Exploring the effect of a chapter map intervention, with a thinking aloud model, on reading comprehension attainment and confidence, for pupils with Severe Learning Disabilities diagnosed with Autism Spectrum

Catherine Henderson Slater

A Research & Development Project

Submitted for the MSc Learning & Teaching 2020

DEPOSIT AND CONSULTATION OF THESIS

One copy of your dissertation will be deposited in the Department of Education Library via the WebLearn site where it is intended to be available for consultation by all Library users. In order to facilitate this, the following form should be completed which will be inserted in the library copy your dissertation.

Note that some graphs/tables may be removed in order to comply with copyright restrictions.

Surname	Henderson Slater
First Name	Catherine
Faculty Board	Education
Title of Dissertation	Exploring the effect of a chapter map intervention, with a thinking aloud model, on reading comprehension attainment and confidence, for pupils with Severe Learning Disabilities diagnosed with Autism Spectrum Disorder

Declaration by the candidate as author of the dissertation

1. I understand that I am the owner of this dissertation and that the copyright rests with me unless I specifically transfer it to another person.

2. I understand that the Department requires that I shall deposit a copy of my dissertation in the Department of Education Library via the WebLearn site where it shall be available for consultation, and that reproductions of it may be made for other Libraries so that it can be available to those who to consult it elsewhere. I understand that the Library, before allowing my dissertation to be consulted either in the original or in reproduced form, will require each person wishing to consult it to sign a declaration that he or she recognises that the copyright of this thesis belongs to me. I permit limited copying of my dissertation by individuals (no more than 5% or one chapter) for personal research use. No quotation from it and no information derived from it may be published without my prior written consent and I undertake to supply a current address to the Library so this consent can be sought.

3. I agree that my dissertation shall be available for consultation in accordance with paragraph 2 above.

Abstract:

This research and development project investigated how to support students with Autism Spectrum Disorder, categorised as having Severe Learning Disabilities, with their reading comprehension. My previous research had highlighted how students, diagnosed with Autism Spectrum Disorder, at my current school who do learn to read words show a reading pattern of high decoding skills but low reading comprehension. An intervention was designed, which combined thinking-aloud techniques with a chapter map design, to build confidence and skills in reading comprehension.

Participants were selected based on their decoding skills and diagnoses. Three students were found who fitted into these criteria. Unfortunately, due to the worldwide pandemic, two students were unable to complete the intervention. For the remaining participant, the intervention had to be shortened and original timings had to be changed.

The findings showed that the intervention had little impact on reading comprehension for the student who undertook it. However, this could be partially explained by the situation caused by the pandemic, such as timings being changed and anxiety caused to the student by changes to routine.

Table of Contents

Table of Contents **5**

List of Tables **6**

Introduction **7**

Social Model of Disability 9

Definitions 10

Theoretical Framework 12

Literature Review **17**

Methodology **41**

Ethical Consideration 53

Findings 56

Discussion 63

Conclusion 69

Reference List 71

Appendices 81

List of Tables:

Table 1: Student Characteristics

Table 2: Timeline

Table 3: Examples of modelled thoughts with symbol cards

Table 4: Comparison of plot point recall

Table 5: Comparison of main character recall

Table 4: Comparison of main setting recall

Introduction

Reading attainment is an ongoing issue, at my current school. I work in a Specialist School for students categorised as having severe learning disabilities (SLD) and profound and multiple learning disabilities (PMLD). The majority of our students are also diagnosed with autism spectrum disorder (ASD). I work in the Key Stage Four class (teaching all subjects) and, despite being aged fourteen to sixteen, some of my students cannot read over five words. The students who can read words individually show little to no reading comprehension in their Literacy lessons. For my Part 2 assignment, I investigated why it was that these students could decode perfectly, and yet could not understand what they were reading, through interviews with teachers and students. Teachers at my school reported a lack of self-efficacy on understanding how to help these students and an uncertainty in how to adapt lessons or provide interventions. Students showed confusion on the nature of reading and how to help themselves with comprehension strategies. It is not surprising that there is this uncertainty as research into this area, both understanding the reasons behind it and how to support, is very limited (Ricketts, Jones, Happe and Charman, 2013).

Reading comprehension is recognised as an area of improvement for students with ASD, not only in the UK but worldwide (Huemer and Mann, 2009; O'Connor and Hermelin, 1994; Nation et al., 2006). O'Connor and Klein (2004) described how individuals with ASD have a 'paradoxical combination of good word identification with poor comprehension' (p. 115) and Davidson, Kaushanshaya and Weismer (2018) compared recent findings within research on strengths and weaknesses with reading for individuals with ASD and estimated that between 38% to 73% of all individuals with ASD struggle with limited reading comprehension.

When I began working in an SLD school, I was surprised to find many professionals and colleagues diminished the importance of reading for students with severe disabilities. Many SLD schools do not have libraries or teach activities that encourage reading

(Kliewer, Biklen and Kasa-Hendrickson, 2006). As English Lead, I wanted to change the attitude to this at my school, as learning to read not only supports academic learning but it is 'suggested that more exposure to and experience with reading may enhance expressive, receptive and social communication' (Mirenda and Erickson, 2000, p. 351). Preparing students for life after school and promoting independence is essential, and reading plays a key part of this. With my research, I therefore wanted to investigate not only how to support reading comprehension for students with ASD, but also specifically those categorised as SLD.

Due to the worldwide pandemic, the intervention I designed underwent changes and not all participants could be involved. The individual who did take part in my intervention underwent significant changes in his personal and school life. As it is well-established that students with ASD can react negatively to change (Teh, Chan, Tan and Magiati, 2017), I went back to my literature review and added an additional question and focus on the impact of change on anxiety for individuals with ASD, in order to understand how this might have impacted on academic performance in the intervention.

Social Model of Disability:

Before proceeding, it is important to explain the aim of the research and how this is influenced by the Social Model of Disability. The Social Model moves away from the Medical Model of Disability which considers an individual's 'impairments' as the root cause of any disadvantages they endure and the solution to be the treatment or cure (Crow, 1996, P.3). The Social Model of Disability looks at the terms 'impairment' and 'disability' and argues that 'impairment' is the description of the physical body and 'disability' is the 'disadvantage or restriction of activity caused by contemporary social organisations' (Oliver, 1996, P.22-35). This distinction demonstrates how often what disables an individual is institutional norms and physical and social arrangements which could be altered (Goering, 2005). When looking at reading for individuals with ASD, I would argue that what 'disables' them would be the conventional methods of teaching reading comprehension which do not support their particular needs.

In line with the Social Model of Disability, this research is not derived from a deficit perspective (Mertens and McLaughlin., 2003), but instead on removing the 'disability' by finding new ways of teaching reading comprehension that can create a more inclusive and supportive learning environment for individuals with ASD.

Definitions:

As I will be using medical terms throughout, I have outlined the definitions and abbreviations. Different medical diagnostic terms for ASD have been used over the past few decades and so that it is clear how these terms fit into new definitions when discussing past research, I have briefly described them and then clarified which I will be using.

The term Autism was updated to Autism Spectrum Disorder in the World Health Organisation (WHO) in the 11th edition of ICD (ICD-11), in 2018. ASD was defined as, 'characterized by persistent deficits in the ability to initiate and to sustain reciprocal social interaction and social communication, and by a range of restricted, repetitive, and inflexible patterns of behaviour and interests' (Icd.who.int., 2020).

The term ASD recognises that ASD is a spectrum and those diagnosed with it demonstrate a 'full range of intellectual functioning' and communication skills (Icd.who.int., 2020).

Although the terms high-functioning and low-functioning are frequently used in research to differentiate between abilities within ASD, they are not official medical terms. Therefore, I will be using the terms SLD and MLD to differentiate. The Special Educational Needs Code of Practice categorises through primary needs (Assets.publishing.service.gov.uk, 2020) and through a needs assessment students will be categorised as SLD, MLD etc…

As research into reading for students with ASD, categorised as SLD, is so limited, I have included research in my literature review which uses terms, such as Asperger's Syndrome, which are no longer used in the UK. However, when discussing my own research, I will use the definition of ASD from ICD-11 and the categorises SLD and MLD, as detailed in the student's Education Health Care Plan.

When considering the use of labels, it is important to consider it from a Social Model of Disability perspective, as the person should always be seen as an individual rather than simply their diagnosis. I therefore chose throughout, grammatically, to place the person before the label, e.g. child with ASD rather than ASD child.

List of abbreviations:

ASD – Autism Spectrum Disorder

SLD – Severe Learning Disabilities

MLD – Moderate Learning Disabilities

PMLD – Profound and Multiple Learning Disabilities

ToM – Theory of Mind

WCC – Weak Central Coherence

Theoretical Framework:

The theoretical foundations of my research begin with cognitive-processing theory and specifically the Simple View of Reading (SVR), introduced by Gough and Tunmer in 1986. Reading, through a cognitive-processing lens, considers the underlying cognitive processes (Tracey and Morrow, 2017) and the SVR determined that reading comprehension was the result of two cognitive capacities: decoding and listening comprehension (Hoover and Tunmer, 2018). They argued that these two components were both necessary for reading comprehension and used a multiplication formula to demonstrate how if either component was at 0 then reading would not be successful:

R (Reading comprehension) = L (listening comprehension) x D (Decoding)

Within this formula, each component has a clear and concise definition:

Decoding - refers to a process beginning with sounding out a word and followed by fluent reading of words out of context with understanding of the semantic information (Hoover and Gough, 1990). It is separate from reading comprehension as each word is read and understood separate from each other.

Listening comprehension - refers to 'the ability to take lexical information…and derive sentence and discourse information' (Hoover and Gough, 1990, p. 131). The term listening comprehension was changed to linguistic comprehension by Hoover and Gough (1990), but retained the same meaning. Listening comprehension is different from reading comprehension, as it is tested through listening to a text being read aloud.

Reading comprehension – refers to the final outcome where a text is read and understood. Unlike listening comprehension, reading comprehension relies on decoding the words on the page and understanding them in context of each other, rather than hearing them orally (Hoover and Gough, 1990).

The assumption, therefore, is that once decoding is perfected then the individual will read at the same level as they could listen (Gough and Tunmer, 1986).

This view of reading is still highly influential and was used as the conceptual model of reading in the UK government's Rose Review (2006) which guided national curricular advice (Hoover and Tunmer, 2018). It was also frequently used as the theoretical framework on research into the reading profiles of individuals with ASD (McIntyre, Oswald, Solari, Zajic, Lerro, Hughes, Decine and Mundy, 2018) as the SVR can be used to understand where reading disabilities may form, e.g. when looking at the formula Dyslexia would fall under poor decoding (Gough and Tunmer, 1986, p. 7). It is very useful when explaining reading difficulties for individuals with ASD as it demonstrates clearly how decoding and listening comprehension are separate and that an individual can have strengths in one and yet weaknesses in the other.

However, there have been criticisms of the SVR. Some have argued that reading is more complex and other factors influence reading, such as psychological factors (Shankweiler and Macaruso, 2010; Braze, Katz, Magnuson, Mencl, Tabor, Dyke, Gong, Johns, and Shankweiler, 2016). There is debate over if the SVR needs expanding to include addition variables, the Component Model of Reading, for example, was suggested to include the psychological component of learned helplessness (Aaron, Joshi, Gooden and Bentum, 2008). Moreover, some argue that the term 'listening comprehension' could include subcomponents, Catts (2018), for example, argued that the term could include the factor of working memory. Nation (2019) debated that listening comprehension itself absorbs factors such as gramma (p.50) and that in 'keeping with the principles' of the SVR the terms can be used in a neutral way such as 'things to do with understanding spoken language' (p.51). Interestingly, although not giving it a broader definition, Catts (2018) changed the term to 'language comprehension' again making it more generalised and moving away from the original proposal with its clear definition. Hoover and Tumner (2018) in a reflection on the SVR

over thirty years later, commented on the changing use of terms and argued that readers must take care in considering the different uses (p. 305).

As the terms and definitions are changing and becoming more generalised to incorporate new research on factors which influence reading comprehension or even new adapted models being suggested, it draws doubt over whether the original SVR model alone is sufficient.

Moreover, in the context of my own school, the SVR alone did not explain the complex reading patterns of students with ASD. From my own observations and colleagues', we became aware that students with ASD can listen to a chapter being read out to them and answer comprehension questions accurately (listening comprehension) and then read a following chapter with accurate decoding, and yet show very little comprehension of what they have just read. Gough and Turner stated that if there was an individual who could decode accurately and showed listening comprehension then this would 'falsify the simple view' (1986, p. 9). Therefore, the SVR alone cannot explain why my students cannot comprehend what they read.

The SVR model is a useful framework for separating decoding from comprehension and there is evidence demonstrating that the two components have separate developmental paths and subskills (Oakhill, Cain and Bryant, 2003). Separating the two skills is essential when investigating reading difficulties so that interventions which are appropriate are selected (Oakhill, Cain and Bryant, 2003). I will therefore be using it to give clear definitions to the components and as a framework to describe how they develop out of sync for my students. However, as it has been recognised to require additional subcomponents or change of definitions or terms, it is clear that alone it is not sufficient. Moreover, when it comes to explaining why when decoding is fluent comprehension might fail, in the context of my school, it is also necessary to consider different factors. Therefore the theoretical foundations of my research will be embedded in multiple models of reading.

Valuing multiple theoretic lenses when approaching educational problems is a relatively recent idea (Tracey and Morrow, 2017) and the 'search for a single model of reading has been supplanted by recognition of the worth of multiple models of different reading and writing experiences' (Tierney, 1994, p. 1163). Reading is a complex activity and understanding how a diagnosis of ASD impacts that is still uncertain (see later section in literature review). Therefore, the search for understanding should be broad using multiple theoretical views.

For my Part 2 research, a topic which came up frequently in my interviews with teachers and Leads, on how to support students with ASD with their reading comprehension, was modelled thinking aloud techniques. Modelled thinking aloud is recognised as a metacognitive instruction used to help readers become more aware of thinking processes during a reading session (VanKeer and Vanderlinde, 2010). Metacognitive instruction reflects a constructivist perspective 'because of its depiction of the readers' active, internal cognitive engagement as central to the reading process' (Tracey and Morrow, 2017, p. 69). Metacognition is the process of becoming aware of your own thinking and research has shown that poor readers have less metacognitive awareness (Allen and Hancock, 2008). Reading comprehension involves metacognition as it is an active creation of meaning between the reader and the text. Strategies are self-monitoring and self-regulating activities which include being aware of whether they comprehend what they read and how to employ specific cognitive strategies to support them if they don't. Comprehension monitoring strategies, included modelled thinking aloud, and how they specifically support students with ASD, are discussed later in the literature review in more depth. My intervention is designed around metacognitive theory and more details of this are in the methodology.

When considering the questions to guide my literature review, I therefore used the SVR as a framework to separate word decoding from comprehension skills, in line with the majority of the research which investigated the reading abilities of students with ASD.

This supported my understanding of my students' reading profile, the effect of decoding and the meaningfulness of subsequent interventions. However, I also considered how, after eliminating the factor of decoding, reading cannot be simply predicted by listening comprehension, as seen by my own students, and investigated other causes such as the effects of metacognition.

The questions I will be considering in my literature review are:

Why do individuals with ASD often show below average reading comprehension skills despite normal or above average word decoding skills?

What interventions and adapted teaching methods support reading comprehension for individuals diagnosed with ASD?

What interventions and adapted teaching methods support reading comprehension in individuals categorised as SLD?

How does unexpected changes in situation and routine impact on anxiety for individuals with ASD and how can teachers provide support?

Literature Review:

As research into reading for individuals with ASD is so limited, I have broadened my search to include research from around the world, not just the UK.

1. Why do individuals with ASD often show below average reading comprehension skills despite normal or above average word decoding skills?

When considering this question, it was imperative that I examined it from a social model view of disability, so that the focus was on support rather than deficits. Whereas it is undeniable that research into 'specific deficits' has greatly 'informed our understanding of what autism is', any research which considers deficits in a group of vulnerable individuals can be problematic if it is the 'exclusive focus' (Potter and Whittaker, 2001, p.13), since it is also important to consider how society excludes neurologically diverse individuals. For myself, the focus of this questions was to fully understand how to support my students with their reading so that I can adapt my own teaching and classroom environment and advise other teachers, in my school, on this. I took care to understand that some of the issues that arose for individuals with ASD came from the physical text itself, such as a reliance on anaphoric referencing and that I needed to carefully consider the implications of this, on my own practice. Therefore, rather than approaching this from a deficit perspective, my focus instead was to ultimately gain a greater understanding on how to support my students.

There are several hypothesises on what may cause comprehension impairments for individuals with ASD, when decoding is at average or above average level. These

include Weak Central Coherence, lack of Theory of Mind, oral language impairments and problems understanding grammar and semantic information.

Weak Central Coherence (WCC) theory is a cognitive style attributed to individuals with ASD, described as a failure of a central system which combines different sources of information to establish meaning as a whole (Frith, 2003). In other words, WCC theory refers to a 'detail-focused processing style' which often characterises ASD (Happe and Frith, 2005, p.5). Accardo, Finnegan, Gulkus and Papay (2017) proposed that in the context of reading, WCC would mean that individuals with ASD would focus on small details in the text, rather than the main idea or theme. This could lead to misunderstandings or lost reading comprehension. Furthermore, it has been suggested that students with ASD may focus solely on each word separately when decoding and therefore miss comprehension of the text as a whole (Randi et al., 2010). When considering the Simple View of Reading, this would explain how, for some students, even when decoding and listening comprehension skills are high, this does not lead to reading comprehension. When the student is listening, they do not have to decode the words and so can hear and comprehend the text holistically. However, when reading themselves, perhaps due to WCC, as they decode, they focus on each word individually and so do not gain understanding of the meaning fully. Therefore, skills in listening comprehension and decoding may not equal reading comprehension.

The link between linguistic processing and local coherence impairments was investigated by Jolliffe and Cohen (1999) with thirty-four adults, diagnosed with either ASD or Asperger syndrome. Three experiments were used to investigate the individuals' ability to process language for meaning: a homograph test, a local coherence test and an ambiguous sentence test. The ambiguous sentence test, for example, required individuals to make connections with the preceding sentences in order to understand the current one (e.g. whether 'glasses' in a sentence referred to drinking glasses, or to spectacles depended on the context of the sentences beforehand). If an individual could

make the connection then local coherence would be achieved as they would be connecting the sentences together. The outcome of all three tests supported WCC theory, for example with the ambiguous sentence test the students showed difficulty linking the sentences together. Likewise, Norbury and Bishop (2002)'s findings further support WCC theory. They found that students with ASD performed worse on a task, than their peers, requiring participants to infer missing text based on an understanding of context.

WCC theory also explains why individuals with ASD may struggle with anaphoric referencing (the use of a word which relies on previous words or ideas for its meaning) in texts, leading to further comprehension difficulties. A typical text will use anaphora throughout with an expectation that readers will use the context to understand what it is referencing. If a pronoun is used, for example, then a reader is expected to be able to use the context of the writing to understand who or what is being referenced. However, if due to WCC, the individual is looking at each word or sentence separately then this becomes problematic. It has long been noted that individuals with ASD struggle with the use of pronouns in speech (Kuijper, Hartman and Hendriks, 2015). As part of their investigation on strategies to facilitate reading comprehension for students with ASD, O'Connor and Klein (2004) investigated the effects of anaphoric cuing. Students were asked to look at two texts: one with pronouns and a different one where the pronouns had been replaced by a blank space, which had a drop-down list underneath of possible choices. The students had to choose which noun from the drop-down list to select. Anaphoric cuing was found to have a significant impact on students' passage comprehension as when they used the drop down list they demonstrated a higher level of comprehension of the passage as a whole, suggesting that due to WCC it is often only when individuals with ASD stop and consider the other sentences together that they can understand the reference.

Moreover, Colle, Cohen, Wheelwright and van del Lely (2007) found that anaphoric pronouns were used less by individuals with Autism or Asperger Syndrome in a story-telling task than their matched controls. Despite being an oral task of telling a story from a wordless, picture book rather than a reading comprehension activity, this still supports the argument that anaphoric referencing can be difficult for individuals with ASD. However, both O'Connor and Klein's (2004) and Colle et al., (2007)'s research could be questioned based on their selected participant sample. Both studies had very small sample sizes, only selected individuals labelled as 'high-function' or diagnosed with 'Asperger Syndrome', and had a majority of male participants – nineteen out of twenty for O'Connor and Klein (2004)'s and all of Colle et al., (2007)'s. By only having this select proportion of the ASD population, the research was not representative of the full spectrum of ASD. As the range of abilities is so vast for individuals diagnosed with ASD and so much of the research available relies on a majority of male participants, these findings need to be treated with caution.

Rather than concluding that evidence found supported WCC, Colle et a., (2007) suggested that the difficulties with pronouns supported the hypothesis of the role of Theory of Mind (ToM), for individuals with ASD. ToM is described as cognitive empathy – the ability to imagine what other people might be thinking or feeling (Baron-Cohen, Leslie, & Firth, 1985). Impairments in ToM are evident across the different abilities seen in ASD (White, Hill, Happe and Frith, 2009). Colle et al., (2007) suggested that ToM was required in story-telling tasks because the speaker would need to consider how much the listener already knew in order to use pronouns correctly.

ToM impacts reading comprehension in several ways. Individuals lacking ToM may have difficulty understanding others' intentions, desires and beliefs so they could have difficulty understanding character-based inference in books, e.g. character motivation (Williamson, 2014). Further difficulties with reading comprehension may stem from a lack of understanding of the author's message, as ToM impairment may prevent individuals

from understanding that a text is an expression of the author's thoughts and emotions, and may have a different intended meaning than literal meaning (Tomasello, 2010).

There has been very little research into how lack of ToM may impact academic achievement, but McIntyre et al., (2018) researched the relationship between ToM, ASD and reading achievement. Seventy children with high-functioning ASD and forty children, reported as typically developed, participated in the study. The children with ASD performed worse on the ToM tasks than the controls and the data explained unique variance in reading comprehension for them. It was concluded that this difference in social cognition led to decreased reading comprehension.

Oral language ability is another reason often cited for why individuals with ASD may struggle with reading comprehension (Ricketts et al., 2013; Nation et al., 2005; Nation et al., 2004). Impairments in oral abilities can have an impact on reading comprehension for many students, not just those with ASD. Nation and Norbury., (2005) found that impairments in communication are often linked to impairments in reading comprehension, when researching three groups of children with developmental disorders. They found that poor comprehenders specifically struggled with oral non-phonological skills such as using the past tense in speech. When specifically looking at individuals with ASD, both Norbury and Nation's (2011) study and Ricketts et al., (2013)'s regression analysis (of one hundred individuals with ASD) found that, as well as word reading and social factors,. oral language ability correlated with reading comprehension.

Moreover, Davidson et al., (2018) investigated the different impact of individual aspects of oral language impairments on reading comprehension with individuals with ASD. Davidson et al., (2018) found that oral language vocabulary knowledge had the strongest impact on reading comprehension for twenty-four individuals with ASD. However, whilst studies such as this indicate that oral language impairments often coexist with comprehension difficulties, much of the research (e.g. Ricketts et al., 2013) does not

confirm whether poor oral abilities caused the impairment in reading comprehension, or if both derive from a different underlying cause (e.g. lack of social skills etc.).

When looking at the different components of oral language and their impact on reading comprehension for individuals with ASD, Cronin., (2014) found that her thirteen participants demonstrated deficits in the three aspects of oral language she measured: phonology, semantics and syntax, but no deficit in their comprehension skills. This study seems to contradict the findings above, but on reflection, Cronin., (2014) recognised that none of the comprehension questions she had used to measure reading skill required inference or abstract thinking and it is known that these are the aspects of reading comprehension that students with ASD can find the most challenging (Williamson, 2014). Reading comprehension is a complex skill and clearly multiple factors and underlying causes can impact individuals with ASD.

Finally, individuals with ASD often have been found to struggle with grammar and semantic skills, which could be another factor impacting comprehension ability. O'Connor and Klein (2004) found that individuals with ASD mispronounce homographs, and are unable to use the semantics of a sentence to support their understanding. Nation and Snowing., (1998) similarly discovered that individuals with ASD have trouble understanding that synonyms can have the same meanings, and also show difficulty comprehending grammar such as the past tense and figurative language, which could impact their ability to understand texts.

Ultimately, when considering research into reading comprehension and individuals with ASD it is important to recognise that a difficulty could arise from multiple factors. Within ASD, individuals demonstrate a wide range of abilities and much of this research only considers high-functioning ASD (e.g. Cronin, 2014; McIntyre et al., 2018; Colle and Baron-Cohen, 2007; Norbury and Bishop, 2002). Therefore, when considering how to support a student with ASD with their reading comprehension, it is vital to consider the

person as an individual rather than making assumptions based on research which relies on a narrow focus, and only considers one specific section of ASD.

2. What interventions and adapted teaching methods support reading comprehension for individuals diagnosed with ASD?

Despite schools across the world reporting a growing number of students diagnosed with ASD per year, there is a surprising lack of research on interventions to support academic learning. Interventions still primarily focus on 'reducing challenging behaviour and improving communication, rather than treatments designed to enhance academic performance' (Zein, Solis, Vaughn and McCulley, 2013, p. 1303). This is particularly startling when you consider the vitality of being able to read, as it's 'a crucial skill for student success in school and postschool opportunities' (Whalon, Hanline and Woods, 2011, p.195). Zein et al (2013)'s recent review of reading comprehension interventions for students with ASD, found only twelve studies between 1980 and 2012 and only three of these were found to have conclusive evidence due to problems with very small sample sizes, amongst others. The conclusion was that 'this line of research has not been adequately explored' and the authors argued that far more evidence-based research was needed to help these students (Zein et at., 2013 p. 1319).

When addressing my literature review question, I have therefore included some research-based studies and interventions with very small sample sizes, due to how sparse the research is. Much of the research available has investigated modelled-thinking aloud techniques, in line with a metacognitive view of learning. Other studies have included interventions supporting anaphoric referencing, embedding perseverative interests, question generating and peer tutoring.

One of the identified ways in which individuals with ASD may struggle with reading comprehension is understanding anaphoric referencing (Oakhill and Yuill, 1986). As discussed earlier, O'Connor and Klein (2004) found that anaphoric cuing significantly increased reading comprehension of a short passage for twenty-five individuals with ASD. However, Roux, Dion and Barrette (2015) found anaphoric referencing had no effect on reading comprehension in an intervention with six students with ASD. Their intervention focused on five activities: two based on single word comprehension, one on identifying the main idea and two on understanding the structure of the text. However, anaphoric referencing tasks, where the participants were required to identify the referent of pronouns, were only included in three of the thirty sessions. The study therefore focused primarily on vocabulary learning (the remaining twenty-seven out of thirty sessions), yet it is documented that individuals with ASD have average to high decoding skills (Huemer and Mann, 2009). For individuals with ASD who can decode, 'single word comprehension is largely intact' and it is only for 'linguistic units beyond the word' where reading comprehension is more limited (O'Connor and Klein, 2004., p. 116). Therefore, it seems an inappropriate decision for Roux et al, (2015) to focus so heavily on single word comprehension, a choice which reveals a lack of understanding on the nature of ASD and how it impacts reading comprehension. With only three sessions on anaphoric referencing when it is known that individuals with ASD struggle with this, it is unsurprising that no impact was seen. On the other hand, O'Connor and Klein (2004) designed their intervention to support comprehension at sentence level, page and chapter level and focused on supporting participants to access prior knowledge when reading, use the information of the text to make predictions and use the context of the sentence to understand anaphora. This would suggest that their findings – that anaphoric referencing showed a significant impact on reading comprehension – are more convincing than Roux et al.'s (2015), since it is clear that they used their knowledge of impairments in reading for individuals with ASD to design the intervention to specifically help them.

An understanding of how particular texts and reading material support or hinder individuals with ASD is crucial when considering reading comprehension from a social model of disability perspective. Like O'Connor and Klein (2004), Zein, Solis, Lang and Kim (2016) utilised their understanding of ASD in their research into reading comprehension, exploring embedded perseverative interest within the texts themselves. Reading interest has long been noted to have an impact on children's comprehension (Estes, Vaughan and Jr, 1973), but there is a lack of research on this impact, regarding students with ASD. Perseverative interests (PIs), as described by Zein et al., 2016, are the highly selective interests that individuals with ASD can display, and their study investigated the effects of embedding these interests within texts. They compared comprehension of a text altered to include a PI with the original text and used a retelling format and comprehension questions to measure understanding. They found that comprehension improved with the PI texts. However, it must be noted that the long-term effects of this were not measured and it is therefore unclear if this enhanced reading comprehension skill or if the participants simply understood the PI texts better. More research is needed into the long-term effects of using PI texts on the reading comprehension of students with ASD.

Several studies used the theory of WCC to understand weak comprehension skills in individuals with ASD, and designed interventions which would help participants understand the text as a whole. Stringfield, Lyscre and Gast (2011) trialled a story map intervention with three boys diagnosed with ASD. Performance was measured through modified accelerated reader (AR) quizzes and positive effects on reading comprehension were quickly achieved. The participants were trained on how to use the story maps which included summarising the different elements of the story, including setting, characters, beginning, middle and end. However, caution should be taken when looking at these findings alone as the baseline procedures and intervention had a key difference. When participants were answering the AR quizzes their reading books were

shut and they were relying only on memory, whereas in the intervention, when answering the quizzes, they had the chapter map in front of them. It is therefore not clear if the improvement came from having the chapter map to refer to for answers rather than genuine reading comprehension improvements.

Williamson, Carnahan, Birri and Swoboda (2015) conducted a similar, but more convincing, intervention with a character event map, again with three male participants all diagnosed with ASD. Whereas Stringfield et al., (2011) drew from WCC hypothesis, Williamson et al., (2015) drew from the theory of lack of ToM and aimed to help participants gain a deeper understanding of characters, arguing that this would improve overall reading comprehension. The character event maps helped students make inference on characters by including a column for who is involved and what it means, as well as what happens. Reading comprehension was measured through comprehension questions and the three students all demonstrated good progress. Unlike Stringfield et al., (2011) the students answered the comprehension questions without support and therefore when considering both studies together it suggests that story mapping interventions may support reading comprehension for students with ASD. However, as both studies only had three participants who were all male, more research is needed with a more diverse and larger participant group.

Alongside their character event map, Williamson et al., (2015) also included a thinking-aloud technique. As discussed earlier, from a metacognition theory perspective, thinking-aloud techniques are a useful tool for helping students be aware of their own thinking and, in the context of reading, develop comprehension monitoring and fostering strategies. With students with ASD, the thinking process behind how to comprehend what they are reading may need to be taught explicitly (Asberg and Sandberg, 2010). In Williamson et al.,'s (2014) intervention, the teachers modelled comprehension fostering techniques when thinking aloud and filling in the character event maps with the students, and this was found to be a useful strategy. The students then voiced their thoughts whilst

they summarised the chapter and considered how the characters' felt. Singh, Moore, Furlonger, Anderson, Busacca and English (2017), likewise, used modelled thinking aloud as part of their intervention. They combined reciprocal teaching (predicting, clarifying and summarising) with behaviour skills training (instruction, modelling, rehearsal and feedback). The participant had been diagnosed with ASD and showed significant reading comprehension improvement. He stated that the modelling step was the most helpful. However, since this study only included a single participant, the findings, whilst useful in contributing to a more complex understanding of ASD and reading comprehension, are insufficient in making more general conclusions.

Moreover, thinking-aloud techniques have also shown impact with question generating tasks for students with ASD. Whalon (2004) investigated this area over the course of different studies, looked into the effects of reciprocal questioning using thinking-aloud with three primary grade students with ASD. Like Singh et al., (2017), reciprocal teaching was used as a comprehension-monitoring strategy, but with questioning. Whalon modelled thinking-aloud, with prompts from story cards containing elements of the story e.g. setting, to demonstrate how to generate questions as she read to monitor her reading comprehension. For example, a story card with "setting" prompts the teacher to think aloud 'Okay where does the *Goldilocks and the Three Bears* take place?' (Whalon, 2004, p. 46). All three students were able to effectively learn and utilise the question generating strategy and the frequency of these questions and responses grew as the intervention continued. Whalon and Hanline (2008) subsequently investigated the effects of reciprocal questioning with a think-aloud procedure to verbally walk students through the mental thought processes behind question generating comprehension monitoring and fostering techniques. Over the course of the intervention, the students generated more specific questions which were directly related to their reading comprehension. Whalon and Hart (2011), furthered this research by adapting a National Reading Panel approved evidence-based reading comprehension strategy, question-and-answer

relationship (QAR), with thinking aloud, for individuals with ASD. They argued that this would explicitly teach comprehension monitoring and fostering by the teacher voicing their thought process. The teacher first models by summarising what she has just read and then models how she would generate a question to check understanding. They also included a further metacognitive strategy of a self-monitoring checklist, again to support students to understand their own thought process to monitor their comprehension.

Whilst much of the work into reading comprehension for individuals with ASD only focuses on 'high-functioning' individuals (Roux et al., 2015; Stringfield et al., 2011; Asberg and Sandberg, 2010), Whalon, Hanline and Wood (2007) offered guidance on a reading comprehension strategy which used thinking-aloud for individuals with ASD who would be considered 'low functioning' or SLD. They used visual supports and activities such as a story map with velcro strips where the student could, for example, link a card with the word 'setting' with the correct word answer. They also broke down examples of thinking-aloud techniques for teachers to model, for example, 'I just learned something new about the setting.' (Whalon et al., 2005, p. 22).

Further studies using thinking-aloud techniques include Flores and Ganz (2007) who used a direct instructional programme manual to guide instructors' behaviours such as modelling skills and guiding students' responses. However, I am reluctant to consider this study as only two of the four participants had ASD; the other two were grouped with them because they met 'the criteria for mental retardation' (p.246) - one participant had ADHD which clearly would have a very different impact on reading comprehension. From a socio-cultural view of disability, simply grouping individuals together because they have a learning disability without any attempt to understand individual differences or how the classroom/research environment would impact them differently, is very problematic. Asberg and Sandberg (2010) conducted a more convincing study. They also used a training booklet and modelled thinking aloud, but with twelve students diagnosed with ASD, rather than simply grouping students together with various different diagnoses. The

intervention guided teachers on a set of concepts for thinking-aloud when reading, such as considering the different types of questions and where to look in the text for the answer. All students showed significant improvement with their comprehension.

Essentially, when considering this literature review question, it is impossible to ignore how little research there is in this area. The research that is available often has very small sample sizes and, more often than not, considers only a small proportion of individuals with ASD, those categorised as 'high functioning'. This is problematic for teachers who are looking to support students with ASD, who can decode but are also categorised as SLD. Many of the interventions listed are simply too complex or require complex ideas such as labelling types of comprehension questions (Asberg and Sandberg, 2010) for students with ASD. This feeling of uncertainty was seen in research by Accardo, Finnegan, Gulkus and Papay (2017)'s investigation of one hundred and twelve teachers of students with ASD. The research found that only 5% reported high-levels of self-efficacy with teaching reading comprehension. Clearly, far more research is needed, particularly with a participant group which truly reflects the diverse nature of ASD and abilities seen amongst individuals within it.

In light of the lack of research into reading comprehension for individuals with ASD, categorised as SLD, I felt prompted to look specifically at reading for individuals categorised as SLD for my next literature review question.

3. What interventions and adapted teaching methods support reading comprehension in individuals categorised as SLD?

When considering effective interventions and adapted teaching to support my students' reading comprehension, it was important that I recognised their position as not only being diagnosed with ASD, but also as having been categorised as SLD. It became clear that the vast majority of studies into reading for students with ASD reflected the needs of individuals labelled as 'high-functioning' or MLD. The findings, therefore, were not, on their own, useful or meaningful for students such as mine, as they expected a higher level of basic comprehension or language ability.

I objected to these students being forgotten in research and wanted to understand the background and debates around this issue. Therefore, I opened my search to include research into a range of diagnoses within SLD and broadened my definition of the term 'reading comprehension'. Because of the complex needs of these individuals, the term 'reading comprehension' as defined by the Simple View of Reading was not always appropriate and some of the research listed below focuses on enjoyment of reading, word recognition and new inclusive ways of accessing reading.

Unfortunately, even with this broad search, research into reading for children categorised as SLD is very limited and, in fact, the teaching of reading and writing in a systematic way to these individuals is relatively recent (Katims, 2000). This derives historically from 'society's ongoing denial of literate citizenship for people with perceived intellectual difficulties' (Kliewer et al., 2006, p. 163). Much of the research available is not evidence-based and is small scale. Within specialist settings the old debate of whether reading and writing should be taught to individuals categorised as SLD is still influential on practice and teaching. Specialist schools often lack activities that foster, and an environment which encourages, literacy; for example, many of these schools do not

have libraries (Kliewer et al., 2006). When reading is taught it is often limited and ineffectual. A recent analysis of seventy-five literacy activities, used to teach eight middle and high school students categorised as SLD, found that students spend a disproportionate amount of time passively listening to reading without an opportunity to respond, and comprehension was almost exclusively taught and tested through questioning alone (Ruppar, 2015). Studies have found that a majority of individuals with SLD have reading ability 'well below their mental age' and this can be partly explained due to 'the fact that many practitioners de-emphasize literacy learning', but is also due to the 'teaching of isolated mastery of a linear set of subskills' (Katims, 2000, p. 11). Since individuals have difficulty with these subskills they rarely get to experience how to write holistically and read for pleasure.

Recent research has challenged the preconceived idea that ability to learn literacy is limited in individuals categorised as SLD, through studies utilising interventions and adapted teaching methods – ranging from using symbols (Sheehy, 2005; Sheehy and Howe, 2001), to new approaches such as teaching whole texts through themes (Wilder and Williams, 2001).

Much of the research supporting reading for individuals categorised as SLD focuses on the use of symbols to improve word decoding (Sheehy, 2002; Sheehy and Howe, 2001; Sheehy, 2005). Despite being used frequently in specialist settings, this method is often unsuccessful (Solmon and Wu, 1993; Rose and Furr, 1984) potentially due to the student's attention being focused on the symbol rather than the word (Sheehy, 2002). Sheehy (2005), however, explored the symbol accentuation method, which involved a morphing of an image with the word, and found that out of eight young people aged 8-16, all with no prior sight vocabulary, five found it more effective to learn new words with the morphed image approach. Similarly, Sheehy (2002) used the Handle technique, in which a small symbol based on the child's own understanding of the word is placed near

the word on a flashcard. This method was found to be more effective than the word alone and the integrated picture cueing.

However, although clearly useful for improving decoding skills (recognising isolated words), the symbol methods do not subsequently develop listening or reading comprehension (understanding the whole text). Unlike the students in my studies, the individuals in my research, despite categorised as SLD, can decode fluently. As defined in the Simple View of Reading, they can decode and have listening comprehension, but lack reading comprehension. Research which supports reading or listening comprehension is very limited, but some researchers have investigated comprehension alongside word recognition for individuals categorised as SLD. Ward (2005) trialled the use of language experience, originally designed for students learning English as an additional language, which uses an individual's own vocabulary to create new texts (Huang, 2013). Students began by drawing an image and dictating a description of it. From this description, Ward stored words for the student in a word bank as they began to recognise them. The students started with no sight vocabulary and at the end of the process could read and understand sixty words. Although it could be argued that using word banks would fall into the category of decoding rather than comprehension, through a metacognition theory lens understanding how to build up comprehension fostering techniques with key words in a description would aid comprehension.

Also working with full sentences, Wilder and Williams (2001), trialled their Theme Scheme with five small SLD classes. These classes followed an instructional programme designed to teach themes, whilst five other SLD classes were taught following the school's normal practice, with a focus on vocabulary and plot. At the end of the study, those classes using the Theme Scheme demonstrated clearer understanding of themes. Whilst according to the Simple View of Reading, an understanding of a theme in a story does not necessarily demonstrate whole text comprehension, Wilder and Williams' study clearly shows that interventions focusing on whole stories do have an impact on students

categorised as SLD, and supports arguments against depriving these students from a full, literacy education.

Focusing on designing a new curriculum, Goh et al., (2013) undertook a small randomised, controlled trial to support communication through reading and writing, for non-verbal students with ASD. As part of the programme, comprehension and expressive use within sentences of one hundred words was taught, with key focuses such as past and future tense and noun-verb pairings. Out of the five students who completed the programme, three showed a marked improvement in reading. It was concluded that only a subset of non-verbal students with ASD may be able to learn language through reading and writing. However, to make a conclusion discounting a group of disabled children seems presumptuous, especially with such a small sample size, and diminishes the Social Model of Disability, as does the use of the term 'non-verbal' rather than 'pre-verbal'.

By only focusing on traditional concepts of literacy (as a series of skills related to ability to read and write printed text), SLD or PMLD students are arguably reduced to a status of illiteracy (Lacey et al., 2007). By contrast, rather than disregarding a group of individuals due to their disability, a sociocultural perspective of disability would view the 'disability' as being the way in which the text itself obstructs the individual from accessing it. This model includes students who may always be considered illiterate in the conventional sense, and broadens the concept of reading to enable everyone to access books and stories in a way that is meaningful for them (Lacey et al., 2007). Flewitt et al., (2009) explored inclusive, multimodal literacy practices and argued that, in order to create an inclusive environment in education, the concept of literacy itself needs to be redefined. Rather than viewing literacy as a curricular goal with focus on development of skill-based reading, a broader approach needs to be adopted where literacy is the development of shared meaning through communication which is not solely language. Flewitt et al.'s, (2009) study affirmed the Social Model of Disability and illustrated that

meaning in literacy events can be shared in ways which break through some of the barriers that could prevent individuals with additional needs being included. Inclusive literacy therefore shares meaning of a story or text through other means, rather than a reliance solely on reading.

Similarly, other researchers have explored use of images and sensory items when reading with students categorised as SLD. The use of joint picture book reading provided a context for dialogue to be developed between a caregiver and a child with severe language delays in a single case study by Smith and Durkin (1986). Picture symbols and tactile objects were used by Mucchetti (2013) when studying the impact of teacher-led adapted shared reading with minimally verbal students with Autism. Although not explicitly described as being categorised as SLD, the four students had a spontaneous vocabulary of fewer than twenty words, suggesting that they would fall under this categorisation. Using a modified alternating treatment design, Muchetti (2013) compared shared reading with and without sensory items. All students showed increased listening comprehension and engagement with the use of tactile objects and images. However, Muchetti (2013) found that engagement in the books was increased by the use of sensory materials and other independent variables, it is not clear that comprehension of the words themselves was enhanced by this. The answers to the comprehension questions were often the three-dimensional objects themselves; for example, the answer to what the child in the story put on was the sensory object used: rain boots. Whereas in the baseline test, the students only had the semantic information to rely on, in the intervention they could recall the objects they had seen. Therefore, it is not clear if the student comprehended the semantic information or if they simply recalled the object.

However, when using the model of inclusive literacy, the use of tactile objects can be seen as another form of multimodal communication. Therefore, arguably, through recall of objects, movement and body language, Muchetti (2013)'s students could obtain the shared meaning of the story, if not listening comprehension. The objects themselves are

a method of telling the story without a reliance on understanding language, enabling the student to access the world of literacy without being able to read or write (Lacey, 2007).

Furthermore, Robinson et al., (2018)'s research commissioned by the UK charity BookTrust investigated the impact of books on social inclusion and well-being of young individuals categorised as SLD or PMLD, with a model of inclusive literacy. Basic literacy level was not viewed as a precondition to reading and the focus of their research was to investigate pleasurable enjoyment of books rather than comprehension of the language itself. Forty-three children and young people were included in the data collected, and although all were categorised as SLD or PMLD, they were diagnosed with an array of conditions which included ASD amongst others. Through interpretivist methods involving interviews and observations, they concluded that books did have a positive impact on the children's well-being and development. As with Muchetti (2013), sensory stimulation was used to increase engagement in the books. In the research conducted by Robinson et al., (2018) and Muchetti (2013), it could be argued that the shared meaning came from the tactile objects rather than the semantic information. Depending on the perceptive of reading and your definition of reading comprehension, this could either enhance comprehension or simply be an inclusive and enjoyable way of sharing texts.

Unlike the students in these studies and explorations into inclusive literacy, the individuals in my research, despite categorised as SLD, can decode fluently. As defined in the Simple View of Reading, they can decode and have listening comprehension, but lack reading comprehension. However, inclusive literacy is still significant when considering my research. It is clear that teaching of reading, for children categorised as SLD, has been held back by a focus on conventional strategies and teachers are often expected in schools to simply teach individuals categorised as SLD using the same methods but with an expectation that they will take longer to learn or that the task might need to be broken down into smaller steps (Lacey et al., 2007, P. 150). From this research, it is clear that alternative strategies are likely more meaningful for students

categorised as SLD and in line with the Social Model of Disability, teaching needs to adapt to be inclusive for all.

Whereas a multi-modal approach promotes inclusion for all, there is still a strong argument that understanding of the semantic material itself, for students where this is appropriate, is vital for an independent life of opportunities. Teachers and educational settings which do not focus on teaching children, where appropriate, to read 'limit future opportunities if they make a priori assumption not to teach reading to some students because of the nature or severity of disability' (Browider et al., 2006, p. 393). The research which is available on reading comprehension for students categorised as SLD is very limited with very small sample sizes; for example, fewer than five students (Goh et al., 2013; Wilder and Williams, 2001; Ward, 2015). Much of this research only focuses on decoding, e.g. symbol studies, and much more evidence is clearly needed on how to support students categorised as SLD with reading comprehension when decoding is already evident.

For these reasons, I have decided to use research of interventions from both studies with students ASD and studies for individuals categorised as SLD to design an intervention which would be appropriate for my students and to share with my colleagues working in an SLD school. After discussions with Leads in my school for my Part 2 assignment, the consensus was that WCC best explained the issues they had seen behind comprehension impairments with our students and so I also carefully considered this when selecting an appropriate intervention design. I used the reading pattern seen in individuals with ASD to guide my intervention to appropriately focus on reading comprehension rather than decoding.

4. How does unexpected changes in situation and routine impact on anxiety for individuals with ASD and how can teachers provide support?

For children and young adults, in a clinical setting, anxiety is one of the most prevailing problems for individuals diagnosed with ASD (White, Oswalk, Ollendick and Scahill, 2009). Considering diagnosis rates, Simonoff, Pickles, Charman, Chandler, Loucas and Baird (2008) found that 42% of individuals with ASD had a diagnosable anxiety disorder. It can be very difficult to diagnose an individual with ASD with an anxiety disorder, as symptoms between anxiety and ASD are very similar and it is not always clear if a symptom is part of the ASD diagnosis or from anxiety, for example symptoms overlap such as compulsive checking (White et al., 2009). This can lead to considerable differences in diagnoses and therefore many studies explored reported symptoms rather than diagnoses. Sudhodolshy, Scahill, Gadow, Arnold, Aman and McDougle (2008) developed a twenty-item scale for parent reported anxiety in children with ASD. It measured anxiety disorders whilst avoiding overlapping symptoms with ASD. 42.7% of children were found to have diagnosable levels of anxiety (from a range of different sources including social anxiety), based on parent perspective. Bradley, Summers, Wood and Bryson (2004) conducted one of the few studies which considered anxiety in students considered severely disabled. They assessed twelve individuals who were diagnosed with ASD and categorised as SLD. When compared to individuals who were categorised as SLD, but not diagnosed as ASD, they found that 42% of those with ASD had clinically significant levels of anxiety whereas none of the individuals without ASD diagnosis had significant levels. Teh, Chan, Tan and Magiati (2017) summarised that anxiety related problems are estimated to affect 11-84% of adolescents and children with ASD. They conducted a longitudinal study that investigated continuity and change in anxiety symptoms over time. They found that the anxiety scores remained stable over

time, suggesting that not only is anxiety a widespread problem for individuals with ASD, but clinically elevated anxiety levels do not ease over time.

When considering how change impacts anxiety levels for individuals with ASD, the research focuses on two main behaviours: Insistence on Sameness and Intolerance of Uncertainty. Insistence on Sameness can be seen as one of the restrictive repetitive behaviours which are a key feature of ASD (Factor, Condy, Farley and Scarpa (2016), and many scholars have found that restrictive behaviours within ASD derive from the anxious desire to keep things the same (Gotham, Bishop, Hus, Huerta, Lund and Buja, 2012). Therefore, an anxiety trigger for an individual with ASD is often a disruption in routine or change in a situation which contradicts the individual's Insistence on Sameness (Ozsivadjian, Knott and Madiati, 2012). Factor et al., (2016) evaluated forty-four children and adolescents through parent reports of anxiety and restrictive repetitive behaviours. They found that heightened anxiety correlates with increased sameness behaviours. By targeting anxiety, they predicted, you would see a reduction in increased sameness behaviours, as restrictive repetitive behaviours are a self-soothing technique for heighted anxiety caused by change and therefore if you reduce one it would make sense to see the other mirror this.

Some researchers have linked Intolerance of Uncertainty to anxiety, Insistence on Sameness and ASD. Intolerance of Uncertainty is a tendency to have a negative reaction to uncertain situations or events in the neurotypical population. Those struggling with it 'find uncertain situations stressful and upsetting due to the belief that not knowing what is going to happen is negative and should be avoided' (Hodgson, Freeston, Honey and Rodgers, 2017, p.3959). Intolerance of Uncertainty puts individuals at a dispositional risk for clinical levels of anxiety (Rodgers, Hodgson, Shields, Wright, Honey and Freeston, 2016). Intolerance of Uncertainty bears resemblance to Insistence of Sameness and other restrictive behaviours demonstrated by individuals with ASD, such as inflexibility to changes in routines. Boulter, Freeston, South and Rodgers (2013)

suggested that Intolerance of Uncertainty could be used as a framework to understand the causes of anxiety for individuals with ASD after comparing a group of individuals with ASD to a typically developing group and finding that there was a significant relationship between Intolerance of Uncertainty and ASD in the group diagnosed with ASD. Despite growing evidence of this relationship, there is currently no available treatment for targeting Intolerance of Uncertainty for individuals with ASD (Rodgers et al., 2016).

Despite this evidence linking anxiety and ASD and common co-occurring conditions and findings that anxiety can be triggered by change and the unknown, there is very little research on how teachers should respond to this (Adams, MacDonald, Keen, 2019). Adams et al., 2019 investigated the response of sixty-four teachers to anxiety-related behaviours of individuals with ASD compared to students with no diagnosis. They created a survey which asked teachers to outline their responses to different scenarios involving children with and without a diagnosis of ASD. Teachers responded differently to situations involving a child with ASD and were more likely to use anxiety-promoting strategies such as being overprotective and not promoting problem solving strategies. Adams et al., (2019) suggested that possible reasons for this could include teachers not feeling confident dealing with students with ASD due to lack of research, and teachers worrying that promoting problem solving strategies might cause an escalation in behaviour issues. In one of the few studies investigating strategies to support individuals with ASD manage anxiety in the classroom, Rodgers et al., (2016) developed a manualised treatment programme, for a parent group, tailored towards Intolerance of Uncertainty, for young people with ASD. It involved cognitive behaviour therapy where parents deliberately exposed children to uncertain situations to build up their tolerance. A modest effect was found. In discussions with parents, Hodgson et al., (2017) also found that parents reported strategies which increased tolerance of uncertainty as successful. Two categories of strategies were suggested – the first to increase certainty (e.g. repetitive reassurance) and the second to increase tolerance of uncertainty (e.g.

regularly including uncertainty in a routine in order to build resilience to it). Both these studies are based on parent perspective of their child's anxiety levels, which can be highly subjective, and more research is needed in order to fully understand how to support children with ASD manage anxiety stemming from change.

My research questions therefore are:

1. Can a chapter map intervention, using thinking-aloud techniques, support students with ASD and categorised as SLD with reading comprehension attainment?

2. Can a chapter map intervention using thinking-aloud techniques, raise confidence in reading for individuals with ASD categorised as SLD?

Methodology:

Setting:

Students and Teachers were from the SLD school that I currently work in as English Lead and KS4-5 Teacher. The school had eighty-two students and seventy-five of these students were diagnosed with ASD, during the 2019-2020 academic year. All students were categorised as SLD or PMLD and had an Education Health Care Plan. The school has a wide catchment area of over thirty miles, but the majority of the students are white, British – over nighty percent. Class sizes are between six to twelve students, averaging one Lead and two Teaching Assistants per class. English and reading were taught daily with a focus on communication.

The intervention and baseline study took place in a spare classroom, during free time or break time.

Participants:

Three students were selected to take part in the intervention, two from my KS4-5 class and one from KS3. Inclusion criteria for students were a) diagnosis of ASD by a child psychologist, b) categorised as SLD by the local council, c) assessed as being able to accurately read aloud short stories as measured through Bsquared by class teachers ("SEND Assessment Software Designed By SEN Teachers | B Squared", 2019). These three students were all male as our female students, who could read short stories, had not been diagnosed with ASD.

Once the three students had been selected, on the advice of the Assistant Headteacher, I included a further test on decoding since Bsquared can sometimes not fully represent a student's full abilities at our school (it involves a subjective process of teacher observation rather than tests). Therefore, to further ensure this intervention was

appropriate, I used a high frequency word test with criterion level set at 70% as suggested in 'Assessment of Reading and Writing Difficulties: An Interactive Approach' (Lipson and Wixson, 2013).

As the intervention required a level of automaticity in word recognition, I selected a sight word test rather than a phonics test. If a reader spends his or her energy on decoding a word then they may have no resources left to work out the meaning (Salvia, Ysseldyke and Witmer, 2016, p.216). As this was an intervention to support comprehension rather than decoding, I wanted to eliminate this factor. Fry's instant word list (Kress and Fry, 2016, P.95-101) consisting of 300 words, which make up about 65% of all written material, was used rather than the often used, yet controversial, Dolch Basic Sight Word Test (Otto and Chester, 1972, P.435; Johnson, 1961 p. 451). Fry's list included words from beginner's reading material and, unlike Dolch's list, had systematic selected words rather than choosing some at random (Otto and Chester, 1972, P.435).

As the use of a structured word test can be constraining, and limitations include that the student is not assessed in reading words in connected text (Lipson and Wixon, 2013, P.418), I therefore also monitored word decoding during the intervention.

Student	**Age**	**Diagnosis**	**Category**	**Gender**	**Bsquared Reading Level**	**Results of Fry's Instant Words /500**
Michal	14:3	ASD	SLD	Male	2a	497/500
Chris	17:1	ASD	SLD	Male	2b	500/500
Robert	16:7	ASD	SLD	Male	2a	490/500

Bsquared: National Levels
Age is reported in years:months

Table 1: Student Characteristics

A Teacher and two Teaching Assistants (TAs) were selected to be interviewed on the pupils' confidence before and after the intervention. Teacher voice can be extremely helpful in a Special Needs setting and the most beneficial outcome is when it enriches professional relationships and shares learning (Kershner and Chaplain, 2001). For analysis of my intervention, teacher voice was paramount as the participants had varying levels of self-awareness and verbal ability. The Teacher and two TAs were selected based on their experience with the participants – all working in either in the KS3 or KS4 class.

A Teaching Assistant (TA), Gill, offered to run sessions of the intervention. This was to raise her own self-efficacy in teaching reading comprehension as she was planning on beginning teacher training in the next two years and had asked for support with teaching reading as part of her performance management.

Experiment Design:

My research followed a single subject research design with an AB format, as my goal was to introduce an intervention and measure my hypothesis that reading comprehension would improve (Cohen, 2001). The baseline condition (the A phase) was compared to the intervention condition (the B phase) to see the impact of the intervention (Cohen, 2001). I chose a single subject research design rather than having a separate control group due to the limitations of my setting. At my school, we had only three students who fitted the inclusion criteria and therefore it was not possible to have a separate control group without limiting even further the participant sample size.

Intervention Design:

The design had two sections: a baseline study and then the intervention. Two books were read: one in the baseline and one in the intervention.

Baseline – Student performance was measured during shared reading of the first book, in the classroom. In line with the school's curriculum and termly planning, the shared reading consisted of the teacher and student taking turns to read paragraphs with the student answering questions periodically. Teaching, during this phase, was not adapted. Six sessions took place over a fortnight and performance was measured through a verbal retelling followed by student and staff interviews.

Treatment Fidelity - Before running her intervention sessions, Gill was trained to implement the thinking-aloud techniques and chapter map design. Training took roughly twenty minutes where the material was shared with her and she was given the chance to ask questions. All sessions had been planned to be audio recorded and treatment fidelity was measured. Unfortunately, due to Covid 19 school closures, not all the sessions took place. Of the sessions that did take place, I listened to Gill's sessions as well as my own to ensure all the steps (see appendix A) were taken and treatment fidelity was found to be 100%.

Timeline – The baseline sessions were followed by a reading assessment. This was followed by the intervention and a subsequent reading assessment.

Week	**Step**	**Time Duration**
1-2	Baseline sessions	Six thirty-minute sessions over two weeks
2	Baseline Reading Assessment	Thirty minutes

3	Pre-intervention interview with Teachers and Teaching Assistants	30 minutes each over the course of a week
4-5	Intervention sessions	Six thirty-minute sessions over two weeks
5	Intervention Reading Assessment	Thirty minutes
5	Post-intervention interview with Teachers and Teaching Assistants	30 minutes each over the course of a week

Table 2: Timeline

Intervention – The intervention took place over two weeks with four sessions. I ran four of the sessions and Gill, the TA, ran two. During the interventions, both myself and Gill had the intervention guidelines in front of us (appendix A). In each session, the participant and Lead took turns reading a paragraph and then filling out the chapter map (appendix B), as a comprehension monitoring strategy. As some students with ASD struggle with writing, during their turn the students dictated what they would like the Lead to write for them. Whilst reading, the Lead used thinking-aloud to demonstrate comprehension fostering techniques (see appendix A for guidelines) and encouraged students to do the same during their reading. To support students' understanding, symbol cards were used with symbols (see appendix D) and the Lead pointed to the one she was using and encouraged students to do the same during their reading. The symbol cards were adapted from Whalon, Hanline and Wood (2007)'s guidance, but simplified to be more appropriate for my students. Whereas the original cards used terms such as 'setting', 'character' and 'events' (p.17) I changed these to terms my students used in everyday language: who, what and where. The modelled thinking aloud was based on studies by Whalon (Whalon, 2004; Whalon and Hanline, 2008; Whalon and Hart, 2010).

Symbol Card	Modelled thinking-aloud example
Where	'So now I know that they are in the forest.'
What	'What just happened? I'll look back at the page. Oh so Lucy met Tom.'
Who	'We've just been introduced to Sally.'

Table 3: Examples of modelled thoughts with symbol cards

By the end of each session, the Lead and students would have referred to each cue card with a modelled thought to demonstrate comprehension monitoring strategies. If a student did not refer to the card, then the Lead would have used prompts (see appendix A).

Structure of Intervention Sessions –

Lead reads the first quarter of the chapter aloud, modelling her thinking and pointing to the symbol cards to demonstrate which story element she is referring to e.g. where, what and who.

Lead then fills out the first quarter of the chapter map again modelling her thinking and using the symbol cards (e.g. I am writing that they are in the woods – points to 'where' card).

The student then reads the next quarter of the chapter and is encouraged to think aloud and use the symbol cards.

The student then dictates what they would like written in the next section of the chapter map.

Repeat these steps for the remaining two quarters.

At the end of the sessions, the student makes a prediction on what will happen next using the symbol cards e.g. They will stay in the forest (where card).

Chapter Map Design (appendix B) **–** The chapter map took elements from Williamson, et al's (2015) character events map by including a column focusing on how characters' feel about events.

The chapter map intervention was designed with metacognition as the theoretical foundation and used the concept that the students need to be actively aware of their thought processes whilst comprehending their reading. Using both a chapter map and thinking-aloud, allowed the intervention to cover both comprehension monitoring and comprehension fostering.

The chapter map method aided comprehension fostering, by helping the students to summarise the story and see it holistically, supporting WCC for students with ASD.

The thinking-aloud process, enabled comprehension monitoring techniques, whereby the Lead modelled the thought processes behind reading comprehension and made them explicit, for example verbally keeping track of the characters.

Text Selection:

For the baseline sessions and intervention, I chose to include whole stories rather than passages from different texts. There were several reasons for this. Text material used when assessing comprehension should reflect material students read in class (Lipson and Wixon, 2013) to allow for familiarity, and the school's English curriculum included whole texts rather than passages. Furthermore, the use of passages can feel fragmented and this can affect the coherence of a text which could impede recall (Lipson and Wixon, 2013).

To ensure that the books were at the same ability level, I selected books from the Usborne Young Reader Series (""Young Reading Series 1" at Usborne Children's Books", 2020). I used my own knowledge of my two students to decide whether Level 2

or 3 was more appropriate and I asked for guidance from the KS3 teacher for her pupil who was taking part. The decision remained consistent between the pilot study and the following intervention. To further ensure that the text was at the right level for the student, during the intervention any words the student struggled to decode were recorded (through the Lead making a list) and monitored. If the students struggled to decode over five words per chapter, then the level of the book would be re-evaluated. The small number of five was selected because of the high level of automaticity in word recognition required as discussed in the participant section.

The four books decided on were similar length (roughly 63 pages), they were all simplified versions of classics and were typed out to remove the pictures to ensure that all comprehension of the story came from the narrative alone.

As students' familiarity (Lipson and Wixon, 2013, P.391) and interest (Estes, Vaughan and Jr., 1973; El Zein, Solis, Lang and Kim, 2016) in the topic of the text can influence comprehension, before the start of the intervention, I asked students to complete a short tick-list of topics they knew well and were interested in (see Appendix C). Following this, I selected texts on topics which were not ticked by any student for interest or familiarity.

Collaboration:

Within the School - Collaboration with colleagues played a key part in my Part 3 intervention. I reflected on the Lead interviews for my Part 2 when considering what to focus my intervention on. Discussions with staff made it clear that, from their observations, that students were unable to see sentences holistically, fitting into the WCC hypothesis. Some staff members already described using attempts at thinking-aloud techniques, without knowing the research behind them, and seeing an effect with students. I valued this contribution from my colleagues and wished to pursue it further. It therefore made sense for me, especially when I read more about it as part of my

literature review, to focus on an intervention which combined helping students see texts as a whole, with the metacognitive strategy of thinking-aloud. Early on in the school year, in a Lead's meeting I fed back to our staff team my research topic and how this had come from their influence.

As I designed my intervention, I collaborated with other class teachers. As so little is known about effective techniques for supporting reading for students with ASD, it seemed essential to me that I drew from the knowledge of my colleagues who had been working with students with ASD for many years. For example, when discussing my research with another Lead, she suggested that I removed the pictures from the stories, as many of her students tended to guess the storyline from the pictures and this adds another distraction from seeing sentences as a whole. This suggestion directly influenced by methodology.

I worked closely with the TA Gill prior to the baselining and intervention and during them. She volunteered to help run the sessions to support her understanding of teaching reading ready for her training to become a teacher the following year. As part of this, I went over the intervention design and research behind it in a training session, lasting roughly twenty minutes. I also asked for her feedback both on the intervention design and on how students reacted to it during it.

Within the Trust – As part of our Leaderships Team, I was asked to run training sessions on my research for supporting reading comprehension for students with ASD and for those categorised as SLD. Staff members from our other Trust schools were asked to attend and used my research to influence their curriculums and intervention programmes, in their own school. For example, a Head from one of our local Primary schools attended and used the research to create a reading comprehension intervention for a young child with ASD in KS2.

Data Collection and Analysis:

Reading Comprehension - Verbal Retellings:

To assess reading comprehension, I selected a method of verbal retellings, also known as free-recall (Barr and Blachowicz, 1993), rather than a more traditional choice of comprehension questions. Simply answering comprehension questions does not always mean the same thing as understanding the text and retellings give opportunity for analysis of the quantity, quality and organisation of what has been understood whilst reading (Lipson and Wixon, 2013).

In the context of my school, there were several reasons why I decided on retellings rather than comprehension questions. Retellings have been argued to be 'the best way' (Salvia, Ysseldyke and Witmer, 2016, p.216) to assess reading comprehension in Special and Inclusive Education as they give students an opportunity to express what they have understood about a text in their own words and in an order which is clear to them. In the context of my school, when conducting my Part 2 research, the students did not always understand the comprehension questions and in particular demonstrated difficulty understanding questions which relied upon understanding elements of a story, for example the concept of what a character is. When asked a simplified question on who the main characters were (Who is in the story?) one of my students answered with his teacher's name. The use of comprehension questions might, therefore, prevent my students from expressing what they read and understood. From a sociocultural perspective of disability, the participants in the intervention would be 'disabled by barriers in society' (the traditional use of comprehension questioning) rather than 'their differences' and the outcome would not reflect their true ability (https://www.scope.org.uk/about-us/social-model-of-disability/, 2020). If the participant can understand the text, yet it barred a student from being able to demonstrate that knowledge because of the choice of questioning then the problem lies with the method of assessment rather than the individual's ability.

To conduct the retellings, I followed guidance from 'An Assessment of Reading and Writing Difficulties: An Interactive Approach' (Lipson and Wixson, 2013). in order to use a method which was appropriate for students who struggle with reading. I therefore set no time limit for the retellings and initiated the retelling with an open-ended request such as 'Tell me the story' (P. 485). All probes were based directly on the student's retelling to avoid influencing their response and used elements of story grammar to gather how they inferred important story information e.g. 'Where did…. happen? (setting) 'What did… do about…? (attempt) (P.485).

When completing the retelling, the book was removed from the student's view. In order to analyse the retellings and compare the baseline recall to the intervention recall, I designed a retelling checklist, as advised by Lipson and Wixon (P.486). Their examples of checklists, however, often required large jumps in progress (for example, a point for recalling all of the major plot episodes at once). I realised that this was going to be problematic for my students categorised as SLD who often display small steps of progress, as seen in my own observations when teaching. I therefore broke the steps in progress down to small, manageable chunks in my own checklist. Rather than having one point for recalling all major plot episodes, I recorded, through a checklist, the main twenty plot points in each story and assigned one point for mentioning part of the plot point and two for the whole point (appendix E). This also assisted in my analysis as it meant I could see where gaps in recall occurred. Again, rather than having one point for naming all the main characters and one point for naming all settings, I broke it down to a point per character named and a point per setting named, two if it included a description. I asked a colleague to assist me in making the checklist, in order to ensure that my choice of the main plots, characters and settings was fair.

Student confidence - Student and Staff Interviews:

From a sociocultural perspective of disability, research should ‘enable the perspectives and experiences of disabled people… to be heard’ in a participatory approach (Aldridge, 2015, p. 69). It was, therefore, important to learn from the students about their experience of the intervention and if it helped their confidence with reading, rather than solely using a comprehension assessment. I chose to use a semi-structured interview rather than a questionnaire or participant observation for several reasons. A questionnaire was not appropriate for my students due to their limited writing skills (Bryman, 2016, p.224) and would have acted as a barrier to their voice being heard. Similarly, participant observation relies only on the interpretation of the observer and would have not enabled the voice of the individual with ASD.

However, as individuals with ASD struggle with ‘social communication’ (https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/437815624., 2020), the interview needed to be approached in a way that was thoughtful and appropriate. I consulted Aldridge’s (2015) guidance on involving individuals with severe or profound learning disabilities in participatory research in a way that was meaningful and genuine. Aldridge advocated for methods of participatory research which used different sensory contributions, such as visual resources and techniques, to support students with a lower verbal ability (Aldridge, 2015, p. 3). As my three participants were fully verbal, an interview was appropriate, but with the support of other sensory contributions to support communication. I used visual symbols, a mini-whiteboard, and Makaton (a simplified version of sign language). These were to be recorded and transcribed as part of the interview.

Interviews did not take place due to school lockdown and were therefore not analysed and are not in the Findings section.

Ethical Considerations:

To conduct ethical research, I followed the British Education Research Association (BERA, 2019) guidelines. The name of the school where the research took place has been removed. All names of staff and students have been changed in order to keep them anonymous.

Staff

Unfortunately, interviews did not end up taking place, but staff would have been made fully aware that they could withdraw at any point.

All findings are to be shared with staff (BERA p.8, 2019). This was originally planned to be shared in a whole school meeting but will now be shared in a manner appropriate to the current Covid 19 guidelines.

The staff member who volunteered to run some sessions of the intervention had requested training on teaching reading in her performance management and received training on how to run the intervention. She consented to having the sessions recorded. She was made aware that she could withdraw at any point. As I was the TAs Line Manager, there was a power imbalance. I made sure that she knew that her role in the intervention was separate to her role as a Teaching Assistant and that she should view me as a colleague rather than her Line Manager during the research.

Students

Although it was made clear to the students that they could withdraw at any point vocally, I wanted to make sure that there was a method which participants could use to express unease or a wish to withdraw without having to vocalise it. Due to the vulnerable nature of the participants and their struggles with 'social communication' (https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/437815624., 2020), it was

important to use ‘more intuitive approaches that ensure ethical participation is also part of an ongoing process of consultation throughout the course of any project’ (Aldridge, 2015, p. 4). In the school setting, a feelings board is used in each class for students to express their emotions and students can place their photo on the emotion which they are feeling. For familiarity, I used the same design in the intervention. Participants were made aware that they could move their photo at any time during the intervention and if the photo was moved on to a negative emotion then the intervention would be stopped and the participant given the choice to try another day or withdraw from the research.

The nature of the research and intervention was outlined to my students and they consented to taking part. However, as I was not sure if they had been able to fully understand what the research was and what they had consented to, I also spoke to our Headteacher, who had over ten years of experience working in an SLD school. She considered the intervention and if it was appropriate for the students selected, and gave consent for it to take place.

Limitations:

Unfortunately, the nationwide closure of schools occurred after the baseline study, before the intervention started and before interviews took place. The three participants were all home schooled due to being highly vulnerable, despite the school remaining open for 40% of all students with EHCPs. At the end of the last term, one participant returned for three weeks when his mother was called in to work and so I was able to do a shortened version of the intervention with him, but sadly he was unable to do the follow up interview as he went back into home schooling due to his anxieties.

The data analysis in the findings, therefore, only focuses on comparing the verbal retellings from the one participant who took part in the mini intervention.

After discussions with the Headteacher, it was agreed that it would not be appropriate to conduct the staff interviews. This was to support staff wellbeing by limiting workload during this time of turmoil.

Findings:

As staff and student interviews did not take place, the question of students' confidence with reading was not discussed. Therefore, I will not be focusing on the research question:

Research Question 2: Can a chapter map intervention using thinking-aloud techniques, raise confidence in reading for individuals with ASD categorised as SLD?

Therefore, the findings are presented in relation to the other research question.

Research Question 1: Can a chapter map intervention, using thinking-aloud techniques, support students with ASD and categorised as SLD with reading comprehension attainment?

To consider this question, I compared the verbal analysis assessment grids for Robert's baseline verbal recall ('Robinson Crusoe') and intervention verbal recall ('Firebird'). I have included graphs to convey the comparison of the plot points, characters and settings recalled.

As the data is limited due to the pandemic, I have also included a qualitative analysis to compare the two verbal recalls, as advised by my tutor. Although I planned to use a theme mapping approach to analyse my interview data, I was unable to use this approach with the verbal recalls as they were both so short.

Therefore, I presented the verbal analysis grid comparison first and then included in the second section a qualitative analysis of the recalls. As I was unable to complete the pupil interview as intended, I recorded some quotations in the third section to evaluate through qualitative analysis, from Robert as he completed the intervention.

Robert's 'Robinson Crusoe' Verbal Recall (baseline)

They done Crusoe and they were building a shelter for the first time and they were finding some fighting in a second and they were being abandoned and they were surrender. The bad guys tried to surrender but it's not good. And occasionally row a boat and they take his father home. Friday's father. And they were trying to shoot him. They shoot Friday. They were released. All the bad guys took the good guys away and there was horror. They saw some pirates. Crusoe was reluctant to go to England. Crusoe had to stay with his father and be more tolerant.

Robert's 'Firebird' Verbal Recall: (post intervention)

At the beginning of the story about the firebird was a miracle bird. No one has ever seen for years. And it's orange and red. At the start, there was a king called… They had a king and the story was about a castle. Firebird was flying and take the apples and peck some seeds. And then they had a feast and a big meal in the palace and something really bad happened. A problem about the egg squeezed. It was absolutely messy. The grave. About Prince Ivan and King Dalmat. Prince Ivan was a young man who ohh I can remember. Prince Ivan met the firebird. And they arrived in a horse and carriage and they arrived because Prince Ivan used to arrive in a horse and carriage.

Comparison of the two verbal recalls:

Plot Point	***Robinson Crusoe***	***Firebird***
1	*0*	*0*
2	*0*	*0*
3	*0*	*0*
4	*0*	*0*
5	*0*	*1*
6	*1*	*1*
7	*0*	*0*
8	*0*	*0*
9	*0*	*0*
10	*0*	*0*
11	*0*	*0*
12	*0*	*0*
13	*0*	*0*
14	*0*	*0*
15	*0*	*0*
16	*0*	*1*
17	*0*	*0*
18	*0*	*0*
19	*0*	*0*
20	*0*	*0*
Total	*1/40*	*3/40*

Table 4: Comparison of plot point recall

In the baseline study, Robert recalled one plot point from the first half of story, whereas in the intervention he recalled three plot points, two from the first half of the story and one from the second half. His recall therefore increased by a factor of three, from 1/40 to 3/40.

In both verbal retellings, he has recalled a plot point from the first half of the story, but he has only remembered a plot point from the second half of the story in his intervention book. He shows no recall in either retellings from the final four plot points. This would suggest that the lack of comprehension does not stem from poor memory as he does not show improvement of recall from the chapters he has more recently read.

Character	***Mark***	***Character***	***Mark***
Robinson Crusoe	*1*	*Prince Ivan*	*1*
Friday	*1*	*The Firebird*	*1*
Friday's father	*1*	*King Dalmat*	*1*
English Captain	*0*	*King Alfron*	*0*
The rebels	*0*	*Demon Koshchey*	*0*
Total	*3/5*		*3/5*

Table 5: Comparison of main character recall

In the baseline study, Robert recalled three characters and, in the intervention, he recalled three characters. This showed no change.

Setting	***Mark***		***Mark***
The ship	*0*	*King's orchard*	*0*
The sea	*0*	*Winter forest*	*0*
The island	*0*	*King Dalmat's Palace*	*0*
The cave	*0*	*King Alfron's palace*	*0*
England	*1*	*Koshchey's garden*	*0*
Total	*1/10*		*0/10*

Table 4: Comparison of main setting recall

In the baseline study, Robert recalled one setting and, in the intervention, he recalled no settings. This showed a decrease of recall by 1.

Summary of findings from analysis grid comparison:

Robert showed a small increase in his recall of plot points, but no change in his recall of characters and a decrease in his recall of settings.

Qualitative Analysis of Verbal Recalls:

In both verbal retellings, there were misunderstandings and inaccuracies in the retellings. In his baseline recall, Robert described Friday being 'shot' and 'pirates'. In the

intervention retelling, Robert described the bird ‘pecking seeds’, the ‘egg squeezed. It was absolutely messy’, driving a ‘horse and carriage’ and a ‘grave’ all of which did not take place or exist in the story. These misunderstandings are interesting when considering what may cause comprehension issues for individuals with ASD. Many of the misunderstandings seem to stem from Robert’s understanding of the context of the story. Robert remembered that in the olden days they used a horse and carriage and therefore thought that the characters must travel in them, as ‘The Firebird’ takes place in the past. Likewise, he knows that birds peck seeds when they pick fruit and so presumes that this must be why the bird is stealing them, ignoring the fact that the apple is made of gold in the story. He knows that when an egg cracks it will be messy. In ‘Robinson Crusoe’ he knows it takes place on an island and guesses that there must be pirates. When considering why comprehension fails, it can stem from not being able to use prior knowledge to understand the story, however this does not seem to be the case here. Robert has used his prior knowledge to support his understanding, but yet as he is not understood the story itself, the knowledge incorporated has led to misunderstandings. For example, he has drawn from his understanding that when an egg breaks it is messy, but not understood that the egg in the story is golden with the demon’s soul inside. When considering why Robert thought the breaking of the egg would be messy, it could be considered that he did not view the words ‘golden egg’ together and therefore did not link the adjective ‘golden’ with the noun ‘egg’. By only focusing on the word ‘egg’ (as shown by his recall of this word and not golden) he only considered his own connotations of that word, leading to the misunderstanding.

In terms of their significance to the story, there seem to be no similarities between the plot points recalled in the two interventions. In ‘Robinson Crusoe’ Robert recalled the main character building a shelter, whereas in ‘The Firebird’ he recalled the firebird stealing an apple, flying away and later the egg smashing. Whereas in ‘The Firebird’ the

plot point of stealing an apple was a pivotal moment which progressed the story, in 'Robinson Crusoe' building a shelter was not as significant to the plot.

Notes and Quotations from the Intervention:

During the intervention, when discussing what he did at home, Robert said that, 'I did my homework packs and then I did gardening. Sometimes, I helped Mum with cleaning. I did my work independently well.' This is useful when considering the impact the pandemic may have had on his learning and what education may have been missed. From this quote, it would appear that Robert missed learning with a teacher present during lockdown and this gap in his education could explain why he may have been behind when he returned to school and therefore not shown the expected progress with the intervention.

Robert also mentioned changes in routine during lockdown, during a conversation at the start of the intervention. He said, 'I don't like not going to tennis on Tuesdays. I always go on Tuesday. I don't understand why I don't go anymore.' Again, this could be useful in explaining why the expected progress did not take place during the intervention, as changes in routine can lead to anxiety for students with ASD (Ozsivadjian et al., 2012). If Robert was struggling with anxiety, this might have made it harder for him to stay focused on the intervention.

From my own observation of the classroom environment during the time of the intervention, it is also important to note other changes which may have also led to anxiety for Robert. The students who returned to school in the months of June and July were placed in unfamiliar classrooms, due to a bubble system being put in place. The bubble system grouped the students from three different classes who returned as only two or three from each class were permitted to come into school. Robert was placed into a new classroom with students he was not used to and a different TA. As the students in the different bubbles were not allowed to mix, there were changes to the timetable such

as assembly being cancelled and choir. Any activities out in the community were also cancelled such as the weekly swimming lesson, visits to the local café and forest school. Research has found that students with ASD insist on sameness and that changes in routine can cause distress (Factor et al., 2016) and therefore these changes may have impacted on progress from the intervention.

Discussion:

The findings suggest that the chapter map intervention, using thinking-aloud techniques, had a very limited effect on reading comprehension attainment for the one student who took part. There was a small increase in recall of plot point, no change in recall of characters and a small decrease in recall of settings. Overall, very little change was demonstrated in comprehension between the baseline verbal retelling and the intervention verbal retelling.

Drawing on previously mentioned research on thinking aloud techniques with individuals with ASD, a larger effect would have been expected to be present. When compared to a similar intervention by Whalon and Hart (2008), it is surprising that the impact of the intervention was not greater. Whalon and Hart (2008) also used a think-aloud procedure to support students through the mental process of reading comprehension. Similar to the cue cards in my own intervention, they used story cue cards with a visual image to support students with ASD monitor their comprehension. Their three participants were also all male and diagnosed with ASD. Although it was not specified if they were categorised as SLD, the students also struggled with language and communication, suggesting similar abilities to my own participants. Whalon and Hart (2008) found that following the intervention, all students increased their question-generating and responding, suggesting an increase in reading comprehension. The design of the intervention to include thinking-aloud was influenced by a previous study (Whalon et al., 2007) which offered guidance on a reading comprehension strategy. This is a rare example of a study which is applicable for students such as mine, who can decode but yet still work at a very low ability, and I used this intervention design to help support teachers at my own school with reading comprehension lessons, through training the year before. The feedback from teachers after this training was excellent and demonstrated the need for more studies like this where findings can be taken into schools to support students with ASD who are categorised as SLD. From the feedback

from my colleagues the year before on incorporating thinking-aloud techniques into lessons, I would have expected a larger impact from the use of such techniques in the intervention.

When considering the research and evidence on WCC and its impact on reading comprehension, the use of a chapter map design should also have supported students with ASD by helping them see the story holistically. Findings from Stringfield, Lyscre and Gast (2011) with three boys diagnosed with ASD suggest that a larger impact should have been expected on reading comprehension. Similar to the chapter map design of my intervention, Stringfield, Lyscre and Gast (2011) used a story map design, which they found led to increased comprehension. Using WCC as the hypothesis of why individuals with ASD struggle with reading comprehension, they trained participants on how to use the story map to view the different elements of the story as a whole.

There are several reasons why my intervention may have had less of an impact than expected on reading comprehension. The selected method of assessment, verbal retellings, may have been more difficult for students with ASD than the use of monitoring question generating in Whalon and Hart (2008)'s research and quizzes in Stringfield, Lyscre and Gast (2011)'s. Verbal retellings rely on memory whereas question generating occurs alongside the reading and therefore does not require the student to recall the story after they have finished. The online quiz would have included clues in the questions themselves e.g. a comprehension question on what a character did would give the reminder to the student of the character. With the verbal recall, the participant cannot rely on any cues in the questions to prompt recall. A different method of assessment could have shown greater recall in both baseline and intervention, but arguably would have demonstrated larger recall in the intervention as it would have given more opportunity for the participant to demonstrate their greater understanding and comprehension. On the other hand, as the participant did not show greater recall on the later chapters in his verbal recalls, it could be argued that memory did not impact on

comprehension and therefore the use of a different assessment would not change the outcome. Further research is needed using different assessment methods for this to be investigated fully.

Another factor to consider for why the intervention had such a limited impact is the larger context of the situation. Unfortunately, the intervention did not follow the original timings, due to the pandemic, and this would also have had an impact on the findings and could suggest why the impact was not greater. Whereas the intervention was originally designed to take place over two weeks with a session every day, as Robert was only in three days a week, the intervention was shortened to take place over six days. Having two sessions on one day meant that Robert had to focus over a longer period of time and this may have been difficult for him. The intervention also took place several months after it was originally planned, due to Robert being home schooled. This could have impacted on his academic performance as he spent two months at home where he spent less time on formal learning and structured lessons. Robert said that he completed his work at home 'independently well' therefore suggesting that he did miss out on this guided learning time. The effects of home learning and online learning caused by the pandemic on academic progress are not yet measured, but this gap in guided education may have meant that Robert would show a decrease in reading comprehension when he returned to school. This could therefore suggest why his reading comprehension did not show a greater improvement after the intervention.

A further consideration would be the impact of change on students with ASD and how this may have influenced academic performance. Students with ASD often struggle with anxiety triggered by change and unknown situations. There were several factors which caused changes to Robert's routine and environment which could have heightened his anxiety and impacted on his performance, explaining why a greater improvement in reading comprehension was not seen. After spending two months at home, Robert returned to school in a very different environment. The students still in school from Key

Stage 4 and Sixth Form had joined together to make an isolation bubble and classes took place for them in one of the Sixth Form classes. Lunches now took place in class, assemblies were done virtually through video chat and timings of the day had changed, including an earlier lunch time. Insistence on Sameness is a restrictive behaviour well-known to be a key feature of ASD (Factor et al., 2016). The many changes to Robert's daily routine in school and to the environment he worked in, included a complete change of classroom are likely to have caused him enhanced anxiety symptoms. Robert commented on his confusion over the changes in his routine: 'I don't understand why I don't go anymore.' Clearly, these changes were distressing to Robert and the disruption of routine is often an anxiety trigger for individuals with ASD due to their desire for sameness and predictability (Ozsivadjian, Knott and Madiati, 2012). If Robert was struggling with anxiety symptoms this could help explain why a greater impact was not seen on his reading comprehension.

Likewise, Intolerance of Uncertainty would also help explain why Robert would find the situation caused by the pandemic particularly difficult, and why this may have impacted on his progress from the intervention. Individuals with ASD often struggle with uncertain situations and not knowing what will happen and this is linked to their anxiety (Boutler et al., 2013). The pandemic caused many situations of uncertainty both inside and outside of schools. Robert was unsure of when he would be able to go back to his original classroom and when he would see his regular TA and classmates. He also faced daily uncertainty as Government rules and regulations were changing and this was reflected in school life. For example, after his first few weeks in school, he began having to wear a face mask on his transport to and from school, something which caused him much distress. The situation of changing rules as well as teachers being unable to share with him dates of when things were likely to go back to normal, would have caused uncertainty for Robert. An atmosphere of uncertainty would have likely enhanced his anxieties and could have impacted on his progress with the reading intervention. For

future research, the intervention would need to be repeated at a more stable time to see the full impact on reading comprehension.

Other future interventions could focus more heavily on characters. Robert recalled three characters from both stories and these were the three main characters. This was his strongest part of the verbal recalls. A future intervention could draw from this strength, such as a character map intervention. Williamson, Carnahan, Birri and Swoboda (2015) designed an intervention with a character event map where the plot was recorded through a focus on the main characters and their feelings. Something similar which used Robert's understanding of key characters could help anchor his understanding of the plot points and help him access further understanding of the story.

In both verbal retellings, he showed greater recall of characters than on setting. He remembered no settings in the intervention story and one in the baseline story. This would suggest that an intervention which focuses on understanding and recalling setting in a story would be useful in the future for Robert. Because of the small sample size of my study, it is impossible to tell whether Robert's strength in recalling characters and relative weakness in recalling setting is a wider trend or an individual anomaly. More research needs to be done on why recalling setting was so difficult for him and if interventions focusing on settings could support reading comprehension as a whole.

As the data gathered is very limited, due to the pandemic, it is difficult to draw definite conclusions from the findings. It is possible that the other two students who were unable to begin the intervention would have shown different results. Caution should be made when considering findings from such a small sample size and further research is needed to understand the data already gathered.

There is very little research on reading comprehension for students with ASD, categorised as SLD. The verbal recalls from Robert demonstrate a discrepancy between decoding and reading comprehension (as outlined by the Simple View of Reading) for

students with ASD. Whereas Robert showed no difficulties decoding the words of the book, the verbal recalls clearly show that very little was understood and in fact a significant amount was misunderstood. To an outsider listening to Robert read it would appear that he could read fluently, but despite reading over fifty pages of a story accurately, Robert only recalled one plot point from the baseline book and three from the intervention. Far more research is needed on how to support students who can decode but struggle with comprehension reach their full potential in school.

Conclusion:

The purpose of my research was to investigate how to support students diagnosed with ASD, categorised as SLD, with reading comprehension using an intervention utilising a thinking-aloud technique and chapter map design. The findings showed little impact on reading comprehension, for the one student who completed the intervention. This however could at least partially be explained by the circumstances caused by the global pandemic which may well have had an impact on the small amount of data I was able to collect. At the time of the intervention, the single participant, Robert, had just returned from months of home schooling which is likely to have had an impact on both his education, and his mental wellbeing. Further to this, Robert was also subject to changes in routine after he returned to school, which he would have been experiencing as the intervention took place. In my findings section, I have included some quotations from Robert and his mother which indicate that Robert's routine was disrupted by the home school environment, and have also noted my observations of changes to routine, such as unfamiliar classrooms and teaching staff, that Robert experienced when he came back to school. As I outlined in my literature review, scholars have found that individuals with ASD can be prone to severe anxiety when faced with a change of normal routine. Therefore, the changes to Robert's schooling caused by Covid procedures could have impacted his ability to complete the comprehension tasks, and must be taken into account when analysing the findings.

Ultimately, research, not just in the UK but across the world, demonstrates that students with ASD are likely to struggle with reading comprehension despite having average to high decoding skills. However, there is a lack of research into interventions and strategies to support these students. There is even less research into how to specifically support students who are also categorised as SLD, and of the few studies into interventions for students with ASD, the majority are not suitable for these students. Despite having only a small amount of data, my intervention does add to the growing

body of evidence that these students can decode and can read fluently, yet can not understand what they are reading. Whereas research and attitudes in the past have implied that teaching reading to these students is futile, Robert's accurate reading of an entire book, with less than five decoding errors, demonstrates that he does have skills in reading and that support is needed on only a certain aspect of reading. The Simple Model of Reading separates decoding from reading comprehension, and when considering reading for students with ASD, rather than simply writing it off, focus needs to be placed on supporting comprehension through intervention. In line with the Social Model of Disability, students need to have a voice over their education and a say in what will be the most helpful in supporting their reading. Therefore, I have formulated the following questions for future research:

1. What do students with ASD, categorised as SLD, consider the most effective for supporting their reading comprehension?
2. What strategies currently being used in education hinder students with ASD, categorised as SLD, progressing with their reading comprehension?
3. What reading material supports students with ASD, categorised as SLD, with their reading comprehension?

References:

Aaron, P., Joshi, R., Gooden, R., & Bentum, K. (2008). Diagnosis and Treatment of Reading Disabilities Based on the Component Model of Reading. *Journal Of Learning Disabilities*, *41*(1), 67-84.

Accardo, A., Finnegan, E., Gulkus, S. and Papay, C. (2017). Teaching Reading Comprehension to Learners with Autism Spectrum Disorder: Predictors of Teacher Self-Efficacy and Outcome Expectancy. *Psychology in the Schools*, 54(3), 309-323.

Adams, D., MacDonald, L., & Keen, D. (2019). Teacher responses to anxiety-related behaviours in students on the autism spectrum. *Research In Developmental Disabilities*, *86*, 11-19.

Aldridge, J. (2016). *Participatory research: Working with Vulnerable Groups in Research and Practice*. Bristol: Policy Press.

Allen, K. D., & Hancock, T. E. (2008). Reading comprehension improvement with individualized cognitive profiles and metacognition. *Literacy Research and Instruction*, 47, 124–139.

Tracey , Diane H.. Lenses on Reading, Third Edition (p. 261). Guilford Publications. Kindle Edition.

Åsberg, J., & Sandberg, A. (2010). Discourse comprehension intervention for high-functioning students with autism spectrum disorders: preliminary findings from a school-based study. *Journal Of Research In Special Educational Needs*, *10*(2), 91-98.

Baron-Cohen, S., Leslie, A., & Frith, U. (1985). Does the autistic child have a “theory of mind” ?. *Cognition*, *21*(1), 37-46.

Barr, R., & Blachowicz, C. (1993). Informal Diagnostic Procedures for Classroom Teachers. *Reading & Writing Quarterly*, *9*(1), 51-80.

Boulter, C., Freeston, M., South, M., & Rodgers, J. (2013). Intolerance of Uncertainty as a Framework for Understanding Anxiety in Children and Adolescents with Autism Spectrum Disorders. *Journal Of Autism And Developmental Disorders*, *44*(6), 1391-1402.

Bradley, E., Summers, J., Wood, H., & Bryson, S. (2004). Comparing Rates of Psychiatric and Behavior Disorders in Adolescents and Young Adults with Severe Intellectual Disability with and without Autism. *Journal Of Autism And Developmental Disorders*, *34*(2), 151-161.

Braze, D., Katz, L., Magnuson, J., Mencl, W., Tabor, W., & Van Dyke, J. et al. (2015). Vocabulary does not complicate the simple view of reading. *Reading And Writing*, *29*(3),

Browder, D., Wakeman, S., Spooner, F., Ahlgrim-Delzell, L., & Algozzinexya, B. (2006). Research on Reading Instruction for Individuals with Significant Cognitive Disabilities. *Exceptional Children*, *72*(4), 392-408.

Catts, H. (2018). The Simple View of Reading: Advancements and False Impressions. *Remedial and Special Education*, 39(5), 317-323.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). London ; New York: Routledge.

Colle, L., Baron-Cohen, S., Wheelwright, S., & van der Lely, H. (2007). Narrative Discourse in Adults with High-Functioning Autism or Asperger Syndrome. *Journal Of Autism And Developmental Disorders*, *38*(1), 28-40.

Cronin, K. (2014). The Relationship Among Oral Language, Decoding Skills, and Reading Comprehension in Children with Autism. *Exceptionality*, *22*(3), 141-157.

Crow, L. (1996). Including All of Our Lives: Renewing the Social Model of Disability. *Encounters With Strangers*.

Davidson, M., Kaushanskaya, M. and Ellis Weismer, S. (2018). Reading Comprehension in Children With and Without ASD: The Role of Word Reading, Oral Language, and Working Memory. *Journal of Autism and Developmental Disorders*, 48(10), 3524-3541.

El Zein, F., Solis, M., Lang, R., & Kim, M. (2014). Embedding perseverative interest of a child with autism in text may result in improved reading comprehension: A pilot study. *Developmental Neurorehabilitation*, *19*(3), 141-145.

El Zein, F., Solis, M., Vaughn, S., & McCulley, L. (2013). Reading Comprehension Interventions for Students with Autism Spectrum Disorders: A Synthesis of Research. *Journal Of Autism And Developmental Disorders*, *44*(6).

Estes, T., & Vaughan, Jr, J. (1973). Reading Interest and Comprehension: Implications. *The Reading Teacher*, *27*(2), 149-153.

Flewitt, R., Nind, M., & Payler, J. (2009). 'If She's Left with Books she'll Just Eat Them': Considering Inclusive Multimodal Literacy Practices. *Journal Of Early Childhood Literacy*, *9*(2), 211-233. Retrieved 17 June 2020, from.

Factor, R., Condy, E., Farley, J., & Scarpa, A. (2016). Brief Report: Insistence on Sameness, Anxiety, and Social Motivation in Children with Autism Spectrum Disorder. *Journal Of Autism And Developmental Disorders*, *46*(7), 2548-2554.

Frith, U. (2003). *Autism: Explaining the enigma* (2nd ed.). Blackwell Publishing.

Flores, M., & Ganz, J. (2007). Effectiveness of Direct Instruction for Teaching Statement Inference, Use of Facts, and Analogies to Students With Developmental Disabilities and Reading Delays. *Focus On Autism And Other Developmental Disabilities*, *22*(4), 244-251.

Goering, S. (2015). Rethinking disability: the social model of disability and chronic disease. *Current Reviews In Musculoskeletal Medicine*, *8*(2), 134-138. doi: 10.1007/s12178-015-9273-z

Goh, S., Whitaker, A., Feldman, J., Cull, M., Hoyte, K., & Algermissen, M. et al. (2013). Teaching non-verbal children with autistic disorder to read and write: a pilot study. *International Journal Of Developmental Disabilities*, *59*(2), 95-107.

Gotham, K., Bishop, S., Hus, V., Huerta, M., Lund, S., & Buja, A. et al. (2012). Exploring the Relationship Between Anxiety and Insistence on Sameness in Autism Spectrum Disorders. *Autism Research*, *6*(1), 33-41.

Gough, P. and Tunmer, W. (1986). Decoding, Reading, and Reading Disability. *Remedial and Special Education*, 7(1), 6-10.

Happé, F. and Frith, U. (2006). The Weak Coherence Account: Detail-focused Cognitive Style in Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 36(1), 5-25.

Hodgson, A., Freeston, M., Honey, E., & Rodgers, J. (2016). Facing the Unknown: Intolerance of Uncertainty in Children with Autism Spectrum Disorder. *Journal Of Applied Research In Intellectual Disabilities*, *30*(2), 336-344.

Hoover, W. and Gough, P. (1990). The simple view of reading. *Reading and Writing*, 2(2), 127-160.

Hoover, W., & Tunmer, W. (2018). The Simple View of Reading: Three Assessments of Its Adequacy. *Remedial And Special Education*, *39*(5), 304-312. doi: 10.1177/0741932518773154

Huang, J. (2013). Bridging Authentic Experiences and Literacy Skills through the Language Experience Approach. *Journal Of Adult Education,* v42(n1), p8-15.

Huemer, S. and Mann, V. (2009). A Comprehensive Profile of Decoding and Comprehension in Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 40(4), 485-493.

ICD-11 - Mortality and Morbidity Statistics. (2020). Retrieved 13 April 2020, from https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/437815624

Johnson, D. (1971). The Dolch List Reexamined. *The Reading Teacher*, *24*(5), 449-457.

Jolliffe, T., & Baron-Cohen, S. (1999). A test of central coherence theory: linguistic processing in high-functioning adults with autism or Asperger syndrome: is local coherence impaired?. *Cognition*, *71*(2), 149-185.

Hoover, W. and Gough, P. (1990). The simple view of reading. *Reading and Writing*, 2(2), 127-160.

Huemer, S., & Mann, V. (2009). A Comprehensive Profile of Decoding and Comprehension in Autism Spectrum Disorders. *Journal Of Autism And Developmental Disorders*, *40*(4), 485-493. doi: 10.1007/s10803-009-0892-3

Kamps, D., Barbetta, P., Leonard, B., & Delquadri, J. (1994). Classwide Peer Tutoring: An Integration Strategy to Improve Reading Skills and Promote Peer Interactions Among Students with Autism and General Education Peers. *Journal Of Applied Behavior Analysis*, *27*(1), 49-61.

Katims, D. (2000). Literacy Instruction for People with Mental Retardation: Historical Highlights and Contemporary Analysis. *Education And Training In Mental Retardation And Developmental Disabilities*, *35*(1), 3-15.

Kershner, R. and Chaplain, R., 2001. *Understanding Special Educational Needs.* Routledge

Kliewer, C., Biklen, D., & Kasa-Hendrickson, C. (2006). Who May Be Literate? Disability and Resistance to the Cultural Denial of Competence. *American Educational Research Journal*, *43*(2), 163-192.

Kress, J., & Fry, E. (2016). *The Reading Teacher's Book of Lists* (6th ed.). San Francisco: Jossey-Bass.

Kuijper, S., Hartman, C., & Hendriks, P. (2015). Who Is He? Children with ASD and ADHD Take the Listener into Account in Their Production of Ambiguous Pronouns. *PLOS ONE*, *10*(7), e0132408.

Lacey, P., Layton, L., Miller, C., Goldbart, J., & Lawson, H. (2007). What is literacy for students with severe learning difficulties? Exploring conventional and inclusive literacy. *Journal Of Research In Special Educational Needs*, *7*(3), 149-160.

Lipson, M., & Wixson, K. (2013). *Assessment of Reading and Writing Difficulties* (5th ed.). Boston: Pearson.

Macaruso, P., & Shankweiler, D. (2010). Expanding the Simple View of Reading in Accounting for Reading Skills in Community College Students. *Reading Psychology*, *31*(5), 454-471

McIntyre, N., Oswald, T., Solari, E., Zajic, M., Lerro, L., & Hughes, C. et al. (2018). Social cognition and Reading comprehension in children and adolescents with autism spectrum disorders or typical development. *Research In Autism Spectrum Disorders*, *54*, 9-20.

Mertens, D. and McLaughlin, J. (2005). Research and evaluation methods in special education. Thousand Oaks, CA: Corwin Press.

Mirenda, P., & Erickson, K. (2000). Augumentative communication and literacy. *Wetherby & B. Prizant (Eds.), Autism Spectrum Disorders: A Transactional Developmental Perspective*, 333-367.

Mucchetti, C. (2013). Adapted shared reading at school for minimally verbal students with autism. *Autism*, *17*(3), 358-372.

Nation, K., Clarke, P., Wright, B., & Williams, C. (2006). Patterns of Reading Ability in Children with Autism Spectrum Disorder. *Journal Of Autism And Developmental Disorders*, *36*(7),

Nation, K., Clarke, P., Marshall, C. and Durand, M. (2004). Hidden Language Impairments in Children. *Journal of Speech, Language, and Hearing Research,* 47(1), 199-211.

Nation, K. and Norbury, C. (2005). Why Reading Comprehension Fails - Insights From Developmental Disorders. *Topics in Language Disorders*, 25(1), 21-32.

Nation, K. and Snowling, M. (1998). Semantic Processing and the Development of Word-Recognition Skills: Evidence from Children with Reading Comprehension Difficulties. *Journal of Memory and Language,* 39(1), 85-101.

Norbury, C., & Bishop, D. (2002). Inferential processing and story recall in children with communication problems: a comparison of specific language impairment, pragmatic

language impairment and high-functioning autism. *International Journal Of Language & Communication Disorders*, *37*(3), 227-251.

Norbury, C., & Nation, K. (2011). Understanding Variability in Reading Comprehension in Adolescents With Autism Spectrum Disorders: Interactions With Language Status and Decoding Skill. *Scientific Studies Of Reading*, *15*(3), 191-210.

Oakhill, J., Cain, K., & Bryant, P. (2003). The dissociation of word reading and text comprehension: Evidence from component skills. *Language And Cognitive Processes*, *18*(4), 443-468.

Oakhill, J. and Yuill, N. (1986). Pronoun Resolution in Skilled and Less-Skilled Comprehenders: Effects of Memory Load and Inferential Complexity*. Language and Speech,* 29(1), 25-37.

O'Connor, N., & Hermelin, B. (1994). Two autistic savant readers. *Journal Of Autism And Developmental Disorders*, *24*(4), 501-515. doi: 10.1007/bf02172131

O'Connor, I. and Klein, P. (2004). Exploration of Strategies for Facilitating the Reading Comprehension of High-Functioning Students with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders,* 34(2), 115-127.

Oliver, M. (1996). *Understanding disability*. London: Macmillan.

Otto, W., & Chester, R. (1972). Sight Words for Beginning Readers. *The Journal Of Educational Research*, *65*(10), 435-443.

Ozsivadjian, A., Knott, F., & Magiati, I. (2012). Parent and child perspectives on the nature of anxiety in children and young people with autism spectrum disorders: a focus group study. *Autism*, *16*(2), 107-121.

Potter, C. and Whittaker, C. (2001) Enabling Communication in Children with Autism. Jessica Kingsley Publishers.

Randi, J., Newman, T., & Grigorenko, E. (2010). Teaching Children with Autism to Read for Meaning: Challenges and Possibilities. *Journal Of Autism And Developmental Disorders,* 40(7), 890-902

Robinson, D., Moore, N., & Harris, C. (2019). The impact of books on social inclusion and development and well-being among children and young people with severe and profound learning disabilities: Recognising the unrecognised cohort. *British Journal Of Learning Disabilities*, *47*(2), 91-104.

Rodgers, J., Hodgson, A., Shields, K., Wright, C., Honey, E., & Freeston, M. (2016). Towards a Treatment for Intolerance of Uncertainty in Young People with Autism Spectrum Disorder: Development of the Coping with Uncertainty in Everyday Situations (CUES©) Programme. *Journal Of Autism And Developmental Disorders*, *47*(12), 3959-3966.

Rose, T., & Furr, P. (1984). Negative Effects of Illustrations as Word Cues. *Journal Of Learning Disabilities*, *17*(6), 334-337.

Roux, C., Dion, E., & Barrette, A. (2015). Enhancing Reading Comprehension Among Students with High-Functioning Autism Spectrum Disorder: A Randomised Pilot Study. *Canadian Journal Of Education*, *38*(1), 2-19.

Ricketts, J., Jones, C., Happé, F., & Charman, T. (2012). Reading Comprehension in Autism Spectrum Disorders: The Role of Oral Language and Social Functioning. *Journal Of Autism And Developmental Disorders*, 43(4), 807-816

Ruppar, A. (2015). A Preliminary Study of the Literacy Experiences of Adolescents With Severe Disabilities. *Remedial And Special Education*, *36*(4), 235-245.

Salvia, J., Ysseldyke, J., & Bolt, S. (2016). *Assessment in special and inclusive education* (13th ed.). Australia: Wadsworth.

SEND Assessment Software Designed By SEN Teachers | B Squared. (2020). Retrieved 17 December 2019, from https://www.bsquared.co.uk/solutions/send

Sheehy, K. (2002). The Effective Use of Symbols in Teaching Word Recognition to Children with Severe Learning Difficulties: A comparison of word alone, integrated picture cueing and the handle technique. *International Journal Of Disability, Development And Education*, *49*(1), 47-59.

Sheehy, K. (2005). Morphing images: a potential tool for teaching word recognition to children with severe learning difficulties. *British Journal Of Educational Technology*, *36*(2), 293-301.

Sheehy, K., & Howe, M. (2001). Teaching Non-readers with Severe Learning Difficulties to Recognise Words: the effective use of symbols in a new technique. *Westminster Studies In Education*, *24*(1), 61-71.

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric Disorders in Children With Autism Spectrum Disorders: Prevalence,

Comorbidity, and Associated Factors in a Population-Derived Sample. *Journal Of The American Academy Of Child And Adolescent Psychiatry*, *47*(8), 921-929.

Singh, B., Moore, D., Furlonger, B., Anderson, A., Busacca, M. and English, D. (2017). Teaching Reading Comprehension Skills to a Child with Autism Using Behaviour Skills Training. *Journal of Autism and Developmental Disorders*, 47(10), 3049-3058.

Solman, R., & Wu, H. (1995). Pictures as Feedback in Single Word Learning. *Educational Psychology*, *15*(3), 227-244.

Smith, L., & Durkin, K. (1986). Picture-book reading with a child with severe learning disability: a case study. *Child Language Teaching And Therapy*, *2*(3), 301-318.

Stringfield, S.G., Luscre, D., Gast, D.L. (2011). Effects of a Story Map on Accelerated Reader Postreading Test Scores in Students With High-Functioning Autism. *Focus on Autism and Other Developmental Disabilities*, 26(4), 218–229.

Sukhodolsky, D., Scahill, L., Gadow, K., Arnold, L., Aman, M., & McDougle, C. et al. (2007). Parent-Rated Anxiety Symptoms in Children with Pervasive Developmental Disorders: Frequency and Association with Core Autism Symptoms and Cognitive Functioning. *Journal Of Abnormal Child Psychology*, *36*(1), 117-128. doi: 10.1007/s10802-007-9165-9

Teh, E., Chan, D., Tan, G., & Magiati, I. (2017). Continuity and Change in, and Child Predictors of, Caregiver Reported Anxiety Symptoms in Young People with Autism Spectrum Disorder: A Follow-Up Study. *Journal Of Autism And Developmental Disorders*, *47*(12), 3857-3871.

Tierney, R. J. (1994). Dissensions, tensions, and the models of literacy. In R. B. Ruddell, M. R. Ruddell, & H. Singer (Eds.), *Theoretical models and processes of reading* (4th ed., pp. 1162–1182). Newark, DE: International Reading Association. Touchette, E., Petit,

Tracey , Diane H.. Lenses on Reading, Third Edition (p. 261). Guilford Publications. Kindle Edition.

Tomasello, M. (2010). Origins of human communication. *Wechsler Abbreviated Scale of Intelligence* (2nd ed.). MIT Press and D.Wechsler.

Tracey D & Morrow. (2012). *Lenses on Reading* (2nd ed.). New York: The Guilford Press.

VanKeer, H., & Vanderlinde, R. (2010). The impact of cross-age peer tutoring on third and sixth graders' reading strategy awareness, reading strategy use, and reading comprehension. Middle Grades Research Journal, 51(1), 33–45.

Tracey , Diane H.. Lenses on Reading, Third Edition (p. 261). Guilford Publications. Kindle Edition.

Ward, H. (2005). The use of language experience in teaching reading to students with severe learning disabilities. *The Reading Matrix,* 5(1).

Williamson, P., Carnahan, C., Birri, N., & Swoboda, C. (2014). Improving Comprehension of Narrative Using Character Event Maps for High School Students With Autism Spectrum Disorder. *The Journal Of Special Education*, *49*(1), 28-38.

Whalon, K. (2004). *The Effects of reciprocal questioning on the reading comprehension of children with Autism* (PhD). The Florida State University.

Whalon, K., & Hanline, M. (2008). Effects of reciprocal questioning on the question generation and responding of children with autism spectrum disorder. *Education And Training In Developmental Disabilities*, *43*(3), 367-387.

Whalon, K., & Hart, J. (2010). Adapting an Evidence-Based Reading Comprehension Strategy for Learners With Autism Spectrum Disorder. *Intervention In School And Clinic*, *46*(4), 195-203.

Whalon, K., Hanline, M., & Woods, J. (2007). Using Interactive Storybook Reading to Increase Language and Literacy Skills of Children With Autism Spectrum Disorder. *Young Exceptional Children*, *11*(1), 16-26.

White, S., Hill, E., Happé, F., & Frith, U. (2009). Revisiting the Strange Stories: Revealing Mentalizing Impairments in Autism. *Child Development*, *80*(4), 1097-1117.

Wilder, A., & Williams, J. (2001). Students with severe learning disabilities can learn higher order comprehension skills. *Journal Of Educational Psychology,* 93(2), 268-278

White, S., Oswalk, D., Ollendick, T., & Scahill, L. (2009). Anxiety in Children and Adolescents with Autism Spectrum Disorders. *Clinical Psychology Review*, *29*, 216-229.

“Young Reading Series 1” at Usborne Children’s Books. (2020). Retrieved 17 January 2020, from https://usborne.com/browse-books/catalogue/subject/1/YR/YRS1/young-reading-series-1/

Appendix:

Appendix A: Guidance and Steps for Intervention

Steps for Intervention:

Step 1	Lead reads the first quarter of the chapter aloud, modelling her thinking and pointing to the symbol cards to demonstrate which story element she is referring to e.g. where, what and who.
Step 2	Lead then fills out the first quarter of the chapter map again modelling her thinking and using the symbol cards (e.g. I am writing that they are in the woods – points to 'where' card).
Step 3	The student then reads the next quarter of the chapter and is encouraged to think aloud and use the symbol cards.
Step 4	The student then dictates what they would like written in the next section of the chapter map.
Step 5	Repeat these steps for the remaining two quarters.
Step 6	At the end of the sessions, the student makes a prediction on what will happen next using the symbol cards e.g. They will stay in the forest (where card).

Symbol Card	**Modelled thinking-aloud example**
Where	'So now I know that they are in the forest.'
What	'What just happened? I'll look back at the page. Oh so Lucy met Tom.'
Who	'We've just been introduced to Sally.'

Prompt 1	Show the symbol card they need to use.
Prompt 2	Read aloud the symbol card they need to use.

Appendix B: Chapter Map

Chapter:

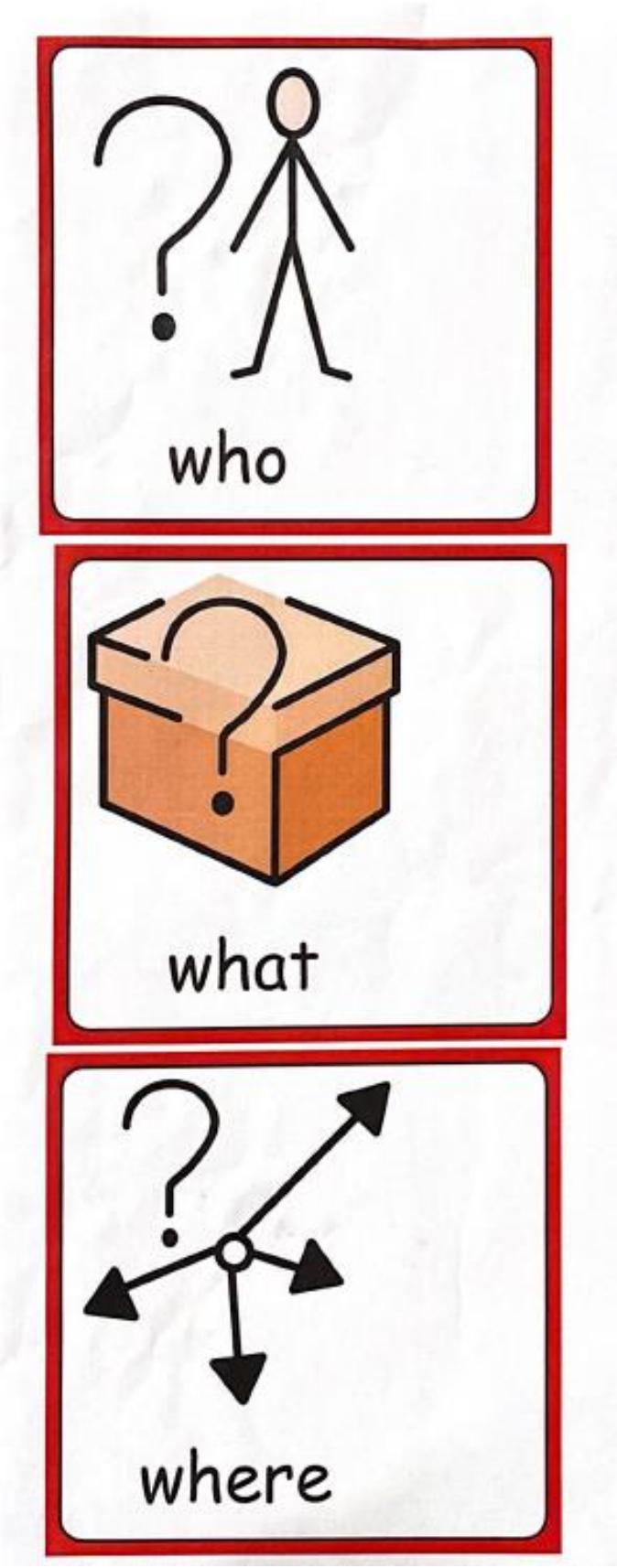
	What happened?	How did the characters feel?	Predict what will happen next?
Teacher modelled			
Student			
Teacher modelled			
Student			

Appendix C: Tick box on interests and familiarity

Please tick any boxes if you are interested in or familiar with the topic:

- Boats
- Pets
- Firebirds
- Travelling
- Football
- Tennis
- Barbies
- Trains
- Shipwrecks
- Scotland
- Pirates
- Phones
- Exploring

Appendix D: Story cue card and symbols



Appendix E: Analysis Grid Example

Firebird – Recall Analysis

Main Plot Points:

Directions: Place a 1 in the mark section if the student mentions part of the plot point. Place a 2 in the mark section if the student mentions the full plot point.

Plot Point	Mark
There was a powerful King with an orchard. In the orchard there was a tree with golden apples.	
Some apples went missing.	
The King's eldest son Dimitri kept watch one night but fell asleep.	
Prince Vassily kept watch but the guards fell asleep.	
Prince Ivan kept watch and saw a Firebird take an apple.	
Prince Ivan grabbed the bird, but its body was so hot that he let go. The bird flew away leaving behind a single bright feather.	
The King wanted the bird when he saw the feather. Prince Dimitri and Prince Vassily went searching but could not find it.	
Prince Ivan went looking. It was very cold but the feather glowed and kept him warm.	
A great silver wolf attacked Prince Ivan and his horse died.	
The wolf said the Firebird was in the top of the tallest tower in a golden cage, but that Ivan must not touch the cage.	
Prince Ivan touched the cage and the alarms went off. Ivan was arrested. King Dalmat said that he could have the Firebird if King Afron gave back his Horse of Power.	
Ivan went to King Afron's palace but he touched the bridle of the horse. King Afron said that he could have the horse if he brought back his daughter from the demon Koshchey.	
In the demon's garden there were 12 beautiful girls dancing. A princess said to run away or else they would be turned to stone. There were many statues in the garden of knights and princes who had been turned to stone.	

Horrible creatures entered the garden. Ivan and the wolf fought them.	
Koshchey said that he could not be killed as he had hidden his soul outside of his body. The wolf said to look for it in the tree trunk.	
Prince Ivan found the golden egg and smashed it and the demon disappeared.	
The statues came back to life and the castle crumbled to the ground. Underneath it was a glittering city.	
Prince Ivan and the princess married.	
Prince Ivan returned the Horse of Power. Then he returned home with his wife. His father said that he was wrong and that he should free the firebird.	
The firebird visited the apple frequently and scattered seeds around the kingdom. Lots of apple trees grew with apples that were not gold but were very sweet.	

Main Characters:

Directions: Place a 1 in the mark section if the student mentions the character's name.

Character	**Mark**
Prince Ivan	
The Firebird	
The King	
Prince Dimitri	
Prince Vassily	
The wolf	
King Dalmat	
King Alfron	
A princess	
Demon Koshchey	

Main Settings:

Directions: Place a 1 in the mark section if the student mentions the setting and place a 2 in the mark section if the students mentions the setting with details or description.

Setting	**Mark**
King's orchard	
Winter forest	
King Dalmat's Palace	
The tallest tower	
King Alfron's palace	
The stables	
Mountain crag	
Koshchey's garden	
Glittering city	