

Autism Spectrum Disorder and Reading Comprehension: Challenges and Implications in the Primary School

Although it is widely recognised that pupils with autistic spectrum disorders (ASD) have well-developed word recognition skills alongside impaired reading comprehension, it is unclear where the causes of this presentation lie. This paper consists of a literature review, which aims to clarify why pupils with ASD tend to be competent decoders of text, yet struggle to comprehend text effectively. The literature review is illustrated with a case study and the educational implications of difficulties with reading comprehension in the mainstream primary setting are outlined. The literature review and case study inform suggested interventions and strategies, which can be used in the mainstream primary setting. The fact that ASD is a spectrum disorder indicates that there may be variability in the level of impairment of reading comprehension and also variability in how these pupils will respond to interventions. It is not a case of ‘one size fits all’.

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INTRODUCTION

This paper explores the complexities of how pupils with autistic spectrum disorder (ASD) are challenged by reading comprehension in the primary school context. Before exploring the literature it may be helpful to make a connection to a real scenario, in which the reading comprehension of one boy with ASD was observed over a three month period. This pupil, who we will call Alan, was 8 years of age and showed a positive disposition towards reading. However, over the course of the observation period, it became apparent that he seemed to interpret texts on a superficial level, was unable to filter out unimportant information, found it challenging to make connections to his own experience and his poor social and communication skills seemed to hinder his understanding of text. He focused on parts of text that interested him and spoke excitedly about these parts. When asked to recall what happened, he often forgot or left out important details. Without

support, this pupil was struggling to comprehend the text or engage meaningfully with the text, but it was unclear to what extent his ASD diagnosis caused these difficulties. This scenario is very familiar to many primary teachers and deeper understanding is needed. A review of literature was considered helpful at this stage to better understand how ASD affects people's ability to comprehend text.

Defining ASD and Reading Comprehension

It is important to firstly set this paper in context by defining ASD and reading comprehension. The medical model of ASD from the Diagnostic and Statistical Manual, 5th Ed. (DSM-V) states that

People with ASD tend to have communication deficits, such as responding inappropriately in conversations, misreading nonverbal interactions, or having difficulty building friendships appropriate to their age. In addition, people with ASD may be overly dependent on routines, highly sensitive to changes in their environment, or intensely focused on inappropriate items. Again, the symptoms of people with ASD will fall on a continuum, with some individuals showing mild symptoms and others having much more severe symptoms. This spectrum will allow clinicians to account for the variations in symptoms and behaviours from person to person (American Psychiatric Association, 2013).

This definition of ASD is very informative in terms of understanding comprehension difficulties, as it mentions communication deficits. Of course, speaking is not the only means of communication. Reading, writing and non-verbal communication are all important too. This impairment in communication skills could be one of the causes of reading comprehension difficulties.

Another definition is based on the Social Model of ASD from the International Classifications of Function (ICF) which states that

Autism Spectrum Disorder (ASD) refers to a group of conditions that are characterized by impairments of reciprocal social interaction, verbal and non-verbal communication, as well as a preference for repetitive, stereotyped activities, behaviours and interests. The age of onset is always prior to 36 months and the symptoms persist throughout the lifespan. These features are associated with alterations in cognitive and emotional functioning, high rates of psychiatric co-morbidity, relationship problems, poor adaptive skills and lower reported quality of life (World Health Organisation, 2014).

This definition also refers to communication and social interaction and references alterations in cognitive functioning. Students with ASD are communicating differently, thinking differently and interacting with the world around them in a different way to their typically developing peers. This gives us further clues as to why people with ASD find it challenging to engage with and understand text.

Lastly a definition of reading comprehension itself is needed. It is a complex process affected by many factors and variables

Skilled text comprehension is a complex process that depends on knowing the meaning of words, in addition to such skills as analysing the syntactic and semantic structures of word combinations, drawing upon one's background knowledge to interact with the topic of discourse, applying logical inferential abilities and relying on metacognitive structures, such as self-monitoring (Randi, Newman and Grigorenko, 2010, p. 891).

There seems to be an agreement among researchers (Huemer and Mann, 2010; Henderson, Clarke and Snowling, 2011; Norbury and Nation, 2011; Randi et al., 2010) that many pupils with ASD present with impaired reading comprehension. From reflecting on the above definitions of ASD and reading comprehension, it is clear to see that in some cases the skill set of pupils with ASD does not match the skills needed for successful reading comprehension. If pupils were to acquire the skills necessary to successfully interact with and make meaning from text, the world of literature, information and text based experience would be opened up to them. The complexity of reading comprehension for children with ASD will be explored in this study, with the hope that with better understanding, educators can plan for effective intervention.

CRITICAL ANALYSIS OF THE LITERATURE

With clear definitions of ASD and reading comprehension, analysis of the literature was needed to better understand the relationship between them. Research from the United States of America and the United Kingdom was explored as there seems to be limited research of this kind in the Irish context. Due to the limitations of this study I have chosen to focus only on ASD and reading comprehension, as the pupil in my case study has an ASD diagnosis and my interest stems from my observations of how he comprehends text. The analysis of literature is presented under four headings: underlying causes of reading comprehension impairment in pupils with ASD, language and communication difficulties, types of reading comprehension profiles in pupils with ASD, and

evidence-based strategies and interventions to support the development of reading comprehension in pupils with ASD. Connections will be made with the pupil from the case study throughout.

Underlying Causes of Reading Comprehension Impairment in pupils with ASD

All the research included in this review found a discrepancy between decoding skills and reading comprehension skills in pupils with ASD. ASDs are a cluster of developmental disorders characterised by deficits in communication and social interactions as well as cognitive processing deficits. (Randi et al., 2010). These deficits affect people in different ways, therefore showing varying presentations in reading comprehension impairment.

Frith (2003) claims that “Comprehension problems in ASD may be due to difficulties integrating information in context” (cited in Huemer and Mann, 2010). This is echoed by Randi et al. (2010) who highlight the need for pupils to use context to infer meaning of unfamiliar words. Cain et al. (2003) also refer to the need to understand context and inference because “context supports decoding attempts and good inferencing skills enable readers to infer meanings of unfamiliar words from surrounding text” (cited in Norbury and Nation, 2011, p. 205). Therefore, making inferences and understanding context by connecting new text to prior knowledge are two important cognitive skills necessary in successfully comprehending text. However, Broun (2004) “noted that the life experiences of children with ASD are often limited”, (cited in Williamson, Carnahan and Jacobs, 2012, p. 451) and this may affect the reading comprehension of pupils with ASD who may have fewer experiences with which to connect.

Weak central coherence theory (Frith, 2003, cited in Norbury and Nation, 2011) refers to a core cognitive weakness in pupils with ASD and causes them to focus on the details in a text rather than the global meaning. Pupils with ASD may struggle to filter out unnecessary parts of a text and often remember only the parts which interest them. This is referred to as the “inhibition deficit hypothesis” by Henderson et al. (2011, p.965). Another theory from these authors is the top down executive deficit hypothesis which they use to describe the deficits in executive functioning which pupils with ASD often display. Their findings conclude that pupils with ASD present with “impaired top-down semantic processing that occurs alongside intact bottom-up semantic processing” (Henderson et al., 2011, p. 971). If there is a deficit in executive functioning, the organisational part of the brain, it is not surprising that pupils with ASD struggle to complete all the complex cognitive tasks required in synthesising information in text and creating meaning. This theory is shared by Frith (2003) who also refers to problems with

integrating information in context and using context and inference to enhance meaning.

Other cognitive skills such as working memory and monitoring comprehension are also areas which challenge pupils with ASD. Perfetti et al. (2005) highlighted “limited processing resources or working memory, not knowing when to draw inferences, and failure to monitor text coherence” (cited in Randi et al., 2010, p. 892) as difficulties which hinder comprehension. O’Connor and Klein (2004) agree with this and suggest that “as readers on the spectrum work through longer passages, the ability to integrate the clauses and sentences to form a representation of the gist of the text may be impaired (cited in Williamson et al., 2012, p.451).

Language and Communication Difficulties

The language and communication difficulties associated with ASD impact pupils’ range of vocabulary and their understanding of grammar and how it affects written language. Even though there seems to be agreement that pupils with ASD have strengths in decoding and weaknesses in reading comprehension, Tager-Flusberg, Calkins, Nolin, Baumberger, Anderson and Chadwick-Dennis (1990) argue that “higher level elements of decoding, however, have been shown to be impaired or delayed in autism, especially when it comes to more complex grammatical structures” (cited in Huemer and Mann, 2010, p. 846). These skills include understanding the passive voice in text or comprehending text when clauses are used. Mirenda and Eriksen (2000) cited in Huemer and Mann (2010, p. 485) argue that deficits in verbal skills, oral language ability, impairments in communication and general language impairment can all be a factor in impaired reading comprehension in pupils with ASD. Wahlberg and Magliano refer to the difficulties pupils with ASD have in interpreting the ambiguities in text (cited in Huemer and Mann, 2010), which is all related to language and communication.

Another issue in relation to vocabulary is that children with ASD may have greater difficulty understanding vocabulary than using vocabulary. This may be confusing for teachers, who observe a child using vocabulary and therefore expect that the child will understand the same vocabulary when s/he meets it in text. This is not a presumption that can be made about children with ASD. One study showed that “Preschoolers with ASD show more severe impairments in word comprehension than word production” (Charman, Drew, Baird and Baird, 2003; Luyster, Kadlec, Carter and Tager-Flusberg, 2008, cited in Henderson et al., 2011, p. 964), which indicates that when the text is produced by them, they can comprehend it, but they find it hard to understand the text presented by others. This could be referring to mind blindness or Theory of Mind (Baron-Cohen, Alan and Frith, 1985), which

affects how pupils with ASD find it difficult to understand the perspectives of others and to empathise. Emotional intelligence, empathy and understanding others' perspectives are challenging skills for pupils with ASD and if there is a deficit in this area, then connecting to the themes and characters in text can be very difficult.

Despite there being some ambiguity surrounding Theory of Mind, executive functioning and weak central coherence and how these affect reading comprehension in pupils with ASD, these theories do give us an understanding of the link between cognition and reading comprehension for these pupils. It is the cognitive differences presented by pupils with ASD which seem to underlie the associated reading comprehension impairment, in all its varied forms.

Types of Reading Comprehension Profiles in Pupils with ASD

Understanding ASD as a spectrum disorder helps us see why there is such variability in how these reading comprehension difficulties are presented. Even with pupils who are termed hyperlexic, "the more abstract skills of comprehending text do not develop along with their word recognition skills" (Randi et al., 2010, p. 891). Williamson et al. (2012) presented evidence from their research with pupils with ASD, which revealed three reading comprehension profiles:

- Text bound comprehenders (TBC) – Focus on bringing meaning to the text without interpretation: Understand the text at its most basic level
- Strategic comprehenders (ST) – Use a variety of strategies to comprehend text, e.g. making connections to prior knowledge, yet show difficulties in executive functioning and theory of mind, which lead to comprehension difficulties
- Imaginative comprehenders (IC) – Pictures with text and visualisation can be supportive for these pupils but they can rely on these and resort to scripting when pictorial support is absent, often generating their own version of a story.

These could all be influenced by the following four factors:

- Facilitative text factors – Using familiar text or text with familiar content can be supportive but other types of text can be more challenging
- Action strategies - Inferring meaning and constructing meaning from text, which can be effective but often leads to misunderstanding because of weak central coherence and poor executive functioning

- Differences in prior knowledge and experiential differences – This can affect understanding of vocabulary as well as conceptual understanding of the text
- Differences in language ability – vocabulary range, complexity of their spoken language and understanding of semantics can all have an impact on levels of attainment in reading comprehension.

The theory explored by Williamson et al. (2012) also “suggested that factors manifested as particular strengths and challenges during CI [Construction Integration] processing” (p. 464), further highlights the variability of how pupils with ASD interact with text. This theory also emphasises the importance of both text-based processing and situation model processing, in order for the construction integration model of text comprehension to work (Snyder and Cacamise, 2010, cited in Williamson et al.). Pupils with ASD are challenged to understand the basic text presented to them, as well as all the subtle nuances being communicated through the text. Because ASD is a spectrum disorder the three comprehension profiles can also be seen as a continuum and the factors mentioned above will affect students differently. When considering the complexity of ASD and reading comprehension together, the challenge for educators becomes apparent.

Evidence-based Strategies and Interventions to Support the Development of Reading Comprehension in Pupils with ASD

Many mainstream class teachers may have strategies and interventions which are effective in the development of reading comprehension in pupils with ASD, but many of the strategies which are already used effectively with typically developing pupils can be used successfully with pupils with ASD. Rosenshine, Meister and Chapman (1990) and Earles-Vollrath, Cook, Robbins and Ben-Arieh (2008) found that “many of the instructional supports and techniques used to effectively teach reading comprehension strategies are consistent with instructional recommendations for teaching children with ASD” (cited in Whalon and Hart, 2011, p.196).

Strategies listed below may help develop reading comprehension in pupils with ASD as well as their typically developing peers.

- Graphic organisers – to support visualisation of the text
- Cooperative learning – peer learning and socially constructing meaning together
- Reciprocal questioning – ‘I wonder’ questions or questions that make us think

- Anaphoric cuing strategy – Understanding pronouns and how they connect/refer back to a previous section of the text
- Story maps – A way of tracking what happens in a text using images, mind-maps, flowcharts and other tools to structure the meaning of a text.

However they may need to be utilised in a more targeted way to support the specific needs of a particular pupil.

A preventative approach could also be effective for all pupils, as educators understand the benefits of early intervention. RAND Corporation (2002) found that “a limited amount of time is actually devoted to reading comprehension instruction in the early and later elementary grades” (cited in Whalon and Hart, 2011, p.195). This was interesting because it seems all children need to learn the skills of reading comprehension early on as without this, more complex comprehension difficulties will become apparent later on. If we already know from research, that pupils with ASD are likely to present with reading comprehension difficulties, then surely early intervention is essential and explicit instruction is needed both in the early years and beyond.

The Building Bridges of Understanding resource book (Courtney and Gleeson, 2010) is an evidence-based strategy which is widely used in Ireland today and having experience using this approach to teach reading comprehension, I found that the transactional strategy instruction (TSI) used to introduce the comprehension skills is very similar to an approach found in the literature; question-and-answer relationships strategy (QAR) (Whalon and Hart, 2011, p.196). These strategies were similar in that they both use:

- Teacher modelling
- Think-aloud
- Guided discovery
- Visuals cues and supports
- Collaborative learning
- Scaffolded approach.

The scaffolded approach is referred to as a Gradual Release of Responsibility by Courtney and Gleeson (2010). They also seem to tackle difficult cognitive skills such as integrating prior knowledge and experiences, visualising what they read and making inferences using context. The programmes differed in the visual representations of each comprehension skill; Courtney and Gleeson use

Comprehension Process Motions (CPMs) and the QAR strategy uses verbal cues, visuals or cue cards to interact with text. One of the biggest advantages I can see from these interactive strategies is that both reading comprehension and communication skills are being enhanced simultaneously. This type of approach has multiple benefits for pupils with ASD (Whalon and Hart, 2011, p. 196). Another advantage of these strategies is their adaptability to the mainstream setting. Every child can benefit from this approach and it can promote meaningful inclusion from the early years. In contrast to this, Williamson et al. (2012) suggest that "For comprehension strategy to be truly effective, interventions may need to be personalized, recognising the unique cognitive profile of individuals on the spectrum given that reading comprehension is a cognitively intensive task (2012, p. 465). A two-pronged approach is needed for pupils with ASD, which includes in-class intervention for all pupils, supported by specific, targeted strategies to support the learning needs of the pupil with ASD, if they are showing signs of reading comprehension difficulties. As we have seen earlier Williamson et al. (2012) have a particularly deep understanding of the variability between the comprehension abilities of pupils with ASD and the variety of profiles which may be presented. This level of understanding is crucial in order to successfully address the reading comprehension needs of pupils with ASD.

Reflecting on Alan – The Case Study Pupil

Looking back to my work with Alan, I wondered which type of comprehension profile he presented with. Text-based processing, including understanding syntax and semantics, were challenging for him. He struggled with pronouns and understanding that these words represented characters mentioned earlier in the text. He struggled to infer the meaning of unknown words from context, but he seemed to be able to make connections, which interested him. He was quite imaginative when reading and tended to elaborate and embellish stories. This often stemmed from something in the text which was of particular interest to him and this regularly led to him losing meaning as he read. His weak central coherence caused him to focus on particular details while lacking awareness of the global meaning of the text, and he struggled with story recall, which may be down to a deficit in working memory. His language problems also seemed to impact how he interacted with text as he had poor articulation and often mispronounced words, leading to misunderstandings. Overall, Alan faced a lot of challenges in terms of reading comprehension. His profile could be described as that of an imaginative comprehender. However, understanding the continuum of the three profiles, it seems unlikely that Alan or any pupil with ASD and reading comprehension difficulties will fit neatly into any one profile. Therefore, having an understanding of all the underlying causes of reading comprehension

difficulties in pupils with ASD is important for educators to better support their pupils.

CONCLUSION

Evidence from the case study involving the pupil with ASD highlights the importance of maintaining a collaborative relationship between class teacher and SEN teacher so that this pupil and other pupils with ASD can be supported effectively. On a whole school level, it is important to ensure that reading comprehension development is prioritised for all pupils, including those with ASD, and reading comprehension strategy instruction needs to be prioritised in the early years.

In conclusion, it seems that the challenge facing educators in the mainstream setting is finding a balance between finding reading comprehension interventions which include pupils with ASD, as well as effectively engaging the typically developing pupils within the same class, whilst remembering that early intervention is crucial. Throughout this literature review, despite the fact that the focus was on reading comprehension and pupils with ASD, the author wondered how the challenges discussed may be affecting other curricular areas. The implications for these pupils are far-reaching, if we are to assume that reading comprehension is a skill needed in many subjects, such as history and word problems and instructions in maths. Further research could be carried out to determine how reading comprehension difficulties hinder the comprehension of word problems and difficult concepts in maths. It is clear that pupils with ASD have cognitive differences which affect their ability to comprehend text, but it is also apparent that early intervention and well-modelled, guided strategies, which focus on the interactive nature of reading comprehension, may be the way forward for these pupils in the mainstream setting.

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