD that were attaining within the expected ranges of learning. Despite contact being made with a range of settings, many did not feel able to make a commitment to the research. One of the main reasons that was reported was that several wellbeing interventions were already taking place in the school, either by trained school staff or external professionals. As a result of these challenges the researcher broadened inclusion criteria to any children diagnosed with ASD. The use of children with additional learning needs may have impacted the engagement and impact of the intervention, and therefore, caution should be taken when generalising the findings to the wider ASD population.

All the children that participated were male, White British and located within a specific area of the UK. These factors alongside the small sample, also limits the generalisability of the findings. In an attempt to increase the external validity, the researcher recruited participants from more than one setting, as suggested by Horner et al. (2005).

5.5.3 A-B SCED

Limitations to the internal validity of the study are particularly relevant due to the choice of an A-B SCED. With this design it is difficult to control for extraneous variables which may have affected the internal validity (Kratochwill et al., 2013; Ganz & Ayres, 2018). For example, one of the pupils moved to a new house during the intervention phase, which may have affected his engagement with the intervention and his anxiety levels. Similarly, despite the researcher requesting that no new interventions were started during the research, one participant started an emotional literacy-based intervention. Although the findings did not indicate a significant reduction in his anxiety, we do not know whether any change observed was a result of either intervention or a combination. Other SCEDs such as an ABA were ruled out because learning would have taken place during the intervention phase that couldn't be 'unlearnt' (Reason & Morfidi, 2001). However, time permitting, it would have been useful to continue

collecting repeated measures during a 'follow up' (C) phase to see if continued practice of the mindfulness skills resulted in increased and sustained impact.

A further limitation to the internal validity of the design was that stability of the baseline was not achieved for many of the participants before introduction of the intervention (Kratochwill et al., 2013). It was not possible to wait for stability to be achieved for all of the participants due to the time frames in which the research needed to be completed. More importantly, it was felt that it would have been unethical to withhold the intervention for an extended period of time. Nevertheless, as recommended, at least three data points were collected in each phase, with more than five being collected for the majority of the participants (Kratochwill et al., 2013).

5.5.4 Measures

Steps were taken to increase the reliability of the repeated measures, such as collecting them during the same days each week. However, as a result of the teachers delivering the intervention and also completing the measures, there is an increased risk of participant and observation bias in this study (Robson, 2002). Furthermore, although the teachers indicated that they felt it was feasible to record the behaviours throughout a school day, this length of time increases the risk of observer error. For example, the children may have displayed behaviours within the day that were not observed by the teaching staff or correctly recorded. In an attempt to reduce this risk, teaching assistants supported the teachers with the measures and fidelity checks were completed by the researcher within each phase (Horner et al., 2005). Furthermore, pre and post teacher measures were triangulated with parental measures.

The lack of observable and significant change in participants' anxiety could be related to weaknesses with the method used to measure anxiety, rather than a lack of effect of the intervention. Within this study participant anxiety was measured through pre-defined target behaviours. Researchers suggest that anxiety can present itself through externalising behaviour within children with ASD (Kerns et al., 2014; Ozsivadjian et al., 2012; White et al., 2009), especially those with lower cognitive functioning (Lecavalier et al., 2014). As the pupils were not thought to have the requisite emotional literacy skills to self-report their anxiety, drawing on the teachers' knowledge to identify

target behaviours was deemed the best form of measurement. However, it is possible that the target behaviours may not have been capturing anxiety and instead measuring a different emotion, such as anger. The reliability and validity of the measures could possibly have been improved by both teachers and parents deciding upon the target observation behaviours. If both home and school identified similar anxiety-related behaviours, this may have improved the reliability of the measure. Still it is important to recognise that the repeated measures were of social importance as these were behaviours that the teachers reported were of concern and regularly observed within school. This increases the social validity of the measures (Horner et al., 2005).

A further challenge with the repeated measures was that there was a high level of variability of the behaviours. Some days the children displayed a high number of behaviours, whereas on other days the children demonstrated minimal behaviours. Due to this research being conducted within a real world setting we do not know all of the extraneous variables that may have affected the participants, for example whether something has happened at home or a poor night sleep. The high level of variability increased the overlap in the data and therefore impacted on the conclusions that can be drawn about any impact (Kratochwill et al., 2013).

Triangulation using pre and post measures enhanced the reliability and validity of the study. However, the small amount of time between the pre and post measures being collected may have also impacted the internal validity of the research. For a number of the participants there was a small reduction in anxiety (as reported by teacher or parent); however, this change tended not to be statistically significant. The data was gathered over approximately 10 weeks, and therefore this may not have been a long enough for change to have occurred or for it to be detected by the measures used.

5.5.5 Intervention

The MindUP curriculum was chosen as it is specifically developed for teachers to deliver, its relative low cost and the prior research suggesting positive outcomes for wellbeing outcomes (Schonert-Reichl & Lawlor, 2010; Schonert-Reichl et al., 2015). However, there are limitations to choosing an American developed curriculum, such as to the ecological validity of the findings. The curriculum was based on experience

and knowledge of an American population and there may be variation in educational principles and teaching methods within a UK population. MindUP also recommend that links are made with other parts of the US school curriculum to support the skills to be embedded and varied ways to do this are described within the curriculum (The Hawn Foundation, 2011). Although the teachers were encouraged to make links to the wider curriculum and practise techniques outside of the intervention, this appeared to be limited. It may have been that the curriculum links were not relevant due to the differences with the educational systems. As these links are encouraged to support consolidation of the skills (The Hawn Foundation, 2011), this may have affected the children's learning of mindfulness and the overall impact on anxiety.

Due to adaptations being agreed with the teachers prior to the lessons, this research was not an evaluation of the manualised MindUP programme. Transparency of the intervention was increased by agreeing lesson plans and the teachers then recorded what had been delivered, which should support replication of the research. However, greater adherence to the curriculum would have increased the fidelity of the intervention across the settings. As adaptations were made, the children in the different schools may have received different teaching. Previous research highlights that teachers reported adaptations that they would make to the mindfulness-based curriculum to support the engagement of their pupils, such as shortening the length of the lessons (Thomas & Atkinson, 2017). Differentiation is also a regular part of a teachers' role to ensure accessibility for children. Therefore, it seems important that interventions have the flexibility to be adapted when delivered in specialist school settings. Moreover, there are ethical considerations to delivering an intervention where there is an awareness that it is not accessible, or that it may cause an adverse reaction.

The MindUP programme does not stipulate that explicit training is required to use the curriculum. This was perceived as one of the benefits of utilising the curriculum as it is easily accessible and low cost. However, other programmes, such as those developed by the MisP, involve a lengthy training period where teachers are required to demonstrate that they have practiced mindfulness skills themselves (MisP, 2020). Therefore, this may affect the reliability of the research as the teachers' competence in delivering mindfulness may have varied. The researcher attempted to minimise this

by spending time reviewing the curriculum with the teachers to support their understanding. Furthermore, the use of an intervention that required lengthy training, or delivery of the intervention by an outside professional may have reduced the social validity of the intervention for teachers. Nevertheless, it is important for the amount of training and the competence of those delivering mindfulness-based interventions to be considered when evaluating the potential impact. Further research might benefit from exploring whether there are any differences in outcomes for children and young people when mindfulness is delivered by those who have undergone extended training compared to those following a manualised programme.

5.5.6 Children's Semi-Structured Interviews

The researcher chose to use semi-structured interviews as they offered structure whilst allowing the questions to be slightly altered depending on the needs of the participant (Robson, 2002). Attempts were made to ensure that the questions asked were accessible for the children. For example, a visual aid of the interview questions that included widget symbols (the children's usual communication strategy) was provided, and the interview questions were shared with the class teachers prior to the interview to check their suitability. On reflection, it would have been useful to have also completed a pilot of the questions with children who have similar needs to check whether they were accessible. This will be an important factor for future research to consider when working with populations with communication and interaction needs.

The children met the researcher on several occasions before their interviews as fidelity checks of the intervention were conducted. It was hoped that this would have eased any anxiety they may have felt talking to an unfamiliar person. In addition, as part of schools' usual process for preparing the children for visitors, the teachers shared a short visual story explaining the researcher's visit. However, the unfamiliarity of the interview process (e.g. being in a separate room, use of a tape recorder) may have been anxiety-provoking for the participants. This could have affected their engagement with the interviews. Focus groups were initially ruled out due to the potential risk of dominance of individuals (Cohen et al., 2018). However, this approach may have been useful to encourage participation and reduce any anxiety due to the unfamiliarity of the situation.

Eliciting the views of the children was felt to be a particular challenge within this research, which is more widely discussed within literature (Beresford et al., 2004; Lewis & Porter, 2007; Punch, 2002; Scott-Barrett et al., 2019). As described above, steps were taken in an attempt to support the children's engagement with the interview process. However, despite these adaptations, and the researcher's prior experience of eliciting the views of children diagnosed with ASD, the information gathered during the children's interviews was relatively limited. This leads to a risk to the credibility of the findings because the information gathered may not have fully captured the children's true perceptions. Punch (2002) highlights that researchers need to be aware of our own assumptions when gathering and interpreting children's views. It is therefore important to acknowledge that, although aspects of the data are felt to be limited based on the researcher's hopes and aims, it should not be assumed that the children did not share all of the views that they wanted to within the process.

The practical knowledge of the teachers was used to support the planning of the interview process, and on reflection, it would have been useful to draw more from the research base in this area to support appropriate methods to elicit the children's views. Evidence suggests that using flexible and creative methodological approaches, that are not reliant on language, can be valuable when researching children's perspectives (Lewis & Porter, 2007). This is suggested to be especially relevant for those with additional communication and language needs, such as being diagnosed with ASD (Scott-Barrett et al., 2019). Possible creative approaches may include, the use of photography, videos and map making (e.g. The Mosaic Approach, Clark & Moss, 2001), visual communication techniques (e.g. Talking Mats), or the use of drawing (Lewis & Porter, 2007). Nevertheless, consideration should be given to the analysis process of data gathered via these methods (Lewis & Porter; 2007) and finding an appropriate balance between methodological rigour and promoting children's participation is key (Beresford et al., 2004).

It is therefore acknowledged that there is not one 'best' method to gathering children's views. Aligned with the pragmatic stance taken within this study, researchers should consider the most appropriate methods for the participants in light of their research questions and aims. Lewis and Porter (2007) highlight that it is important that

researchers are transparent about any difficulties they have experienced to support future research and learning. As such, this is a particular area of learning and development for the researcher and will be imperative for future research to consider.

5.5.7 Researcher Reflexivity

It is important to recognise that the researcher's views, beliefs and experiences can have an impact on the research and interpretation of the findings (Robson, 2002).

The researcher adopted a pragmatic approach which assumes that reality will be guided by the researcher's personal value systems and therefore the researcher studies what they deem to be important (Teddlie & Tashakkori, 2009). This was true within this study as the research topic was of interest to the researcher.

The researcher has previous experience of working with children and young people diagnosed with ASD in a complex needs school. It is important to acknowledge that this experience may have influenced her interpretation and the confirmability of the findings. In an attempt to reduce this threat, for the thematic analysis, inter-rater checks were conducted on the themes generated from the teachers' data.

5.5.8 Visual Analysis

The use of visual analysis in the current study may have impacted on the reliability of the findings. As a result of the instability observed with many of the participants' baselines, visual analysis was challenging as previously highlighted (Brossart, et al., 2006). Reliance on the visual analysis may therefore have increased the risk of a type II error; an effect occurred but it was missed. However, inter-rater reliability was sought, and there was substantial agreement (Cohen's Kappa, 0.75) to try to mitigate this risk.

5.5.9 Thematic Analysis

In an attempt to reduce risks to the dependability of the qualitative findings, the researcher utilised Braun and Clarke's (2006) model to support transparency of the analysis process. This was further supported by the completion of inter-rater checks, which were found to have high agreement within study. Nevertheless, the completion

of member checks would have increased the credibility and confirmability of the findings.

There are no explicit rules for the sample size required in qualitative inquiry (Patton, 2002). However, Braun and Clarke (2013) highlight that typically a sample size of six or more is desirable (Braun & Clarke, 2013). Within this study this was not possible due to the research design. As such, this is considered a limitation to the dependability and transferability of the inferences drawn from the views of the teachers. Despite this limitation, thematic analysis was still deemed the most appropriate method of analysis for the qualitative information gathered as it enabled patterns within the teachers' data to be identified.

5.5.10 Mixed Method Design

When evaluating mixed method designs, the following factors are reported to be of key importance;

- Design quality (*the degree to which the researcher has selected and implemented the most appropriate procedures for answering the research questions*); and,
- Interpretive rigour (*the degree to which credible interpretations have been made on the basis of the obtained results*) (Teddlie & Tashakkori, 2009).

Various factors that are relevant to both of these aspects have been discussed in the sections above, evaluating the methodology of the current study.

To briefly summarise, this study utilised a mixed method design to enable a greater understanding of utility of a mindfulness-based intervention with children with ASD. This choice could be considered a strength within this research as the qualitative element has added further understanding to the use of the intervention with children with ASD, whilst the quantitative aspect allowed for an investigation of the impact on participant anxiety. Nonetheless, limitations to the design as described above must be taken into account when considering the inferences that can be made from the findings.

5.6 Implications of the Current Study

5.6.1 Implications for Future Research

Some recommendations and implications for future research have been highlighted previously within this chapter. This section will now consider these in more detail.

Based on the researcher's investigation into prior research in this area, the current study appears to be one of the first that has explored the impact of a teacher delivered mindfulness-based intervention on the anxiety of children diagnosed with ASD. Although the findings indicated there was no clear or significant reduction in anxiety, further research into this area will be required to draw any firm conclusions related to the use of mindfulness-based interventions within this population to reduce anxiety. It would be particularly useful for future research to make adaptations to the methodological approach used, taking into account the strengths and weaknesses of this study. The use of mixed method designs within future research would support the generation of insight into possible factors that may contribute to any differential outcomes for children and young people in this population. It should be assumed that due to the recognised heterogeneity of children and young people with ASD, there may be differences in the engagement, understanding and potential benefits of learning mindfulness which will need to be considered.

Due to the challenges related with measuring a construct such as anxiety in an ASD population, it will be important for future research to use multiple methods to measure participant anxiety (such as self-report, observations, parent report and teacher report) (Moskowitz et al., 2017). If anxiety-related target behaviours are to be measured, drawing on multiple informants to decide on these would also be beneficial.

As previously described, it is possible that five weeks is not a long enough period of time for children and young people diagnosed with ASD, especially those with additional learning needs, to fully learn mindfulness skills. The teachers within this study emphasised the complexity of the skills being taught through the intervention and that the participants require further opportunity and time for learning. Previous research has found some positive effects for children and young people diagnosed with ASD following engagement with a mindfulness-based intervention over a number

of months (e.g. Hwang et al., 2015; Singh et al., 2019). Therefore, it would be useful for future research to investigate the impact on participant anxiety in the following circumstances; the intervention is delivered over a longer period of time and where continued practise of the skills is tracked during a follow-up phase.

Measures aimed at capturing children and young people's levels of 'mindful awareness' such as the 'Child and Adolescent Mindfulness Measure' (Greco et al., 2011) have also been developed. It may be useful for future research to use a self-report measure such as this to see whether participants' mindful awareness has increased as a result of engaging in a mindfulness-based intervention. This may help to establish, more directly, whether mindfulness learning has taken place and whether as a result participant anxiety has decreased.

Previous research has tended to utilise outside professionals or researchers to deliver the intervention. Due to the current focus on the role that schools have in supporting children and young people with mental health needs (DoH & DfE, 2017), it seems imperative that further research is conducted within this area. Investigation into the impact of mindfulness-based interventions when delivered by teachers who have undergone extended training compared to when teacher have utilised a manualised curriculum is needed. Any differing results would have implications on how mindfulness-based interventions are utilised by school staff. Furthermore, previous evidence has suggested that teacher delivered mindfulness-based interventions can have positive effects on wellbeing outcomes of children and young people of typically developing children in primary-school settings (e.g. Vickery & Dorjee, 2016; Schonert-Reichl et al., 2015). However, this research has not explored the use of such interventions with specific groups of children, such as those diagnosed with ASD. It may be that there is variation in responses to mindfulness-based interventions, and it will therefore be important for further research to explore these potential differences and the factors that might help to improve positive outcomes with specific groups of children.

This research has highlighted some of the potential difficulties of gathering the perceptions of children and young people, especially those with additional communication and learning needs. As previously described, it will be imperative that

future research draws on the relevant literature base (e.g. Beresford et al., 2004; Lewis & Porter, 2007; Punch, 2002; Scott-Barrett et al., 2019) and considers the appropriateness of differing methods. Utilising a flexible, varied and creative approach, with consideration for the methodological rigour and data analysis procedures will be important (Lewis & Porter, 2007; Punch, 2002). Future research could utilise methods such as; drawing, picture taking or the use of visual communication aids (e.g. Talking Mats) to capture the children's perspectives or experiences of a mindfulness-based intervention. With any chosen method, the use of a pilot phase to check suitability would be helpful.

5.6.2 Implications for Schools

There have been direct implications as a result of the study for one of the schools involved. The teacher was asked to share her experience and learning with colleagues, and she reported that another teacher within the school is planning on delivering aspects of the mindfulness-based intervention to their pupils.

In terms of implications for schools who educate similar populations, this study has highlighted some of the perceived challenges and benefits of delivering mindfulness-based interventions to individuals diagnosed with ASD. The teachers' views provide useful information for similar school contexts who are considering whether a mindfulness-based intervention may be appropriate for their pupils and how it may be delivered. For example, the perceived ease and benefits of mindful breathing may be useful for schools who are considering what strategies they might be able to teach to children and young people to support emotional regulation. Furthermore, the teachers appeared to feel confident and able to adapt and deliver the mindfulness-based intervention to their pupils. This highlights the potential value of the mindfulness-based curriculums that have been purposefully developed for teachers to use. Nevertheless, the teachers also highlighted that aspects of the intervention were complex and that the children would benefit from further opportunities to learn the skills. Children's developmental levels and intervention delivery will be important factors for school contexts educating similar populations to consider.

5.6.3 Implications for Educational Psychologists

The findings of the current study are pertinent to EPs due to the growing interest in utilising mindfulness with children and young people (Zoogman et al., 2014) and increased emphasis on early school-based intervention for mental health needs (DoH & DfE, 2017). The findings add to the limited research that has explored the use of mindfulness-based specifically with children diagnosed with ASD.

The reviewed research highlighting the potential relationship between ASD and anxiety, and the possible differences in how anxiety can be displayed within an ASD population, will be important for EPs to be aware within their day-to-day practice. This would support EPs to recognise and/or support school staff to recognise, those individuals presenting with heightened anxiety.

The study highlights the potential need for EPs to consider a number of factors when recommending mindfulness as an intervention for children and young people diagnosed with ASD. Factors such as the children and young people's developmental level, their potential difficulties generalising the skills and any difficulties pinpointing sensations in their body were highlighted by the teachers within this research as challenges to utilising mindfulness-based interventions within an ASD population. As the findings of this study indicated no significant reduction in anxiety and there is limited prior research evidencing positive outcomes in this area, EPs may want to consider the evidence base of alternative wellbeing-focused interventions to reduce the anxiety of those diagnosed with ASD.

Considering the potential lack of time available for EPs to deliver therapeutic interventions (Greig et al., 2019), the current study has highlighted the potential role that teachers may have in delivering interventions to children and young people. The teachers' views suggested that mindfulness-based interventions may have links with wider aspects of the curriculum, include important and relevant skills for children and young people to learn, and that aspects of the intervention can easily be fitted into the school day. This could indicate that the teaching mindfulness skills at a universal level could be useful. In this study, the researcher worked closely with the teachers to ensure they felt confident to appropriately adapt and deliver the mindfulness-based intervention. As such, EPs could have a role in supporting schools to implement

mindfulness teaching as a whole approach through the use of staff training and ongoing supervision.

5.7 Conclusion

5.7.1 Summary of the Findings

This research investigated the impact of a mindfulness-based intervention on the anxiety of five children diagnosed with ASD with additional learning needs. The findings from the SCEDs indicated that there was no observable reduction in anxiety as a result of the mindfulness-based intervention for any of the participants. With the exception of one parent report, the pre and post measures collected from parents and teachers also indicated there had been no significant reduction in participant anxiety following the intervention. The findings differ from research that reported significant reductions in anxiety of 'typically developing' children, aged between 4 and 11 years, following engagement in teacher delivered mindfulness-based intervention (Britton et al., 2014; Moreno-Gomez & Cejudo; 2019; Parker et al., 2014). Furthermore, the findings also differed from the one study that found a significant reduction in anxiety post intervention within an ASD youth population (Hwang et al., 2015). This may have implications on the efficacy of utilising and implementing short-term teacher delivered mindfulness-based interventions with children and young people diagnosed with ASD, especially those who are recognised to have additional learning needs. However, a number of methodological limitations to the design and implementation of the intervention are acknowledged that should be taken into account when interpreting the findings.

This study also explored the perceptions of the children and teachers involved with the intervention. Cautious interpretation of the children's perceptions indicated that they generally had positive views about mindfulness-based intervention. However, there was little indication that they plan to continue practising any of the activities. Potential challenges of implementing the intervention with children with ASD and additional needs, due to the complexity of the skills being taught, were highlighted by the teachers. Nevertheless, the relevance of the skills that were taught through the intervention and the benefits for some of the participating children were identified.

Consequently, due to the methodological weaknesses identified and the limited prior study in this area, further research is needed in this area. In particular, it would be helpful for future research to explore the impact of the intervention over a longer period of time, using a range of robust measures to capture anxiety and include pupils diagnosed with ASD of different ages and with varied communication and cognitive skills. Despite the methodological limitations, this research adds to our understanding about the potential efficacy of utilising teacher delivered mindfulness-based interventions with children and young people with ASD.

5.7.2 Unique Contribution

Based on the researcher's investigation into prior research in this area, the current study appears to be the first that has investigated the impact of a teacher delivered mindfulness-based intervention on the anxiety of children diagnosed with ASD in a UK context. Despite the apparent growing evidence base for the use of mindfulness-based interventions to reduce children and young people's anxiety (Britton et al., 2014; Etherington & Costello, 2018; Napoli et al., 2005), there was a noted lack of evidence of the application of mindfulness-based interventions within an ASD population who are arguably more vulnerable to experiencing anxiety (van Steensel et al., 2011). Furthermore, the previous research exploring the use of mindfulness for children and young people diagnosed with ASD was not conducted in school settings. Considering the increased emphasis on the role schools can have in supporting mental health (DoH & DfE, 2017), this was deemed an important area to investigate.

Therefore, this study has uniquely contributed by adding to our understanding of the potential efficacy of using teachers to deliver a mindfulness-based intervention to reduce anxiety in children diagnosed with ASD.

The study has also contributed to the professional development of the researcher, both as an EP and a researcher practitioner. It has enabled them to develop their research skills in order to be to design and implement a study in a real-world context. The skills that have been learnt will be incredibly valuable within their future professional career.

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Appendices

Appendix 1: Weight of Evidence Criteria and Calculations

Weight of evidence	***Criteria***	***Range for each weighting***		
		Low	*Medium*	*High*
A) Evaluation of the research quality.	A clear description of the intervention is reported.	1-10	11-20	21+
	The theoretical grounding of the intervention is stated.			
	The researchers provide a rationale for their research question/s or aims.			
	The study reports who delivered the intervention.			
	The study reports the length of the intervention.			
	Implementation fidelity is considered.			
	The study design is clearly described.			
	A control group is present.			
	The measures used are appropriate to answer the research question.			
	Potential threats to reliability and validity are considered.			
	Ethical approval or ethical considerations are described.			
	There is random group assignment.			
	The measure/s are clearly explained.			
	Internal consistency for the outcome measures/ are highlighted.			
	The number of participants is stated.			
	The age range of the participants is stated.			
	Gender distribution is stated.			
	Details of the sampling methods are provided.			
	Additional demographic evidence is provided.			
	Pupil assent or consent Is obtained.			
	Parental consent is obtained.			
	The results are presented clearly and are easily accessible.			
	Effect size/s are provided.			
	The method used to calculate effect size is clearly stated.			
	The data analysis is appropriate to test the research question/s.			
	The data justifies conclusions and implications.			
B) Appropriateness of research design to answer the research question.	A randomised control trial is used.	1-2	3-4	5
	A total sample of > 100 is employed.			
	A control group is present. If there is no control group, repeated measures over time are collected.			
	A baseline and post measure are collected.			
	Follow-up measure/s are collected.			
C) Appropriateness of research focus to answer research question.	The intervention is based on clear mindfulness principles*	1-4	5-7	8-9
	The intervention includes the teaching of mindfulness-based skills *			
	The intervention can be delivered at a primary school.			
	The intervention in the study was delivered by a trained person in the school.			
	The intervention is clearly explained.			
	The study provides a separate measure of anxiety.			
	The study discusses the impact of the intervention on anxiety levels.			
	The study reports comparisons between pre and post data.			
	The participants are primary-school aged children.			
D) Overall judgement.	An overall weighting from the scoring given on the above categories. *a lower judgement was given if the study did not meet these criteria.			

The table above outlines the criteria used for the Weight of Evidence judgements presented in section 2.5.6. Higher weightings were given to those studies that met an increased number of the criteria. The range of each weighting (e.g. '*Low*', '*Medium*' or '*High*') are also outlined in the table. The overall Weight of Evidence judgement involved consideration for the scoring in each area (e.g. A, B and C). Increased

emphasis was placed on two of the criteria in area ‘C’ (*The intervention is based on clear mindfulness principles and the intervention includes the teaching of mindfulness-based skill*) as this was the focus for the review. Studies that did not meet these criteria received a ‘*Low*’ weighting.

Appendix 2: Initial Email to Head Teachers of Specialist Settings

Dear [insert name],

My name is Kirstie Summers and I am a Trainee Educational Psychologist currently working for XXX County Council Educational Psychology Service. As part of my professional doctoral training at the University of Nottingham, I am carrying out a research project. I am contacting you today to inform you of the research project and ask whether your school would be interested in being involved. The overall aim of the research project is to improve our understanding of the use of mindfulness-based interventions on the anxiety with children who have a diagnosis of Autistic Spectrum Disorder.

The research project would require two class teachers being trained in a mindfulness-based intervention that they then would deliver to their pupils over a half-term (approximately 7 weeks). I would like to collect data on the impact of the intervention on a small group (up to eight) of pupils who have a diagnosis of ASD and who school feel are experiencing anxiety. I would gather data before, during and after the intervention, relating to the pupil's anxiety. This would involve gathering views before and after from parents and teachers relating to the participants perceived anxiety, and data before and during the intervention from the pupils. After the intervention, I would like also to carry out short semi-structured interviews with the pupils and teachers, to gather information about their views of the intervention. Parental consent will be obtained prior to any pupil's involvement in the research. All data will be confidential, and the participants and your school remain anonymous in the final research report.

I appreciate that this email does not inform you of the full research outline and procedure. Therefore, if you feel that your school might be interested in participating, please respond to this email before [insert date], and I would be happy to discuss the research further.

Thank you for taking the time to read this, and I look forward to hearing from you.

Best wishes,
Kirstie

Kirstie Summers
Trainee Educational Psychologist.

Research supervisor: Dr Nick Durbin
Nick.Durbin@nottingham.ac.uk

Appendix 3: Example Intervention Lesson Plan

Lesson 5 Mindful Seeing (pages 60-67)

Aims of the lesson:

- Children practice focusing their attention on an object and describe the visual details they observe.
- Children strengthen their visual vocabulary and memory through mindful seeing.

Materials needed:

- Chart paper.
- One or more large clear containers.
- Food dye/ or liquid paint (blue, red, yellow etc).

Activities:

- Start with belly breathing.
- *Today we are going to practise mindful seeing.*
    - *What can you notice around this room? I see something red. What could I be looking at?* Repeat with different items and colours around the room.
- *Today we are going to do an experiment together. We are going to look more closely at colours and how they change.*
  Fill a large clear container with warm water (e.g. large water bottle/ fish bowl). Place on the table and ask the children to join. Drop food colouring into the container.
    - *Watch carefully.* Ask questions to encourage them to look and notice what is happening.
    - *What colour did I put in? What is happening to the colour? What shape is it making? What does it look like? It looks like a … to me. See how the shape is changing. The colour is still moving through the water. What do you see now? Has the colour changed?*

  Record what the children are saying on chart paper.
  Empty and refill? then repeat for the different colours. You can mix in different colours together. Discuss what is happening and what they are noticing. Encourage the children to focus their attention on the colour moving through the water.
- Discuss the activity
    - *What did you see when I put each colour into the water?*
    - *What did you see when I put the two colours into the water?*
    - *How could mindful seeing help you day-to-day?* (example answer- if you have lost something, taking the time to look and notice might help you find it)
    - *How might it help you get along with other people? (*example answer- if someone is upset you might notice)
    - *How might it help you if you are feeling worried or excited …* (example answer- it slows you down and helps you notice what is happening around you)

Link to book:

'What the sun sees'

Appendix 4: Example Intervention Fidelity Check

Intervention Fidelity check

Date: 20/01/2020

School: [redacted]

Lesson plan

Comments

Lesson 4 Mindful Listening (pages 53 -59)

Aims of the lesson:

- Children train their attention to specific sounds and try to identify those sounds.
- Children learn how mindful listening skills can help them communicate more successfully.

Materials needed:

- Various common objects to make different sounds (examples include – paper to crumple, pencil to tap, coins in a jar to shake)
- Bag for holding these objects
- Sounds and Scents activity sheet (page 154 of book)

Activities:

- Review mindfulness and the parts of the brain that you talked about in lessons 1-3. Ask class what they can remember. Remind them about different brain areas (the wise leader, the memory saver and the security guard), the belly breathing and why it helps to be mindful.
- Belly breathing activity
- *Today we are going to think about listening.*
  - *Why is careful, mindful listening so important? Can you think of a time when you paid attention with your ears and heard an important sound that warned you about danger?* (You could provide an example here if they cannot think or share some - e.g. listened and heard the noise of a car coming around the corner)
  - *What do you do when there's lots of noise around you to help pay attention to just one sound?*
- *Together we are going to play a guessing game that is going to help us practise mindful listening.*
  - Children to sit on the carpet or at their desk. Ask them to shut their eyes.
  - *'Listen as mindfully as you can to the sound I make and focus on it until you no longer hear it. If you think you know what it is, keep quiet and raise your hand'.*
  - Ask the children to guess and demonstrate the noise.
  - Answers can be recorded on the sounds and scents activity. TA supported
  - Repeat with various sounds. - 3
- *How is the game different to how we usually listen to sounds?* (answer e.g. Explain that we are using brain energy to listen to the sound. We are taking the time to focus.
- *Did you have trouble concentrating on the sounds?*
- *Did anything distract you?*
- *Why could the game be helpful?* (answer- we were practising listening and by paying attention we can train our brain. Listening helps the information reach our PFC (wise leader) in the brain where the thinking happens. When you are really listening, you get the information you need and don't miss things. This helps you decide what to do)

Link to book:

Bunny's noisy book: https://www.youtube.com/watch?v=EJWQOnBlR1s

13:07 lesson started. Teacher asked what pupils could remember:

- 'brains'. Poster shown- reminded them of parts and different roles.
- Breathing- children demonstrated.

Belly breathing activity- all engaged. One pupil completed at the back of the classroom.

Remained at desk. Children didn't want to shut eyes. T went behind door. 3 sounds- ball, paper and tapping pencil.
TA supported pupils to write answers.
Children not sure how it is different. T explained- focused, concentrating on listening carefully.

Video shown. Lesson ended 13:32. Children then had free time until end of lesson (13:40).

<u>Summary:</u>
All activities completed. Changes- Children did not want to shut eyes so teacher hid behind door.

Appendix 5: Template to Support Identification of Target Behaviours

Pupil initials: **DOB:** **YG:**

Parental consent received?

Background information (e.g. diagnoses, other professional support, interventions currently in place)
How would you know the child was anxious? What anxiety related behaviours does he/she display?
When do these anxiety related behaviours most often occur in school?
What is the typical frequency of the behaviour?

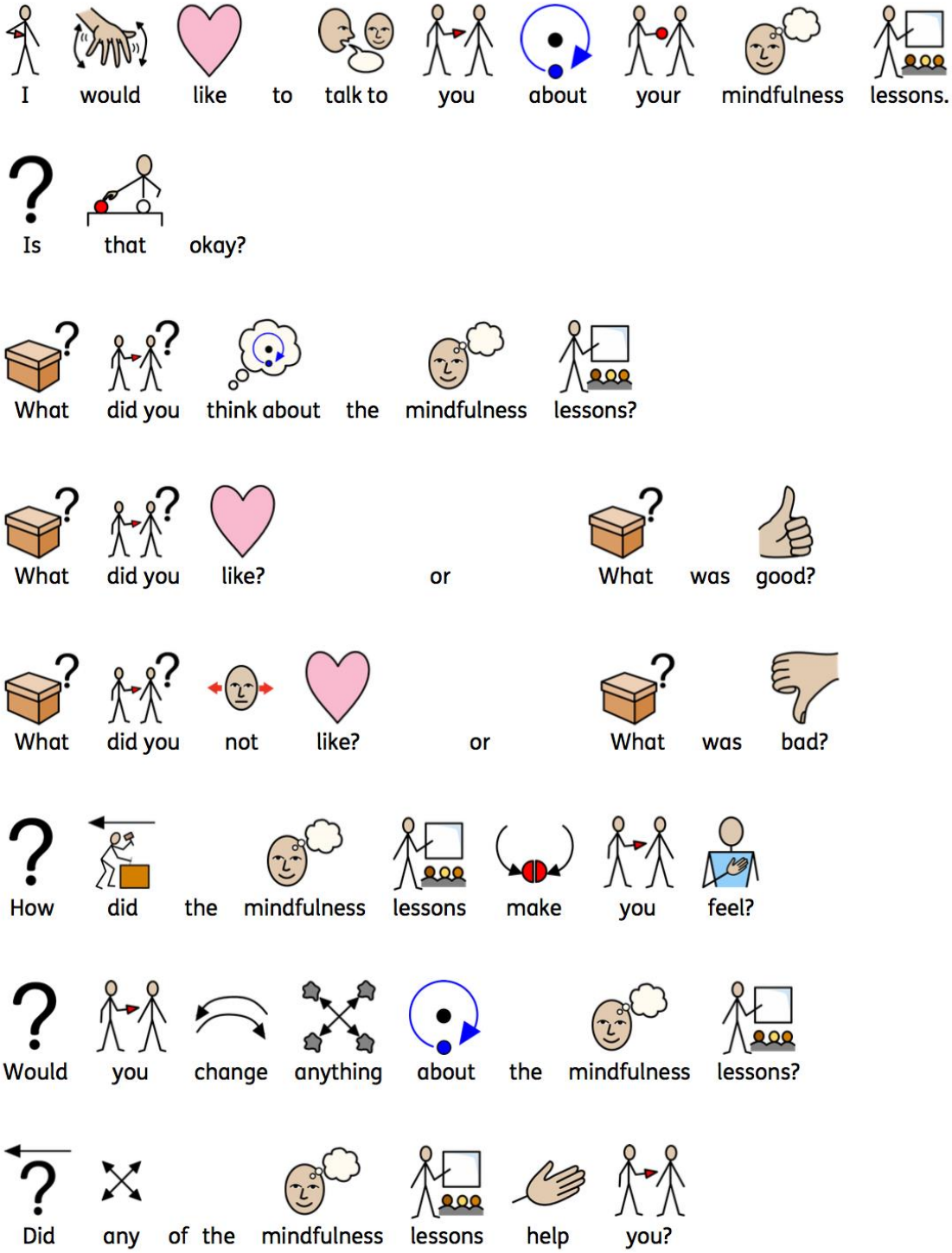
How would you know if the child's anxiety had reduced?

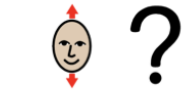
What strategies do school currently use to support X's anxiety/ anxiety related behaviour?

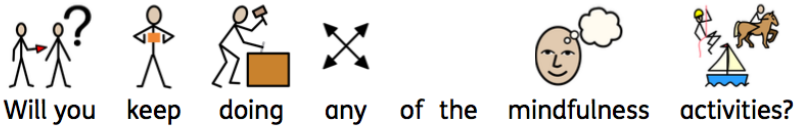
Any other relevant information

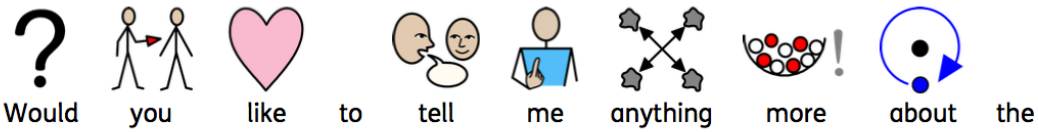
Initial description of anxiety related behaviour to be measured

Appendix 6: Semi-structured Interview Template- Children




If yes how?


Will you keep doing any of the mindfulness activities?


Would you like to tell me anything more about the


mindfulness lessons?


Do you have any questions?

Appendix 7: Semi-structured Interview Template- Teachers

1. What did you like about the MindUP curriculum?
2. Is there anything you did not like about the MindUP curriculum?
3. Which activities were the children most engaged in?
4. Which activities do you think the children found least engaging?
5. How easy was it to fit the intervention into your lesson planning?
6. Were there any barriers to delivering the intervention?
7. Did you need to make many adaptations to the intervention to enable the children to access the activities? If so, what? And in particular for the children with ASD?
8. Do you think there has been any changes in your class or with individual children as a result of the intervention?
9. Do you feel any aspects of the curriculum have been helpful to reduce, or manage, the children's anxiety?
10. Do you plan on continuing any of the mindfulness techniques within your teaching?
11. Would you like to deliver the intervention, or aspects of the intervention, again?

Appendix 8: Teacher Information and Consent Form

School of Psychology
Information Sheet

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Ethics Approval Number or Taught Project Archive Number:

Researcher: Kirstie Summers (Trainee Educational Psychologist)
Kirstie.summers@nottingham.ac.uk
Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

This is an invitation to take part in a research study that is investigating the impact of a mindfulness-based intervention on anxiety among children with a diagnosis of autistic spectrum disorder (ASD).

Before you decide if you wish to take part, it is important for you to understand why the research is being carried out and what it will involve. Please take time to read the following information carefully.

Children with ASD have been found to be at risk of experiencing anxiety, and therefore, this research aims to explore whether a mindfulness-based intervention can be used to help children with a diagnosis of ASD.

If you agree to participate, you will be asked to deliver a mindfulness-based intervention (MindUP) to your class over approximately 7 weeks. MindUP is a step-by step intervention developed for teachers to deliver to support children's social and emotional awareness and become more mindfully aware. Please find a brief overview of the intervention attached. You will receive training from the researcher on how to deliver the intervention and be provided with ongoing support to ensure you feel confident to deliver the intervention to your class.

I would like to collect data on the impact of the intervention on a small group (up to four) of pupils from your class, who have a diagnosis of ASD and who are felt to experience anxiety. This would involve gathering data before, during and after the intervention, relating to the

pupil's anxiety, from yourselves, parents and the children. After the intervention, you will be asked to participate in a short interview to share your views on the intervention. The pupils who participated will also be asked to participate in an interview and share their views on the intervention. Their participation is completely voluntary, and they will be under no obligation to take part. Voice recordings will be taken during interviews to ensure that records are accurate and a true representation of what is said. The recordings will be kept confidential and will only be used by the researcher.

Parental consent will be obtained prior to any pupil's involvement in the research. All data will be confidential, and the participants and your school remain anonymous in the final research report.

Participation in this study is totally voluntary and you are under no obligation to agree to take part. You are free to withdraw at any point before or during the study. All data collected will be kept confidential and used for research purposes only. The information gathered will be kept securely in a locked cupboard and it will be subsequently destroyed once the research is complete.

If you have any questions or concerns please don't hesitate to ask now. We can also be contacted at the above address at any point during and after the research.

If you have any complaints about the study, please contact:
Stephen Jackson (Chair of Ethics Committee)
stephen.jackson@nottingham.ac.uk

MindUP information sheet

MindUP is a classroom-tested, evidence-based curriculum designed for class teachers to deliver to foster social and emotional awareness, enhance psychological well-being and promote academic success. The curriculum is framed around 15 easily implemented lessons that aim to promote and develop mindful attention to support self- regulation. During the course of the curriculum, students learn about the brain and how it functions, in the process of gaining insight into their own minds and behaviours, as well as those of the people around them.

The essential work is delivered through the 15 lessons; however, the curriculum includes a ‘core practice’ (deep belly breathing and attentive listening) that is ideally repeated for a few moments in a school day to support the children to embed and generalise the skills they are learning.

The 15 lessons are arranged into four units:

Removed due to copyright.

Step-by-step-instructions are provided for teachers to follow. The lessons can be delivered flexibility to fit in with the wider school curriculum and typically last for around 30 minutes, depending on the children’s engagement.

School of Psychology

Consent Form

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Ethics Approval Number or Taught Project Archive Number:

Researcher: Kirstie Summers (Trainee Educational Psychologist)
Kirstie.summers@nottingham.ac.uk
Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

The participants should answer these questions independently:

- Have you understood what being involved in the research entails? YES/NO
- Have you had the opportunity to ask questions about the study? YES/NO
- Have all your questions been answered satisfactorily? YES/NO
- Do you understand that you are free to withdraw from the study? YES/NO (at any time and without giving a reason)
- I give permission for my data from this study to be shared with other researchers provided that my anonymity is completely protected. YES/NO
- I give permission for my interview to be tape-recorded? YES/NO
- Do you agree to take part in the study? YES/NO

"This study has been explained to me to my satisfaction, and I agree to take part. I understand that I am free to withdraw at any time."

Signature:

Date:

Name (in block capitals)

I have explained the study to the above individual and he/she has agreed to take part.

Signature of researcher:

Date

Appendix 9: Parent Information and Consent Form

School of Psychology
Information Sheet

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Ethics Approval Number or Taught Project Archive Number:

Researcher: Kirstie Summers (Trainee Educational Psychologist)
Kirstie.summers@nottingham.ac.uk
Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

This is an invitation to take part in a research study that is investigating the impact of a mindfulness-based intervention on anxiety among children with a diagnosis of autistic spectrum disorder (ASD).

Before you decide if you wish your child to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

Children with ASD have been found to be at risk of experiencing anxiety, and therefore, this research aims to explore whether a mindfulness-based intervention can be used to help children with a diagnosis of ASD.

If you agree to participate on behalf of your child, they will be involved in a mindfulness-based intervention (MindUP) over 5 weeks delivered by their class teacher. MindUP is an intervention developed for teachers to deliver to support children's social and emotional awareness and become more mindfully aware.

If you agree to participate, the researcher would also like to gather information from yourselves about your child's anxiety, before and after the intervention. This will involve responding to a short questionnaire that will take approximately 5-10 minutes to complete.

After the intervention, the researcher would like to conduct a brief interview with your child whereby they will be asked about their views of the intervention. The interviews will be supported by any visual strategies that are usually used to support your child in school. During this time, their voice will be recorded. This will be kept confidential and will only be used by the researcher. Voice recordings will be taken to ensure that records are accurate and a true representation of what is said during interviews. These will be used to help form the outcome of the research. The interview will take place during school time, and we will work with the school to ensure that your child does not miss a lesson that they feel is important. Your child will be informed that they do not need to participate in the interview if they do not wish to, and it may be stopped at any time. Should your child choose to withdraw from the interview at any point, they will return to their typical lesson and a familiar member of staff will be informed.

If school raise any concerns about the well-being of your child during the study, your child will be immediately withdrawn from the study and school will contact you on the same day to inform you. School will discuss with you the routes for support for you child if appropriate.

Participation in this study is totally voluntary and you are under no obligation to agree for your child to take part. You are free to withdraw your child at any point before or during the study. All data collected will be kept confidential and used for research purposes only. The information gathered will be kept securely in a locked cupboard and it will be subsequently destroyed once the research is complete.

If you have any questions or concerns please don't hesitate to ask now. We can also be contacted at the above address at any point during and after the research.

If you have any complaints about the study, please contact:
Stephen Jackson (Chair of Ethics Committee)
stephen.jackson@nottingham.ac.uk

School of Psychology

Consent Form

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Ethics Approval Number or Taught Project Archive Number:

Researcher: Kirstie Summers (Trainee Educational Psychologist)
Kirstie.summers@nottingham.ac.uk
Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

The participants parent or carer should answer these questions independently:

- Have you read and understood the Information Sheet? YES/NO
- Have you read and understood the Privacy Information? YES/NO
- Have you had the opportunity to ask questions about the study? YES/NO
- Have all your questions been answered satisfactorily? YES/NO
- Do you understand that your child is free to withdraw from the study? YES/NO (at any time and without giving a reason)
- I give permission for my child's data from this study to be shared with other researchers provided that my anonymity is completely protected. YES/NO
- I give permission for my child's interview to be tape-recorded? YES/NO
- Do you agree for your child to take part in the study? YES/NO

"This study has been explained to me to my satisfaction, and I agree for my child to take part. I understand that he/she is free to withdraw at any time."

Signature of the Parent or Carer:

Date:

Name (in block capitals)

I have explained the study to the above parent/carer and he/she has agreed for their child to take part.

Signature of researcher:

Date:

Appendix 10: GDPR Privacy Notice

Privacy information for Research Participants

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Ethics Approval Number or Taught Project Archive Number:

Researcher: Kirstie Summers (Trainee Educational Psychologist)
Kirstie.summers@nottingham.ac.uk
Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

For information about the University's obligations with respect to your data, who you can get in touch with and your rights as a data subject, please visit: www.nottingham.ac.uk/utilities/privacy/privacy.aspx.

Why we collect your personal data

We collect personal data under the terms of the University's Royal Charter in our capacity as a teaching and research body to advance education and learning.
Your personal data is being collected as part of a research project for a doctorate programme in Applied Educational Psychology, at the University of Nottingham. The purpose of collecting data is to explore whether a mindfulness-based intervention can be used to help children with a diagnosis of ASD.

Legal basis for processing your personal data under GDPR

The legal basis for processing your child's personal data on this occasion is Article 6(1e) processing is necessary for the performance of a task carried out in the public interest.
We hope this research will help education settings, parents and other professionals learn about whether a mindfulness-based intervention can be useful to help children with a diagnosis of ASD.

Where the University receives your personal data from

Some personal data about your child will be collected as part of the research, which will be kept confidential. This data will come either from yourself, your child's school, or from your child.

Special category personal data

In addition to the legal basis for processing your personal data, the University must meet a further basis when processing any special category data, including: personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation.

We will be collecting some 'special category personal data', in line with GDPR Article 9(2a). We will collect, with your consent, data regarding your child's health (diagnosis of ASD and anxiety).

How long we keep your data

The University may store your data for up to 25 years and for a period of no less than 7 years after the research project finishes. The researchers who gathered or processed the data will destroy your data after the research project. Any data stored will be anonymised, meaning that participants will not be identifiable. Any data that might identify a participant will be left out of the interview transcriptions and research report. All participants will be given a 'pseudonym' (a fake name) in the research to protect their identity.

Who we share your data with

Extracts of your data may be disclosed in published works that are posted online for use by the scientific community. Your data may also be stored indefinitely on external data repositories (e.g., the UK Data Archive) and be further processed for archiving purposes in the public interest, or for historical, scientific or statistical purposes. It may also move with the researcher who collected your data to another institution in the future.

Appendix 11: Teacher Written Debrief Forms

Debrief sheet

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Researcher: Kirstie Summers (Trainee Educational Psychologist)
Kirstie.summers@nottingham.ac.uk
Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

Firstly, thank you for your participation in the study.

The study is for my doctoral research project and aims to explore whether a mindfulness-based intervention can be used to help children with a diagnosis of ASD. The information that was gathered will now be analysed with consideration for whether mindfulness-based intervention can be useful intervention to help children with a diagnosis of ASD. Once this has happened, the researcher will contact you and your school to share the findings

You are free to withdraw your consent at any point. Please note that all information will be anonymised, kept confidential, stored in a secure location and used solely for research purposes.

If you have any concerns related to the children who have participated in the study you can talk to XXX in school on XXX. Please follow the standard routes for support (e.g. safeguarding procedures, Early Help, GP, EPSS, Point 1/CAMHS).

If you would like to discuss your participation in this study, please do not hesitate to contact me and my email above. If you have any worries or concerns and would like to talk to someone in your school about the study, please contact XXX on XXX.

Please also find details of support services below if you would like to discuss any worries or concerns with outside agencies.

YoungMinds

Telephone: 0808 802 5544

Website: https://youngminds.org.uk

Samaritans

Telephone: 116 123

Email: jo@samaritans.org

Website: www.samaritans.org

Mind Norwich and Central Norfolk Helpline

Telephone:08088 02 02 88

Website: https://www.norwichmind.org.uk/

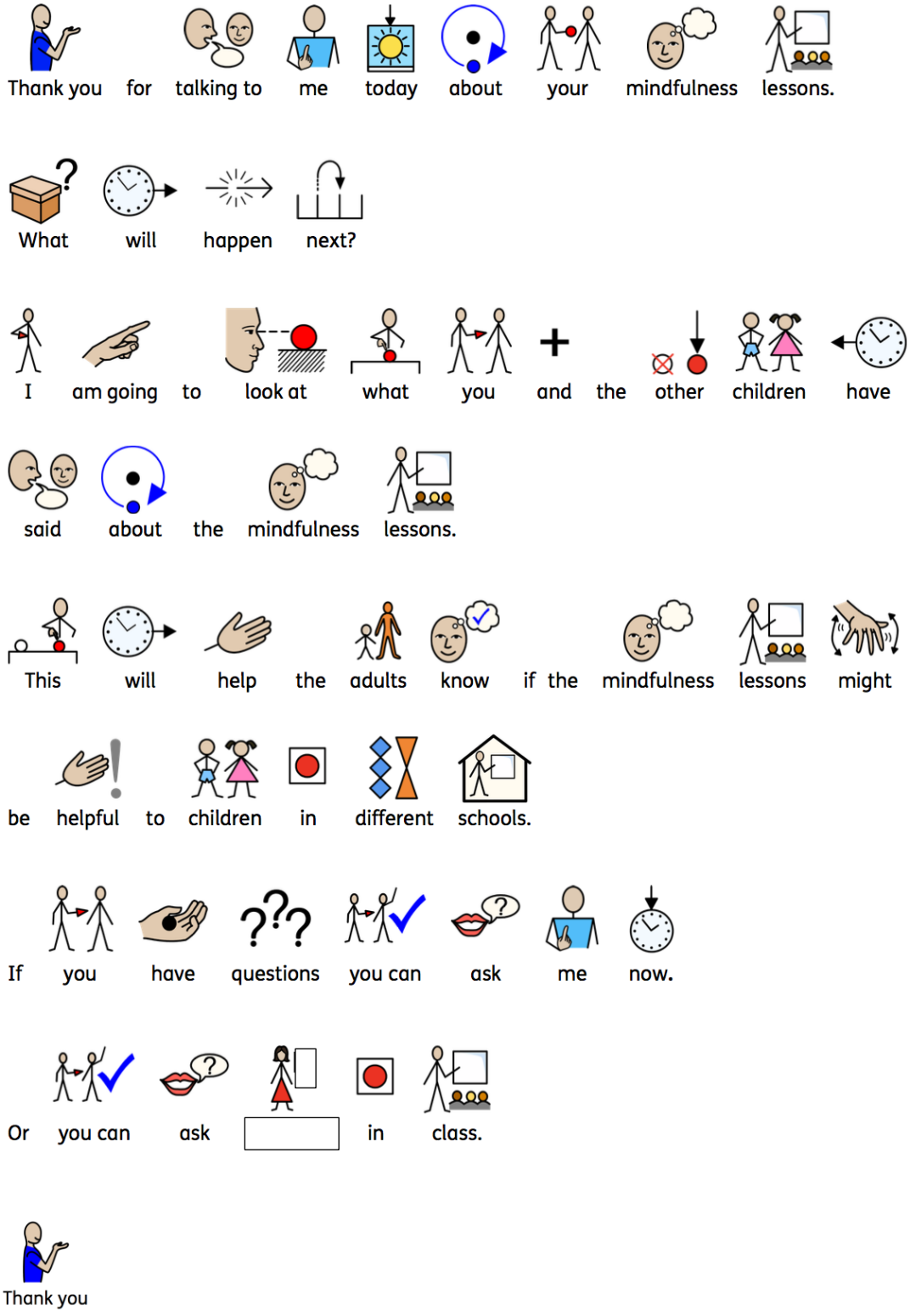
Thank You Again for your Participation!

If you have any complaints about the study, please contact:

Stephen Jackson (Chair of Ethics Committee)

stephen.jackson@nottingham.ac.uk

Appendix 12: Children's Written Debrief



Kirstie

Appendix 13: Parent Debrief Letter

Debrief sheet

The impact of a mindfulness-based intervention on the anxiety of primary-aged children diagnosed with autistic-spectrum disorder.

Researcher: Kirstie Summers (Trainee Educational Psychologist)
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Supervisor: Dr Nick Durbin (Academic and Professional Tutor)
Nick.Durbin@nottingham.ac.uk

Firstly, thank you for your participation in the study.

The study is for my doctoral research project and aims to explore whether a mindfulness-based intervention can be helpful for children with a diagnosis of ASD who experience anxiety. The information that was gathered will now be analysed with consideration for whether mindfulness-based intervention can be a useful intervention to help children with a diagnosis of ASD. Once this has happened, the outcomes will be shared with your child's school, and you will receive a letter with a summary of the findings.

You are free to withdraw your consent for your child at any point, before or during the study. Please note that all information will be anonymised, kept confidential, stored in a secure location and used solely for research purposes.

If you would like to discuss your child's participation in this study, please do not hesitate to contact me on the email above. If you would like to discuss your thoughts with someone at your child's school the identified individual is xxxxx who can be contacted via xxxxxx. Alternatively, if you would like to discuss any worries

or concerns details for the YoungMinds Parents Helpline, Samaritans and Mind Norwich and Central Norfolk helpline are provided below.

Further support for your child can be accessed via the standard routes for support, such as through your GP. Please contact xxxx at your child's school if you would like further advice about support services available.

YoungMinds

Telephone: 0808 802 5544

Website: https://youngminds.org.uk

Samaritans

Telephone: 116 123

Email: jo@samaritans.org

Website: www.samaritans.org

Mind Norwich and Central Norfolk Helpline

Telephone:08088 02 02 88

Website: https://www.norwichmind.org.uk/

Thank You Again for your Participation!

If you have any complaints about the study, please contact:

Stephen Jackson (Chair of Ethics Committee)

stephen.jackson@nottingham.ac.uk

Appendix 14: Inter-rater Agreement for Visual Analysis

The table below describes the characteristics used to visually analyse the data in this study.

Characteristic	***Description***	***Indicator of an effect in this study***
Level	The mean score during each phase. A difference between the mean scores in each phase may indicate an effect.	The mean score is lower in the intervention phase demonstrating a reduction in the frequency of anxiety-related target behaviours.
Trend	The slope of the line of best fit within each phase. The slope may be stable, upward or downward. A change in the slope of the trend line may indicate an effect.	A change in the slope of the trend, ideally from a stable trend to a downward trend. This was calculated via Excel.
Variability	The fluctuation of the data points from the means. Limited variability, particularly within the baseline indicates more reliable data.	Limited variability (small range and standard deviation) of the data would be indicative of more reliable data.
Overlap	The proportion of data points that overlap in the intervention phase with the baseline phase. A small percentage of overlap may indicate an effect.	A small percentage of overlap is observed between the baseline and intervention phase.

Please look at the graphs for each participant, using the above criteria to answer the following question:

- *How convinced are you that a practical improvement in observed anxiety-related behaviours (a reduction) has occurred?*

Please mark your response for each participant on the attached record sheet, rating from 1 (not at all convinced) to 5 (very convinced).

Participant name	***1. Not at all convinced***	***2. Not sure***	***3. It is possible***	***4. Reasonably convinced***	***5. Very convinced***
Charlie	O	X			
Ben	X O				
Harry	X O				
Oliver	X O				
Alex	X O				

X- Rater 1

O- Rater 2

Appendix 15: Example Data from the Children's Transcripts

Child's name	***Example of transcript***
Charlie	Int: What did you think about your mindfulness lessons (.) were they good or bad *(pointing to the visual aid)* Charlie: Good Int: Good what did you like (.) what lessons you did breathing was that good or bad Charlie: Yeah *(pointed to good on the visual)* Int: Good what about the listening Charlie: Yeah Int: That's good what about um tasting Charlie: Yeah Int: What about smelling Charlie: Yeah Int: And moving Charlie: Yeah Int: Ah was there anything that was bad Charlie: No Int: So you liked it Charlie: Yeah
Ben	Teacher: What was good ((pause)) was the tasting good or bad Ben: Tasting Teacher: Was the tasting good or bad Ben: Good Teacher: Was the smelling good or bad Ben: Good Teacher: Was the listening good or bad Ben: Bad Teacher: Was the (.) looking good or bad Ben: Good Teacher: Was the breathing good or bad Ben: Bad Teacher: So we didn't like the breathing and we didn't like the listening Ben: ((in overlap)) not
Oliver	Int: Did you like them were they good or were they bad Oliver: They are good (.) Int: What did you like about them Oliver: Erm (.) my mind ((pause)) Int: Can you remember what you did in your lessons Teacher: Can you remember when we tasted the different food and we had the chocolate buttons and crackers and things Oliver: ((in overlap)) Yeah the chocolate buttons is gross Teacher: Oh didn't like them did you mmm Oliver: ((in overlap)) No that's right Teacher: Did you like the marshmallows Oliver: No Int: Did you like that lesson then or did you not like that lesson Oliver: I did I did like the crackers and the orange Int: Ah so you liked some of the food Oliver: Yeah but not the other ones Int: I am trying to think of other things you've done so you did some breathing

Alex	Int: Did you like them or did you not like them Alex: I like them Int: You like them (.) how did they make you feel how did the mindfulness lessons make you feel Alex: Happy Int: Happy did they was there any that didn't make you feel happy (.) Alex: I don't know so will you change anything about the mindfulness lessons (*reading from the visual aid)* Int: Yeah so if you had a magic wand would you change anything about the mindfulness lessons Alex: ((laughs)) I don't know Int: You don't know Alex: Kind of a bit just kind of a bit funny Int: Mm-hmm is that funny is it Alex: Yeah Int: So you so you think of anything that you might change Alex: Erm (.) erm I don't know Int: You don't know okay do you think any of the mindfulness lessons helped you Alex: Yeah (*nodding)* Int: You're nodding how did they help you do you think Alex: ((in overlap)) they they like breathing maybe Int: How did that help you Alex: Calm down

Appendix 16: Example of Teachers' Coded Data

Int: So what did you like about the Mindup curriculum Teacher 2: Erm I think it was good because it was kind of something different to what they'd have anyway so we do kind of PSHE and stuff but then that was kind of a different side of it that we don't really look at	Link to PSHE
Int: ((in overlap)) Yeh Teacher 2: So we don't we look at feelings and stuff but we don't look at what might happen inside when those things happen	Expanding on what is usually taught
Int: ((in overlap)) Yeh Teacher 2: And stuff so Int: ((in overlap)) Okay Teacher 2: I think it was quite good for the obviously it's still quite tricky stuff them to understand but it was good for them to go a little bit deeper then just sort of happy or sad and what	Difficult for them to understand Expanding their skills
Int: ((in overlap)) Yeh Teacher 2: That might look like yeh Int: Yeh is there anything you didn't like about the curriculum Teacher 2: Erm I think like there was some with stuff with the brain it was quite complicated for them to kind of	Learning about the brain was complex
Int: ((in overlap)) Yeh Teacher 2: Understand and I think they disengaged a little bit because they couldn't understand it if you know what I mean so they liked doing the activities	Disengagement because they didn't understand
Int: ((in overlap)) Yeh Teacher 2: But when I tried to talk about the underlying stuff and the parts of the brain and stuff they just looked really confused	Lack of understanding about the brain
Int: ((in overlap)) Okay Teacher 2: ((laughs)) Int: So it was possibly above their level Teacher 2: (in overlap)) Yes yes I don't know if there is a way to kind of make it even simpler but	Above their level
Int: ((in overlap)) Yeh Teacher 2: I think although they enjoyed the activities I don't think they understood that much of the kind of brain stuff and that sort of thing	Enjoyment of activities Lack of understanding about the brain
Int: ((in overlap)) Yeh okay erm which activities were the children most engaged with do you think Teacher 2: So they like I think they like the kind of more practical things so they liked the making the bottles	Positive engagement with practical activities
Int: ((in overlap)) Mm-hmm Teacher 2: Was probably the best one erm they quite liked the food tasting as well *(someone opened door and left)* they quite liked the food tasting as well erm just	

Appendix 17: Initial Codes and Developing Themes

Developing themes	***Initial codes***
Practical activities	Benefits of doing themselves Positive engagement with practical activities x4 Enjoyment of the activities
Difficulties/ lack of understanding	Lack of understanding about the brain x5 Learning about the brain was complex
	Lessons were intense Complex skills being taught Above their level The need for further teaching and learning x 3 Need for adaptation x2 Aspects were difficult for the children to understand x5 Disengagement because they didn't understand Engagement would depend on the children
	Difficulties generalising skills they are learning due to ASD Difficulties engaging due to ASD Difficulty for children with ASD to recognise feelings in their body
Breathing	Positive engagement with breathing x3 Ease of mindful breathing Benefits of mindful breathing
Relevance for teachers and children	Able to make adaptations x2 Plan to continue doing some of the activities Fitted into school day x2 Benefit of pre-planned lessons Ease of doing some of the activities Knowing the children helps with adaptation Aspects could easily be continued
	Development related to emotional awareness x2 Development of staff skills Positive changes felt to have occurred for particular children x4
	Importance of the skills being taught The need to teach these from a young age
	Link to PSHE Link with areas of the curriculum x2 Expanding their skills Linked well with other parts Expanding on what is usually taught The use of activities outside the intervention

Appendix 18: A Table of Themes, Subthemes, Codes and Data Extracts

Themes	Sub-themes	Codes	Extracts from the data
Complexity of the intervention	Understanding of the brain	Difficulty understanding the teaching about the brain	Int 1: 'it didn't fit the children that I've got in terms of they really didn't understand about the different parts of the brain …the idea that we've got a brain is just was quite a foreign concept' 'we just didn't understand the concept' Int 2: 'I think although they enjoyed the activities I don't think they understood that much of the kind of brain stuff and that sort of thing' Int 2: 'I think like there was some with stuff with the brain it was quite complicated for them to kind of understand'
		Lack of understanding about the brain affecting engagement	Int 2: 'I think like there was some with stuff with the brain it was quite complicated for them to kind of understand and I think they disengaged a little bit because they couldn't understand it if you know what I mean so they liked doing the activities but when I tried to talk about the underlying stuff and the parts of the brain and stuff they just looked really confused' Int 2: ' Int: where there any that they were least engaged with you kind of said about the brain Teacher 2: 'Yeah the ones where we kind of looked at the brain and stuff they could match them up and a couple of them were kind of interested but when you've got sort of [Oliver] and that it takes a lot to get him hooked anyway so for a lot of them he was just wandering round and stuff'
	Complexity of the skills being taught	Aspects were difficult for the children to understand	Int 1: 'the recent activities that we have been doing have been quite (.) I want to say heavy but it's kind of like reverse advent calendars what we can be doing in our local community and because it's not involving us it's really, really difficult for the children to understand because they just don't have that outward thinking' Int 1: 'My class have found that quite tricky'

			Int 2: ‘I think like there was some with stuff with the brain it was quite complicated for them to kind of understand and I think they disengaged a little bit because they couldn’t understand it if you know what I mean so they liked doing the activities but when I tried to talk about the underlying stuff and the parts of the brain and stuff they just looked really confused’ Int 2: ‘I think like their level of understanding and kind of thinking related to that like when you look at it on a poster it’s okay but I don’t think they can quite realise that that’s inside their head as well and that they have a brain I think with that it’s quite difficult for them to again like transfer that that is kind of in their head’ Int 2: ‘I think I might look through and see if there is any particular ones that would be useful because some of them were a bit trickier for them to understand’
		Need for adaptation	Int 1: ‘I had to kind of pick and choose some of them’ Int 2: ‘did you need to make many adaptations to the intervention Teacher 2: So I think we missed some bits out didn’t we because they were just too complex they just wouldn’t understand and I think the one with the smells we didn’t do Int: ((in overlap)) Mm-hmm Teacher 2: Because I think they would yeah if know they don’t like the smell then they probably would have come in and walked out again’
		Teaching complex skills	Int 1: ‘but the actual lessons need, need that time but also need that recognition that it’s quite an intense thing that we are trying to get children who don’t necessarily understand their emotions to be trying to do’
		Lack of understanding affecting their engagement	Int 2: ‘I think they disengaged a little bit because they couldn’t understand it if you know what I mean so they liked doing the activities but when I tried to talk about the underlying stuff and the parts of the brain and stuff they just looked really confused’

		The need for further teaching and learning	Int 1: 'Yeah some of it probably needed to be bit a revisited' Int 1: 'I think that could have been quite ben yeah beneficial I think some of it I'm going to be able to revisit and breakdown' Int 1: 'Int: so at the moment it sounds like you are sort of starting to try and do it sort of outside of the lessons but they are maybe not at the stage where they thinking of it as a you know I can do this on my own Teacher 1: ((in overlap)) Yeah I don't think they are at think they are at that stage but hopefully if we continue with it'
	Specific challenges for those with ASD	Difficulty for children with ASD to recognise feelings in their body	Int 1: 'I think some of it is, is that difficult concept of understanding what their bodies do and what their bodies feel like I think it's quite in a lot of children with autism they are not able to, to possibly pin point pain where it is they know that they are not feeling well but they can't necessarily pin point where abouts in their bodies feel so its quite a tricky thing to suddenly be saying right I want you to be telling me about how you are feeling about something it is quite an abstract'
		Difficulties engaging due to ASD	Int 2: 'Well I think it is quite hard obviously because the children are autistic and like [Oliver] can struggle to sit down to listen to anything really' Int 2: 'I think it yeah it depends on the children you have and whether you know they'll engage cos obviously if I had like a class of seven [Olivers] then it probably would have been quite tricky to get any of them to join in'
		Difficulty generalising skills they are learning	Int 2: 'I think it's quite difficult when they're autistic for them to like transfer it as well So they could do it kind of in the lesson but yeah so it's quite difficult for them to kind of transfer the skills to other areas so you say like the next day or the in the afternoon when they are having a strop and your like oh remember your breathing like they find it quite hard to then do it any differently'
Benefits of mindful breathing		Ease of using mindful breathing	Int 1: 'At the moment with err it being Christmas time and lots of anxiety around Christmas we've done lots of additional mainly the mindful breathing we've also done some mindful listening because it it's easy you can do it quickly' Int 1: 'Int: do you plan on continuing any of the mindfulness sessions

			Teacher 1: ((in overlap)) Yeah I think we'll continue especially the breathing and with the the listening just because it is so easy to do'
		Positive engagement with breathing	Int 1: 'one of the children who we haven't been baselining erm really likes the breathing and when I say to him why do you like breathing how does it make you feel and says it makes me feel tired and I said it isn't really making you feel tired it's making you feel relaxed and because you are feeling relaxed you are feeling calmer' Int 2: 'It takes a lot to get him hooked anyway so for a lot of them he was just wandering round and stuff Int: ((in overlap)) Okay so Teacher 2: Although he did really remember the breathing'
		Perceived benefits of breathing	Int 2: 'Erm yes I think the breathing's helped sort of [Alex] erm to stop him really I think and another pupil [NAME] in the class as well he says about the breathing and he's a little bit more on board with kind of the brain stuff he was really trying to say the words ((laughs)) and so he was yeah he was taking it on board and then this morning he struggled with something and was we sort of told him to breathe and that really helped him so I think yeah the breathing's definitely something that some of them have picked up and used' Int 2: Yeah so I think we'll carry on erm with the chime and erm yeah sort of in the afternoons cos it does like you can see them kind of breathing and when they come out there are a bit more ((general laughter)) Teacher 2: Kind of like chilled and slouched and they yeah so I think we might carry on doing that'
Engagement with practical activities		Benefits of doing themselves	Int 1: 'Yeah having something that we had physically done ourselves made it easier for the children to relate to rather than it being quite abstract in a story books'
		Positive engagement with practical activities	Int 1: 'Most engaged the hands on I think' Int 1: 'Erm the sanding when we were talking about the how the brain processes and I'd got some, some pasta and some sand and kind of showing

			the different ways the brain processes and keeps some bits and gets rid of the rest they loved that session' Int 2: Int 'which activities were the children most engaged with do you think. Teacher 2: So they like I think they like the kind of more practical things so they liked the making the bottles was probably the best one erm they quite liked the food tasting as well they quite liked the food tasting as well erm just anything where they kind of well that's generally what that kind of like more anyway" Int 2: 'I think they liked the kind of more practical stuff'
Relevance of the intervention	Relevance for the curriculum	Importance of the skills being taught	Int 1: 'We're trying to think of that at some point we are going to have to leave and we are going to have to be able to communicate our emotions so two of the children in my class who we have been looking at they do suffer quite in terms of anxiety erm potentially have employable aspects once we've got our literacy and our maths but if we cannot communicate to somebody that we are feeling quite frustrated or anxious about something then we're going to find being in a social situation or in a job environment really difficult to handle and then that's not sustainable so the idea is that actually we need to be equipping them equip the children and educating them to help them communicate so starting right at the beginning in terms of mindfulness and being aware of how we are feeling why we are feeling it and what we can do to make ourselves feel better is incredibly important and I think as a school they really value that because PSHE is one of our top targets'
		Link between activities and other areas of the curriculum	Int 1: 'and fit it in within lots of PSHE targets' Int 1: 'the mindful tasting will come in really handy when we focus on our healthy eating because we had a couple of really quite picky eaters but were quite happy to try something that was a bit different when we were doing the mindful tasting so I think we'll use that a couple of times'
		Expanding on what is usually taught	Int 2: 'I think it was good because it was kind of something different to what they'd have anyway so we do kind of PSHE and stuff but then that was kind of a different side of it that we don't really look at so we don't we look at

			feelings and stuff but we don't look at what might happen inside when those things happen' Int 2 'but it was good for them to go a little bit deeper then just sort of happy or sad and what that might look like yeah'
	Positive changes	Development of staff skills	Int 1: 'Yeah I think um in terms of the I think as practitioners we've become a lot more aware of actually the children's (.) awareness of their own emotions in terms of them being mindful and trying to get them to reflect on it so rather than us as practitioners trying to change the children's behaviour' Int 1: 'I've definitely noticed changes and I think whether that's the staff being more mindful about being mindful'
		Development related to emotional awareness	Int 1: 'at the same time they have done really well in starting to think about their emotions and their feelings and starting to think about actually what erm mindful technique activity erm they've enjoyed' Int 1: 'I've definitely noticed changes and I think whether that's the staff being more mindful about being mindful whether it's the children being more aware of how they are feeling or whether it's that natural transition I'm not quite sure'
		Positive changes felt to have occurred for particular children	Int 1: 'but definitely [Harry] has been more settled and he's able to verbalise how he is feeling a bit more so he will still show that initial first behaviour but we are not having the extreme behaviours that we were … then he might throw a chair if we'd really escalated whereas now he will start to show and then you can see that he's aware of what his actions are and with support from an adult he's then able to say [Harry] doesn't like that job' Int 2: 'I think it has helped [Alex] … yeah he has been able to talk about like refer back to the brain stuff and everything and the breathing and everything' Int 2: 'yes I think the breathing's helped sort of [Alex] erm to stop him really I think and another pupil [NAME] in the class as well he says about the breathing and he's a little bit more on board with kind of the brain stuff he was really trying to say the words ((laughs)) and so he was yeah he was taking it on board and then this morning he struggled with something and was we sort

			of told him to breathe and that really helped him so I think yeah the breathing's definitely something that some of them have picked up and used'
	Prior knowledge of children	Knowing the children helps with adaptation	Int 1: 'I found it easy enough to do knowing the children that I have got and knowing what I needed' Int 2: 'To help them yeah because you sort of know what they are going to react badly to and then obviously that could set them off wrongly for the whole afternoon' Int 1: 'I think it's just choosing a yeah choosing an activity or thinking about out of the choice of activities how's the best way to deliver it for the children that are in the class'
	Flexibility of approach	Benefits of pre-planned lessons	Int 1: 'I liked that everything was really clear in terms of the planning kind of the prior subject knowledge that was needed' Int 1: 'I think in terms of the lessons being pre planned and having the link with the story books actually it works quite well'
		Able to make adaptations as needed	Int 2: 'Int: Was it was it easy to Teacher 2: I think so yeah sort of have a look at them and then the time if it didn't last that long kind of extending Asking more questions about it and stuff like that maybe go a little bit off just to still have them talking about it' Int 2: Yeah make the changes yeah we could make the changes as we went along I think there was a couple of days when we just had to completely scrap it cos something else was happening and one of the children was unsettled that generally yeah we could adapt it and fit it in' Int 1: 'I think it's just choosing a yeah choosing an activity or thinking about out of the choice of activities how's the best way to deliver it for the children that are in the class'
		Aspects could easily be continued	Int 1: 'easily we could continue with some of the mindful activities and be able to do that throughout the week'
		The use of activities outside of the intervention	Int 1: 'At the moment with err it being Christmas time and lots of anxiety around Christmas we've done lots of additional mainly the mindful breathing

			we've also done some mindful listening because it it's easy you can do it quickly'
		Fitted into the school day	Int 2: 'it was quite good because we have to do something kind of in that timeslot anyway and we've recently as a school they've been trying to put more into the timeslots and we have to say what we are doing at what time Int 2: So it's quite good that we found something that we can do in that and it linked quite nicely on as we normally, normally do circle time activities anyway do' Int 2: 'Yeah I think it generally fit into the time because we had sort of about half an hour slot' Int 2: 'yeah it did fit in everyday some days obviously it was shorter And others it was longer but it never kind of went over too much'

Appendix 19: Inter-Rater Agreement of Themes

Inter-rater agreement of themes: TEP 1

Please read the four themes and 10 data extracts below. Please write the name of the theme and sub theme (if appropriate) that you think matches the data extract.

Theme 1: *Complexity* Subthemes: • Understanding of the brain • Complexity of the skills being taught • Specific challenges for those with ASD	**Theme 2:** *Benefits of mindful breathing*
Theme 3: *Engagement with practical activities*	**Theme 4:** *Relevance* Subthemes: • Relevance for the curriculum • Positive changes • Knowledge of children • Flexibility of approach

	Data extract	**Theme (and subtheme)**
1	'I think some of it is is that difficult concept of understanding what their bodies do and what their bodies feel like I think it's quite in a lot of children with autism they are not able to to possibly pin point pain where it is they know that they are not feeling well but they can't necessarily pin point where abouts in their bodies feel so its quite a tricky thing to suddenly be saying right I want you to be telling me about how you are feeling about something it is quite an abstract'	Theme 1 Specific challenges for those with ASD
2	'but definitely [Harry] has been more settled and he's able to verbalise how he is feeling a bit more so he will still show that initial first behaviour but we are not having the extreme behaviours that we were … then he might throw a chair if we'd really escalated whereas now he will start to show and then you can see that he's aware of what his actions are and with support from an adult he's then able to say [Harry] doesn't like that job'	Theme 4 Positive changes
3	'one of the children who we haven't been baselining erm really likes the breathing and when I say to him why do you like breathing how does it make you feel and says it makes me feel tired and I said it isn't really making you feel tired it's making you feel relaxed and because you are feeling relaxed you are feeling calmer'	Theme 2
4	'So they like I think they like the kind of more practical things so they liked the making the bottles'	Theme 3
5	'easily we could continue with some of the mindful activities and be able to do that throughout the week'	Theme 4 Flexibility of the approach
6	'Yeh I think um in terms of the I think as practitioners we've become a lot more aware of actually the children's (.) awareness of their own emotions in terms of them being mindful and trying to get them to reflect on	Theme 4 Knowledge of children

	it so rather than us as practitioners trying to change the children's behaviour'	
7	'I think it's just choosing a yeh choosing an activity or thinking about out of the choice of activities how's the best way to deliver it for the children that are in the class'	Theme 4 Flexibility of approach
8	'it didn't fit the children that I've got in terms of they really didn't understand about the different parts of the brain …the idea that we've got a brain is just was quite a foreign concept' 'we just didn't understand the concept'	Theme 1 Understanding of the brain
9	'the recent activities that we have been doing have been quite (.) I want to say heavy but it's kind of like reverse advent calendars what we can be doing in our local community and because it's not involving us it's really really difficult for the children to understand because they just don't have that outward thinking'	Theme 1 Complexity of the skills being taught
10	'I think it's quite difficult when they're autistic for them to like transfer it as well so they could do it kind of in the lesson but yeh so it's quite difficult for them to kind of transfer the skills to other areas so you say like the next day or the in the afternoon when they are having a strop and your like oh remember your breathing like they find it quite hard to then do it any differently'	Theme 1 Specific challenges for those with ASD

Inter-rater agreement of themes: TEP 2

Please read the four themes and 10 data extracts below. Please write the name of the theme and sub theme (if appropriate) that you think matches the data extract.

Theme 1: *Complexity* Subthemes: • Understanding of the brain • Complexity of the skills being taught • Specific challenges for those with ASD	**Theme 2:** *Benefits of mindful breathing*
Theme 3: *Engagement with practical activities*	**Theme 4:** *Relevance* Subthemes: • Relevance for the curriculum • Positive changes • Knowledge of children • Flexibility of approach

	Data extract	**Theme (and subtheme)**
1	'I think some of it is is that difficult concept of understanding what their bodies do and what their bodies feel like I think it's quite in a lot of children with autism they are not able to to possibly pin point pain where it is they know that they are not feeling well but they can't necessarily pin point where abouts in their bodies feel so its quite a tricky thing to suddenly be saying right I want you to be telling me about how you are feeling about something it is quite an abstract'	*Complexity* • *Specific challenges for those with ASD*
2	'but definitely [Harry] has been more settled and he's able to verbalise how he is feeling a bit more so he will still show that initial first behaviour but we are not having the extreme behaviours that we were … then he might throw a chair if we'd really escalated whereas now he will start to show and then you can see that he's aware of what his actions are and with support from an adult he's then able to say [Harry] doesn't like that job'	Relevance • Positive changes
3	'one of the children who we haven't been baselining erm really likes the breathing and when I say to him why do you like breathing how does it make you feel and says it makes me feel tired and I said it isn't really making you feel tired it's making you feel relaxed and because you are feeling relaxed you are feeling calmer'	Benefits of mindful breathing
4	'So they like I think they like the kind of more practical things so they liked the making the bottles'	Engagement with practical activities
5	'easily we could continue with some of the mindful activities and be able to do that throughout the week'	Relevance • Flexibility of approach
6	'Yeh I think um in terms of the I think as practitioners we've become a lot more aware of actually the children's (.) awareness of their own emotions in terms	Relevance • Positive changes

	of them being mindful and trying to get them to reflect on it so rather than us as practitioners trying to change the children's behaviour'	
7	'I think it's just choosing a yeh choosing an activity or thinking about out of the choice of activities how's the best way to deliver it for the children that are in the class'	Relevance • Flexibility of approach
8	'it didn't fit the children that I've got in terms of they really didn't understand about the different parts of the brain …the idea that we've got a brain is just was quite a foreign concept' 'we just didn't understand the concept'	Theme 1 Complexity Subtheme • Understanding of the brain
9	'the recent activities that we have been doing have been quite (.) I want to say heavy but it's kind of like reverse advent calendars what we can be doing in our local community and because it's not involving us it's really really difficult for the children to understand because they just don't have that outward thinking'	Theme 1 Complexity Subtheme • Complexity of skills being taught
10	'I think it's quite difficult when they're autistic for them to like transfer it as well so they could do it kind of in the lesson but yeh so it's quite difficult for them to kind of transfer the skills to other areas so you say like the next day or the in the afternoon when they are having a strop and your like oh remember your breathing like they find it quite hard to then do it any differently'	Theme 1 • Specific challenges for those with ASD